

MID-TERM EVALUATION  
of  
APPROPRIATE TECHNOLOGY INTERNATIONAL:  
ASIA REGION REPORT

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by

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The views and interpretations expressed in this report are those of the authors and should not be attributed to the Agency for International Development.

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CURRENCY EQUIVALENTS, WEIGHTS AND MEASURES

Nepal

November, 1985                      US \$1 = NRs 17.6

Philippines

November, 1985                      U.S. \$1 = P 18.3

Thailand

November, 1985                      U.S. \$1 = B 26

1 hectare (ha.) = 2.47 acres = 10,000 square meters

1 kilometer = 0.61 miles

1 kilogram (kg.) = 2.2 pounds

1 metric ton (Mt) = 1,000 kg.

## LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Association for Craft Producers (Nepal)
AID	(United States) Agency for International Development
ATI	Appropriate Technology International
CBATDS	Community-Based Appropriate Technology and Development
Services (of PDA)	
CIDA	Canadian International Development Agency
FFI	Filipinas Foundation, Inc.
IO	Implementing organization
MBA	Master of Business Administration (degree)
MRC	Masawan Resources Corporation (FFI)
NGO	Non-Governmental Organization
NIFTAL	Nitrogen-fixing Tropical Agricultural Legumes (project)
NSTA	National Science and Technology Authority (Philippines)
PA	Productive activity
PDA	Population and Community Development Association (Thailand)
PEC	Protein Enriched Cassava
PMES	Project Monitoring and Evaluation System (of ATI)
PVO	Private Voluntary Organization
RECAST	Research Center for Applied Science and Technology (Nepal)
RONAST	Royal Nepal Academy of Science and Technology
RSSI	Rural Small-Scale Industry
RSSIDC	Rural Small-Scale Industry Development Company (of PDA)
S&T	Science and technology
SEED	Small Economic Enterprise Development (SVITA project)
SSI	Small-scale industry
STCA	Science and Technology Corporation of Asia (FFI)
STRC	Science and Technology Research Center (FFI)
SVITA	Foundation in Thailand with which ATI is working
TBG	Thai Bamboo Grass Company
TPI	Thai Plait Industries, Ltd.
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
VCD	Venture Capital Division (of FFI)

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## EXECUTIVE SUMMARY

The present report is one of three regional reports, which contribute to a main report, on a November, 1985 mid-term evaluation of Appropriate Technology International (ATI)'s performance under a Cooperative Agreement with the US Agency for International Development (AID).

### A. Background

ATI's current three-year Cooperative Agreement with AID was signed September 30, 1983. Its purpose is to strengthen ATI's capacity to facilitate the choice, development, transfer, adaptation, commercialization, assessment, and replication of appropriate technologies, particularly those which will benefit the poor. It sought to redirect ATI's earlier program, partly in response to the recommendations of an evaluation carried out in late 1982. The Cooperative Agreement called for ATI to:

- o Concentrate on a limited number of priority technical fields;
- o Support innovative, inherently risky activities with high potential for sustainability;
- o Achieve a balance between technical and institutional aspects of appropriate technology promotion;
- o Focus on small-scale enterprises and organizations providing services or support to these;
- o Emphasize field activities in developing countries;
- o Emphasize activities based on "hard" technologies; and
- o Play a catalytic role in activities it supports, getting as much leverage as possible from limited amounts of resources.

### B. Purpose of Evaluation

The purpose of this evaluation was to:

- o Evaluate ATI's performance under the first 25 months of the Cooperative Agreement, i.e., through October, 1985;
- o Determine lessons of broader significance to be learned from ATI's program about the technology transfer process and the promotion of small and medium-scale industry; and
- o Analyze ATI's planning for and capability to carry out an increased program focus on replicating innovative elements of its successful projects.

The overall seven-person Evaluation Team met together for pre- and post-field work discussions but split into three groups to visit projects in each of Africa, Asia, and Latin America. The present evaluation report is that of the two members of the Asia Team and concentrates on the three countries that they visited--the Philippines, Thailand, and Nepal.

### C. Findings, Conclusions and Recommendations

General findings, conclusions, and recommendations for the Asia region program have been incorporated into the main report of the evaluation and its appendices (see especially Appendices F and G)<sup>1</sup>. The initial draft of these (which appeared originally as Chapters V and VI of the Asia region report) was based on the Asia team's field visits and later discussions among the full Evaluation Team. This initial draft responded to the specific concerns raised in the team's Statement of Work (See Annex 1). Following in-depth review and comment by both ATI and the S&T Bureau, the general findings and conclusions have been combined with those of the other regions for inclusion in the main report. Recommendations for the regional program and for ATI overall management have been fully considered in the overall evaluation recommendations of the main report. Consequently, this regional evaluation report is limited to detailed findings, analyses and conclusions by country, implementing organization, and project or subprojects. The main report of the ATI mid-term evaluation contains the regional and overall field program findings, conclusions, and recommendations.

This regional report describes:

- o The role, capability, and commitment of each implementing organizations (IOs) and/or other intermediary organization for the ATI projects visited in the region;
- o The productive activities promoted under each project visited, including sources of project ideas, likely commercial viability of the productive enterprise, the risks involved in the productive activity (and ATI's assessment and handling of these risks), and project outputs/impacts;
- o Purposes of each project and progress under the project plans;
- o Key linkages and information flows in the projects; and

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<sup>1</sup>Peter Delp, et al, Promoting Appropriate Technological Change in Small-Scale Enterprises--Evaluation of A.T. International's Role, AID Evaluation Special Study No. 45 (Washington, D.C.: Center for Development Information and Evaluation, U.S. Agency for International Development, 1986).

- o The likely market for project products, as well as the potential for marketing (i.e., replicating) the core technology used to produce them.

The Evaluation Team's assessments were limited by the very early (or not yet operational) stage of implementation of the productive activities in each project.

# I. INTRODUCTION

## A. Overview of ATI in Asia

### 1. Projects

Under Appropriate Technology International (ATI)'s original grant, prior to its Cooperative Agreement with the US Agency for International Development (AID), ATI was involved in ten countries in Asia, including Bangladesh, India, Hong Kong, Indonesia, Malaysia, Nepal, the Philippines, Singapore, Sri Lanka, and Thailand. Under the Cooperative Agreement, ATI has been working in only four of these (the Philippines, Thailand, Nepal, and Indonesia) and will soon begin a project in Sri Lanka.

The Asia program has a total of seven projects of the total of 27 under the Cooperative Agreement and about 38 percent of project funding, about US \$1.5 million. The average size of the project portfolio is about US \$217 thousand. This is considerably larger than the size of the average portfolio in the other regions of about US \$130 thousand. In addition to projects, ATI has made a number of small grants in Asia.

During the last half of 1985, implementing organizations (IOs) in two of ATI's Asian projects have begun providing technical and related support to small enterprises in two productive activities. (Wool-spinning has begun in Nepal and bamboo grass mat production has begun under a venture capital project in Thailand). Four productive activities (coconut processing and mushroom production in the Philippines, agro-processing in Nepal, and rhizobium production in Thailand) are scheduled to begin very soon in three other projects. For each of these productive activities, the technology has been tested in pilot plants or in the laboratory. A seventh productive activity (protein-enriched cassava production in Thailand) is still in the technology development phase. Table 1 shows these six projects and their corresponding productive activities.

### 2. Staff

Presently, there are three ATI staff members who cover Asia. They are assisted by technical or business specialists as needed when developing specific projects. The manager of the Asia program has been with ATI since 1981, although he had consulted for ATI prior to that time. The manager also serves as a project officer for the Philippines and Thailand. The previous manager of the Asia program--who was responsible for having developed all of ATI's Cooperative Agreements projects in Thailand, the Philippines, and Indonesia--left in 1984, following 6 years with ATI. The two remaining project officers for Asia have been with ATI since 1984 and 1985, respectively. One of these has been working for ATI only part time. All three have had previous long-term experience in Asia--two in India and one in Bangladesh.

ASIA: ATI EVALUATION

Table 1: Projects Visited and Productive Activities

<u>Implementing Organization</u>	<u>Project</u>	<u>Productive Activity</u>
<u>Philippines</u>		
FFI	Venture Capital	Coconut processing Mushroom production Other productive activities under consideration
<u>Thailand</u>		
SVITA	Rhizobium production	Rhizobium production Various soybean processing activities under consideration
PDA	Venture capital Protein-enriched cassava	Bamboo grass mat production Protein-enriched cassava production
<u>Nepal</u>		
ACP	Wool-spinning	Yarn production
New ERA	Turbine-driven agro-processing	Turbine-driven heat generation for processing citrus, dairy, and other agricultural products

## B. Purpose of Evaluation

The purpose of this evaluation was to:

- o Evaluate Appropriate Technology International (ATI)'s performance during the first 25 months of a Cooperative Agreement with the US Agency for International Development (AID), i.e., through October, 1985;
- o Determine lessons of broader significance to be learned from ATI's program about the technology transfer process and the promotion of small and medium-scale industry; and
- o Analyze ATI's planning for and capability to carry out an increased program focus on replicating innovative elements of its successful projects.

## C. Procedures

The overall seven-person ATI mid-term Evaluation Team met together in Washington, DC for pre- and post-field work discussions. It split into three groups to visit projects in each of Africa, Asia, and Latin America. The Asia Team visited six of the seven ATI projects in Asia under the Cooperative Agreement. The present evaluation report is that of the two members of the Asia Team and concentrates on the three countries (the Philippines, Thailand, and Nepal) that they visited over a three-week period in November, 1985.

The Asia Team was composed of an agricultural economist from AID/Washington and an agro-processing and extension specialist from Devres, a Washington-based consulting firm. The agricultural economist had previously been stationed for several years in the Philippines. The agro-processing specialist had prior experience in promoting the use of rhizobium and in mushroom production, as an agricultural extensionist in Thailand, and had recently completed an evaluation of a rural development project in Nepal which included an appropriate technology component. His command of Thai was helpful in evaluating the three projects in Thailand.

The Asia team derived its findings, conclusions, and recommendations from:

- o Thorough study of project-related documents and studies containing information on ATI's activities and/or the technologies which ATI was promoting;
- o Extensive interviews with implementing organization staff, ATI staff, and a wide variety of knowledgeable persons in each of the countries visited. The latter included staff of USAID and representatives of expatriate and local non-government organizations (NGOs); and

- o More limited field observations of specific activities already underway, including conversations with project beneficiaries and local project field staff.

During the pre-field work meetings in Washington, the Evaluation Team developed a framework for the evaluation and agreed upon a set of issues which would guide the field inquiries. Wherever possible during the field work, the team gathered hard data on the technologies, the enterprises employing these, and the implementing organizations. This proved useful in assessing project planning and management. The overall team met again in Washington in December and each regional team completed its report. Findings and conclusions for each of the implementing organizations and productive activities appear as separate sections in each of Chapters II, III, and IV on the Philippines, Thailand, and Nepal, respectively. Overall conclusions and recommendations for the Asia region appear in the main report.<sup>1</sup>

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<sup>1</sup>Peter Delp, et al, "Promoting Appropriate Technological Change in Small-Scale Enterprises--Evaluation of A.T. International's Role", AID Evaluation Special Study No. 45 (Washington, DC: Center for Development Information and Evaluation, U.S. Agency for International Development, 1986).

## II. PHILIPPINES

### A. Overview

#### 1. The setting for ATI's projects

The Philippines has a fairly well developed network of numerous non-governmental organizations (NGOs) and related development agencies. For example, there is an Association of Foundations with 80 member organizations and an organization--Philippine Business for Social Progress--which maintains contact with over 400 locally-based NGOs, including foundations, cooperatives, and professional, civic and religious groups. There are many multi-national and Filipino firms managed by internationally trained Filipinos, employing large-scale, "high tech" production methods. Numerous market niches are currently filled with imported goods and are not exploited by local producers. There are a number of constraints limiting local entrepreneurial expansion into these, including:

- o Lack of experience in productive as opposed to trading entrepreneurship at the small-scale level;
- o Lack of access to capital;
- o Inadequate business, financial management, and technical skills; and
- o Macro-economic factors, e.g. foreign exchange shortage; centralized, Manila-based, development; and a welfare orientation towards assisting the poor.

The small-scale industry sector (SSI) in the Philippines constitutes about 24 percent of the organized manufacturing sector, with cottage industries comprising 75 percent. Medium-scale and large-scale industries make up the remaining one percent. Cottage industries, although more numerous, have limited growth and employment-generation potential. SSIs, on the other hand, have the highest compounded annual growth rate (8.1 percent), employ 40.2 percent of the total manufacturing labor force, and are labor-intensive (with a capital-labor ratio of P 9,000 per worker, less than a quarter that of medium-scale industry).<sup>1</sup>

#### 2. ATI's history in the Philippines

ATI began working in the Philippines in 1980 and under the grant had carried out projects with four organizations. Its activities were limited largely to institutional strengthening with no direct

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<sup>1</sup>ATI, "Filipinas Foundation Rural Small [Scale] Industries Development Program Project Plan [No. 84-0389]", Washington, DC, 1984, pp.6-7.

focus on productive activities. In 1982, ATI also sponsored a workshop on appropriate technology.

ATI has concentrated its initial activities under the Cooperative Agreement on small-scale rural-based industries. Its one project (See Table 2) has been designed to test a particular strategy--the use of "a venture capital mechanism which will appraise and make investments in small enterprises employing appropriate technologies".<sup>2</sup> This strategy evolved in part from the presence of a potential implementing organization, the Filipinas Foundation (FFI), which had the interest and capacity to establish, operate, and support a venture capital unit. ATI support, in turn, was essential in FFI's receiving government sanction to involve itself, as a foundation, in profit-making ventures.

### 3. The Evaluation Team's field work

The Evaluation Team held discussions with staff of the implementing organization for ATI's project in the Philippines and with other knowledgeable persons. The Team visited field sites relevant to two of the productive activities (PAs) in which the IO will be investing as part of the venture capital project. The following section discusses the Team's findings for the IO and the two activities (coconut processing and mushroom production) in greater detail.

### 3. Filipinas Foundation, Inc. (Project No. 84-0389)

#### 1. Description and findings for FFI

##### a. Brief history

FFI was founded in 1961, with a principal focus on supporting research and education. In the 1970's it first supported several projects related to technology and production, including cattle production, cooperative farming, shrimp culture, and mariculture. It established relationships with other foundations and in 1981 was chosen as the lead agency for appropriate technology in the 80-member Association of Foundations. In this capacity, FFI has

- o Co-sponsored two projects with the National Science and Technology Authority (NSTA), including one to provide technical assistance to entrepreneurs applying NSTA-developed technologies;
- o Initiated a number of technology-oriented publications; and

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<sup>2</sup>ATI, "Monitoring and Evaluation Issues: 84-0389 RSID/FFI", 1985, p.1.

ASIA: ATI EVALUATION

Table 2: Philippines Rural Small-Scale Industries

Region:	Asia	Project No.:	84-0389
Country:	Philippines		
Location of Project:	Countrywide		
Name of Project:	Rural Small-Scale Industries Development		
Implementing Organization (IO):	Filipinas Foundation		
Productive Activity:	Coconut processing--mushroom production--not yet in production; pilot activities underway		
Obligation Date of Project	December 27, 1985		
Start of Project Activities	Approximately March 1, 1986		
Number of Months Elapsed at Time of Evaluation:	8 months		
Scheduled End of Project Date:	February 28, 1990		
Total Funding:	\$367,440		
Purpose of Project:	To create an effective mechanism for replicating rural small-scale industries through establishing a finance and technical assistance company which provides venture capital and credit.		
Description of Technologies:	Subject to feasibility studies demonstrating the commercial viability of particular production technologies, the project will invest in a variety of technologies, such as village coconut processing, mushroom growing, agar-agar processing, rice milling and rice hull briquetting.		
ATI Funds Disbursed to Grantee Through October 31, 1985:	\$42.205 (for mushroom venture) No report yet.		

- o Assisted other foundations and groups in setting up village-based technology projects.<sup>3</sup>

In 1983, FFI committed a much larger portion of its resources to three new programs:

- o The Science and Technology Research Center (STRC), focused on small-scale industrial applications;
- o The Science and Technology Corporation of Asia (STCA), an entrepreneurial R&D venture; and
- o The Masawan Resources Corporation (MRC), a for-profit, larger scale agribusiness and related investments affiliate of FFI.

In 1985, FFI established a Venture Capital Division (VCD) through the ATI sub-project, which is to run from March 1, 1985 for five years.

b. Purpose of ATI's project with FFI

In helping FFI to establish the VCD, ATI intends to create an effective mechanism for replicating rural small scale industries which create jobs and increase incomes for low-income people. ATI's strategy is to set up manufacturing enterprises employing appropriate technologies appraised by FFI and financed by the VCD through a venture capital mechanism.

c. Description of project

The VCD will finance "small-scale industry joint ventures with rural entrepreneurs, including individuals, cooperatives, private companies or associations"<sup>4</sup> in ATI's priority technical areas. In addition, the VCD will provide a variety of supporting services, including technology identification, development, and testing, investment appraisal, and follow-up technical assistance in such areas as business management, technical operations, and market development.

At present the VCD has identified and carried out technical studies for a number of ventures--coconut processing, mushroom production, and agar-agar production--and are expecting to enter joint venture agreements soon for the first two of these (See Sections 2 and 3 below).

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<sup>3</sup>ATI, "Filipinas Foundation Rural Small [Scale] Industries Development Program Project Plan [No. 84-0389]", 1984, pp. 10-11.

<sup>4</sup>Ibid, p.2.

d. Organization and management

FFI, of which the VCD is a small and recent program, is the social development arm of the Ayala Group, one of the biggest Filipino-controlled commercial entities in the Philippines. Traditionally, the Ayala Group has been involved in banking, insurance, and urban real estate and commercial center development and later moved into construction, agribusiness and food processing, manufacturing (e.g., textiles), and trading (marine products).

FFI itself has a full-time staff of 60 to 70 persons. Most of these are in the Education, Arts, and Culture (Human Resources) Division. The Agriresearch, Science and Technology Division (S&T Division), with 28 full-time staff, is divided into the four programs noted above--the STRC (10 staff), the STCA (2 staff), the MRC (12 staff), and the VCD (4 staff). The VCD can and does draw on support from the other staff and resources in the S&T Division as needed. For example, one of the engineers from the STRC was very active in the development of the technology for coconut processing. Similarly, the Research Unit of the Human Resources Division will carry out socio-economic baseline and impact studies for the VCD. The director of the S&T Division serves as chairman of the Executive Committee of the VCD. Before joining FFI, he was chief economist of the corporate planning division and attached to the Office of the President of the Ayala Corporation. The other members of the Committee are a consultant to the STRC, the manager of the VCD, and the director of the Human Resources Division (also Corporate Secretary of the FFI).

e. Staff and resources for the project

As noted above, the VCD has a staff of four, but frequently draws on other resources of FFI. The Manager has a BS in commerce and is an MBA candidate at the Ateneo de Manila Graduate School of Business. She is supported by a technical coordinator, an accountant, and a secretary. The secretary is shared with other programs.

Among the resources of the FFI that VCD draws on are the extremely well-equipped lab and shop facilities of the STRC. These include, for example, lathes, several milling machines (including two 3-D copy milling machines), drills, a band saw, welding equipment, an engraver, a stereo microscope with camera, oven, essential oil extractor, an inoculation chamber, a fork lift, three vehicles, miscellaneous other laboratory and shop equipment and tools, and ample shop and lab space.

f. Operating procedures

FFI and the VCD have developed a detailed set of procedures which they have begun or are planning to use in appraising, planning, monitoring, and managing productive activities, and in monitoring and evaluating project impacts. These are especially well-developed for production and start-up activities and for

accounting, including flow charts, production reports, scheduling and assigning responsibility for key tasks, an invoice processing and payment system, etc. The Research Unit has developed, based on prior experience, a very detailed survey instrument for analyzing household characteristics and experience with specific income-generating activities. (ATI feels it goes far beyond their needs for monitoring and evaluation and plans to negotiate for more reasonable levels of effort in data collection.) The VCD, on its own, took ATI's PMES form and added several columns to it, identifying who is responsible for gathering, time frames, source, and kind, for each item of data. Drawing in part on materials that ATI has provided, FFI has prepared a monthly report format for enterprises financed by the VCD, including both operations and financial. For evaluating and approving projects, a Screening and Evaluation Committee is formed, headed by the director of the S&T Division.

Two productive activities have been approved as of November 1985 and a joint venture partner has been identified for an enterprise for each--coconut processing and mushroom production. These are discussed in the following sections.

## 2. Coconut processing

### a. Objective of the productive activity

The purpose of this project is to add value at the village level to the coconut resources of the Philippines. The project will move to commercial viability a village-based, small-scale plant for processing coconuts. An improved version of the "wet method" of processing, i.e., using freshly grated coconut rather than dried copra, will be employed to provide a greater variety of end products, including a higher quality edible oil, soap, vinegar, coconut milk, and charcoal. The business plan projects that these products can be sold at lower prices to the local populace, due largely to savings in transport from centrally-based processing plants.

Coconut production constitutes one of the major sectors of Philippines agriculture. Coconuts are cultivated on 23 percent of all croplands and 74 percent of commercial croplands. An estimated 25 million Filipinos depend on the coconut for their livelihood. Most of those farming coconuts live in poverty. They are dependent on a widely fluctuating and currently depressed world market. The wet method of processing provides an opportunity to process coconuts into products for the local village market at prices within the reach of the rural poor.

### b. Description of the productive activity

The technology employed in this PA is an improved version of the "wet" method of processing coconuts. It was developed and refined by the STRC/FFI under the supervision of a local Philippine expert. The process is quite similar to "kitchen" methods of oil

production and easily learned by villagers. It involves grating fresh coconuts, pressing out the milk, and heating until the oil separates. The key areas where training and support are most needed are business management and marketing.

The buyers of the finished coconut products are rural households in the vicinity of the processing plant. Marketing plans call for 90 percent of the production volume to be sold through small community stores and retailers in public markets and 10 percent to be sold on a cash basis at the plant itself.

Each processing plant requires about 600,000 nuts per year. This is roughly equivalent to the yearly production from 100 hectares. The coconuts for processing can thus be obtained within a very short distance of the plant. The plant will be able to offer farmers slightly higher prices than those of competing traders in the dried coconut industry because of reduced transport costs.

A first commercial field test of the wet method developed by FFI was established in August, 1985 at Dumaguete, Negros Oriental (see Section d below).

c. Innovations

Principal innovations in this project include:

- o The "wet" method of coconut processing;
- o The use of a hydraulic press for the "batch" process;
- o Local retail marketing of finished product; and
- o Provision for at least a thirty percent share in the enterprise by low-income coconut producers.

The STRC, with the assistance of Filipino experts, developed the proposed coconut processing technology. ATI is assessing a continuous-flow expeller to replace the hydraulic press for pressing the grated coconut. One of ATI's engineers is familiar with an expeller used for palm oil in ATI's project in Cameroon and he has assisted STRC to modify that technology for use on grated coconut.

d. Implementation

A pilot plant located in Dumaguete has been in operation since August 1985 (about three months at the time of the team's visit). The plant was financed entirely by Mr. Hermilio Teves, a prominent and wealthy land owner in Dumaguete and father of the director of FFI's S&T Division. It processes about 2,000 nuts per day to produce soap, coconut oil, livestock feed (from the grated coconut residue), and charcoal. Soap and coconut oil are sold in local supermarkets and at the plant. The coconut residue is used as feed in

a family swine operation. Approximately 20 people are employed by the plant. Contributions of family members (eight grown children) to the production/marketing activities can only be approximated. Coconuts are purchased mainly from one large plantation. Thus, some aspects of the pilot operation (i.e., procurement from and marketing through larger operators) are not those which are intended to characterize subsequent ATI-financed activities.

Nonetheless, the privately-financed pilot operation has been most useful. A fair amount of "tinkering" and "debugging" of the system has helped the VCD in preparing the draft business plan for the VCD's first enterprise. The Teves operation has been monitored closely and careful records kept of the technical process each day. Since the Evaluation Team's visit, these figures have been used in the draft business plan. Less well-organized records have been kept on product sales. These will need to be improved and expanded if the pilot operation is to demonstrate the financial (and economic) viability of the enterprise.

### 3. Mushroom production

#### a. Objective of the productive activity

The business objective of the project is to develop, refine, and move to commercial viability mushroom production and marketing activities. The development objective is to create jobs through a contract growing scheme with partial ownership by low-income families. ATI's project manager sees the project as an opportunity to build equity efficiently and help develop a mixed portfolio--some with innovative technologies and some not--to spread the risk of business failure or business viability within the VDC portfolio.

#### b. Description of the productive activity

The enterprise will produce spawn substrate for the propagation of a number of mushroom varieties. The spawn substrate, packed in two-kilogram bags, will be incubated for about one month at a central plant. When it is ready for fruiting, the spawn will be transferred to the enterprise's growing houses and to selected low-income contract growers within the immediate vicinity. The contract growers will tend the bags, harvest the fruit, and sell the mushrooms back to the enterprise for processing, packaging, and sale to restaurants, hotels, supermarkets and selected dealers authorized by the enterprise.

The technology for tending the spawn is simple enough to be understood and applied by the contract growers. The process of making spawn requires more precise management but, once learned, is applicable to all commercially cultivated mushrooms. The enterprise can easily shift to the production of a variety with higher market demand. Should the project prove to be commercially viable it can be replicated in areas where the temperature and humidity are suited to mushroom growing.

The intended project beneficiaries are the employees and contract grower families who will be selected by the enterprise, based on criteria which include a low level of income. The enterprise will generate jobs for 16 people. Aside from the employees, the enterprise will eventually have 20 contract grower families who will work part time.

c. Innovations

The major innovation in the project is the use of the contract grower system, the corporate organization, and allowing the growers to buy into the corporation. Shares purchased by the growers will be taken from the holdings of the VCD of the FFI. Initially, the VCD will contribute 70 percent of the required financing and the venture capital partner will contribute the remaining 30 percent. The enterprise will withhold a portion of the profits and apply these to the payment of stock shares for the growers. Both FFI and the venture capital partner agree that at least 30 percent of the corporation shall eventually be owned by the contract growers.

The technology for growing the mushroom has been adapted from the Chinese and from traditional methods (grown on logs or wood). STRC tested various types of and ways of processing, packaging, and tending substrates and spawn.

4. Findings and conclusions for the productive activities

a. Appropriateness

The productive activities thus far being developed have been, by and large, introductions of entire complex systems, rather than single or simple interventions in an existing ongoing productive activity. This has been necessary because there are so few ongoing productive enterprises at the small-scale (i.e., above cottage industry) level in rural areas, the target sector of the IO's program. The backstopping and support given to the productive activities will thus have to concentrate on a variety of areas--e.g., business management, market development, etc.--and not just to technology-influenced factors. Given the complexity and importance of these backstopping and support functions, ATI and FFI must ensure that sufficient emphasis is given to them.

The establishment and operation of a coconut plant by a wealthy landowner with entrepreneurial skills has helped considerably in preparing for a VCD-supported enterprise, particularly with respect to technical factors. The pilot plant is less useful as a model for the marketing and business management support that will be needed by project-initiated plants.

b. Commercial viability

The business plans for the productive activities are well-detailed and show each to be commercially viable. Data from a variety of sources is used. Production data is quite precise, based on pilot plant (coconut) or laboratory and pilot growing house (mushroom) operations. Marketing data is variable, based on informal local consumer surveys and/or projections from these and secondary sources (e.g., census figures).

c. Impact

The productive activities provide employment to rural low income people and utilize local materials. If successful, the coconut project will provide low-income consumers with products of higher quality at lower prices. An attractive feature of the mushroom enterprise is its plan to distribute income and employment benefits to low-income people by means of the contract growing scheme. The company or corporation assumes the major share of marketing risk and a part of the production risk. The latter will be minimized by careful selection and training of the growers.

The productive activities thus far being developed do not directly impact on existing productive activities of rural low-income people.

d. Risk

The major risk for each productive activity, as noted by ATI's Project Officer, is marketing. The business plans prepared by FFI indicate that the enterprises can compete in price and quality with principal established competitors. Each of the enterprises can adjust its product mix fairly easily and rapidly to respond to market conditions. Minimizing the risks in controlling product quality and in marketing will depend on careful management. FFI clearly has the capacity to manage well. It does not have experience in on-going support to small-scale enterprises. The Evaluation Team agrees with ATI that the risk is worth taking.

e. Replicability

Coconut processing has considerable potential for replication in the Philippines and the business plan has identified areas with higher potential, based on availability of raw materials and distance from major coconut processing plants. In the Philippines, as in many other countries, oil processing is a highly regulated industry. Replicability to other countries will depend greatly on the existence of an available niche for small-scale production, given the regulatory environment.

Mushroom production for the local fresh mushroom market has limited potential for replication beyond the Manila metropolitan area. Export production of dried mushrooms may hold potential for

considerable growth; however, no analysis of the export market has been carried out.

5. Findings and conclusions for FFI

a. Source of ideas

ATI works with FFI in a very interactive mode--FFI and ATI staff often expressed that no one could trace exactly where a particular innovative idea came from; for example, the contract grower scheme arose and evolved from a series of discussions. Ideas for specific productive activities, however, have generally come from FFI. For example, the idea for mushroom production came from another division of the Ayala Group. The idea for a venture capital mechanism was acceptable because of two main factors:

- o FFI was searching for ways that it could help make its social outreach functions pay for themselves through other means than just relying on corporate donations; and
- o ATI was able to legitimize the use of a profit-making mechanism by a nonprofit foundation. ATI's involvement was instrumental in acquiring government sanction for the concept.

b. Progress

As of November 1985, FFI had not implemented any productive activities. It had developed two PAs to the point where they are ready for implementation--the processes have been fully tested in the laboratory, business plans at the feasibility level have been developed, and for one, a full-scale operation has been underway as a pilot for almost three months.

c. Capability

The VCD set up through ATI is well-supported through both formal and informal mechanisms, by the other units within the S&T Division. It is also supported, on an on-call basis, by other units in FFI (e.g., for social research/baseline studies, etc.) or within the parent organization (e.g., for ideas for commercially viable enterprises).

FFI has set up well-organized systems for financial control, project appraisal, business planning, and feasibility studies. At the level of support for individual PAs, it has developed preliminary planning, reporting procedures which it recognizes as requiring adjustment and/or simplification, to be worked out as the current templates are applied in actual practice. ATI will need to watch closely FFI's monitoring of and responses to problems encountered by the enterprises. As the ATI project officer does not have hands-on

experience in small-scale enterprise management, intermittent support in this area will be needed.

d. Commitment

The staff of FFI seems highly motivated, competent, and committed to productive and socially beneficial development.

e. Information flow

ATI and FFI have developed a well-functioning informal system of feedback which has been continuous since 1984, before the signing of the contract between them. One quarterly report has been prepared, although it lacked the financial section. However, the second quarterly report is to contain the financial report for both of the first two quarters. (Although ATI will advance funds at the beginning of a project, it will hold back disbursements if complete quarterly progress and financial reports are not received from grantees.) ATI staff have visited FFI nine times since January 1984, providing technical assistance/guidance on planning, business management, technical problems, and monitoring and evaluation.

f. Replicability

FFI's position in an association of foundations as lead institution for appropriate technology will be useful in the replication process. The network of associations is already in use as a source of ideas for productive activities and to disseminate information on the technologies being developed. A strategy for replication has not yet been developed for the productive activities presently being pursued.

g. Key inputs

ATI has assisted FFI through a "management by guidance" rather than a "management by control" approach. FFI's perception of ATI's contributions to strengthening it include the following:

- o ATI has helped FFI to broaden its competence in areas crucial to enhancing commercial viability. For example, FFI was previously basically a research center, whose activities were limited to testing prototypes and to market studies based on secondary data. ATI has encouraged and/or supported them in more comprehensive market analysis, e.g., test market activities, identifying buyers, assessing competition, etc.;
- o ATI has helped it develop a more rigorous and thorough approach to technology development, e.g., in testing other alternatives at various points in the production process; and

- o ATI, through the venture capital mechanism which it provided, has enabled FFI to plan for sustained partnerships with entrepreneurs, an idea heretofore not considered.

### C. ATI Linkages

Since January 1984, ATI staff have visited the Philippines nine times, averaging one or two weeks per trip. They have held discussions with a variety of organizations as well as numerous individuals with specific technical and business backgrounds. Contact with the USAID mission has been very limited. ATI staff have not discussed their program with many USAID staff working in related areas, for example, small enterprise development in which a mission-funded project has worked with dozens of organizations and small enterprises over the past few years. Neither the mission nor ATI knew the other was involved in the development of small-scale coconut processing, each promoting a different technological process. Under the Cooperative Agreement, ATI is working only with FFI. It plans later to draw in organizations more oriented to grassroots development efforts.

### III. THAILAND

#### A. Overview

##### 1. The Setting for ATI's projects

Thailand's growth and development over the past 20 years have been impressive. Per capita GDP has increased about 4.5 percent annually. Inflation and unemployment have been relatively low for most of this period. The annual population growth rate dropped from more than 3 percent in the 1960s to 1.6 percent today. The incidence of poverty has been estimated at half that of 20 years ago.<sup>1</sup>

Several positive factors have influenced development potential and ATI's program in Thailand. The government has a well-defined policy towards rural development. In the past three or four years, it has given increased attention to technology development (although institutional responsibilities are still vague and not well coordinated). The business community has a tradition of contributing to community development. Numerous professionals are active in NGOs.

Nonetheless, the NGO community in Thailand is not as extensive or well-organized as that in the Philippines. Most NGOs are very small and often dependent on a single personality. Many are extremely reluctant to work with government agencies or accept support from large corporations. Thailand faces a number of other problems and/or constraints in continuing to grow and develop:

- o An over-concentration of resources in Bangkok compared to regional centers;
- o The structure of poverty, with 90 percent of Thailand's poverty groups located in rural areas;
- o Growing underemployment and seasonal unemployment;
- o Lack of unexploited arable land;
- o Poor linkages between the technical research community and firms or individuals who could apply developing technologies;
- o Inadequate confidence by financial institutions in the potential for technology to increase productivity;
- o Energy dependence; and

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<sup>1</sup>USAID, "Country Development Strategy Statement, 1986: Thailand", Bangkok, 1985.

- o Macroeconomic conditions, for example, limited government expenditure, high external debt, and economic vulnerability (international trade accounts for 41 percent of GDP).

Agriculture is the most important productive sector in Thailand, providing 60 percent of its exports, 26 percent of the GNP, and jobs for three-quarters of the labor force. Agriculturally-based cottage and small-scale industry are an important part of the manufacturing sector.

## 2. ATI's history in Thailand

ATI began working in Thailand in 1977 with the Population and Community Development Association (PDA; see Section C, below). ATI was the first to recognize the potential of the PDA in the area of rural development and appropriate technology. It also gave a grant to SVITA for a small enterprise development project.

Under the Cooperative Agreement, ATI has maintained support for these two organizations and has no plans for expanding its program to other NGOs in the near future. Two of ATI's projects under the Cooperative Agreement are focused largely on the development and adaptation of specific hard technologies, as described in the following sections (see Tables 3 and 4). ATI is also supporting PDA in a venture capital project (see Table 5) similar to that in the Philippines (see Chapter II).

## 3. The Evaluation Team's field work

The Evaluation Team held discussions and visited project sites with main office and field staff of the implementing organizations. Only limited time was available for site visits to the two projects (rhizobium and bamboo grass mat production) which had begun some field activities. Discussions were also held with USAID and PVO staff engaged in related activities. The following Sections B and C discuss the team's findings for the two IOs (SVITA and PDA) and their respective productive activities in greater detail.

### B. SVITA Foundation

#### 1. Description and findings for SVITA (Project No. 84-16)

##### a. Brief history and description

SVITA was founded in 1978 by a small group of professionals led by its present director, a microbiologist. Her group felt the need for a technically-oriented NGO with links to the scientific community and to other NGOs. SVITA also serves as a "facilitator" for linking donors with the NGO community. For example, SVITA sponsored a group known as APPROTECH Thailand, an association of 27 governmental and nongovernmental organizations, involved in appropriate technology in rural development programs.

ASIA: ATI EVALUATION

Table 3: Thailand Rhizobium

Region:	Asia	Project No.:	84-16
Country:	Thailand		
Name of Project:	Rhizobium Inoculant		
Location of Project:	Chiang Mai area, Thailand		
Implementing Organization (IO):	SVITA		
Productive Activity:	Not yet in production		
Obligation Date of Project	May 1, 1984		
Start of Project Activities	Approximately May 1, 1984		
Number of Months Elapsed			
at Time of Evaluation:	18 months		
Scheduled End of Project Date:	December 31, 1986		
Total Funding:	\$137,700		
Purpose of Project:	To increase soybean yields through the use of rhizobium inoculant, a natural bacterium that fixes atmospheric nitrogen in leguminous plants.		
Description of Technology:	The project will develop a simple, small scale production process for producing rhizobium, a bacterium that can be grown in an aerobic fermentation process using a seed culture and a growth medium under aseptic conditions.		
ATI Funds Disbursed to Grantee			
Through October 31, 1985:	\$91,711		

ASIA: ATI EVALUATION

Table 4: Thailand Protein Enriched Cassava

Region: Asia	Project No.: 84-0290
Country:	Thailand
Location of Project:	Bangkok
Name of Project:	Protein Enriched Cassava
Implementing Organization (IO):	Population and Community Development Association (PDA)
Productive Activity:	Not yet in production (research stage)
Obligation Date of Project	June 29, 1984
Start of Project Activities	September 15, 1984
Number of Months Elapsed at Time of Evaluation:	15 months
Scheduled End of Project Date:	January 31, 1987
Total Funding:	\$235,300
Purpose of Project:	To develop a process for producing protein enriched cassava for use as a low cost stock feed.
Description of Technology:	This project will use a two-step solid substance fermentation technique developed in Thailand to enrich the nutritional content of cassava on a small scale basis. Chipped cassava and an acid nutrient solution are combined to produce 12% protein-enriched cassava.
ATI Funds Disbursed to Grantee Through October 31, 1985:	\$63,231

ASIA: ATI EVALUATION

Table 5: Thailand Rural Small-Scale Industries

Region:	Asia	Project No.:	84-0226
Country:	Thailand		
Location of Project:	Countrywide		
Name of Project:	Rural Small Scale Industries Program		
Implementing Organization (IO):	Population and Community Development Association (PDA)		
Productive Activity:	Bamboo grass mats - in production		
Obligation Date of Project	June 29, 1984		
Start of Project Activities	November 1, 1984		
Number of Months Elapsed			
at Time of Evaluation:	12 months		
Scheduled End of Project Date:	October 31, 1990		
Total Funding:	\$350,333		
Purpose of Project:	To establish a small finance and technical assistance company which uses venture capital and credit mechanisms to invest in rural small industries.		
Description of Technologies:	Subject to feasibility studies demonstrating the commercial viability of particular production technologies, the project will finance a variety of industries, including bamboo grass mats (currently in pilot production). Other possible industries include: bamboo shoot processing, powdered pepper processing, basil nut oil processing, shrimp paste manufacture, water jar production of environmental sanitation equipment.		
ATI Funds Disbursed to Grantee Through October 31, 1985:	\$12,290		

SVITA began its association with ATI in 1981 with a grant for Small Economic Enterprise Development (SEED), a credit fund for small enterprise development focusing on micro-businesses for women and youth in rural areas. In 1984, ATI provided another grant of B 3.1 million (US\$ 137,700) to finance development of a small-scale plant for producing rhizobium. This was partially a result of SVITA's long-term association with the Nitrogen-Fixing Tropical Agricultural Legumes Project (NifTAL) and its work in Thailand. The Foundation has been very active in training, carrying out workshops, and publishing books and manuals, largely for use in the NGO community.

Total funding for SVITA in 1985 is about US\$ 158,000 with 35 percent (US\$ 55,615) from ATI. The balance is from IDRC/CIDA, USAID, and international Private Voluntary Organizations (PVOs), and includes both grants and payment for consulting or other services.

b. Organization and management

SVITA's director has been very much the guiding force of its small staff. She is assisted by a deputy who provides complementary skills in business management. SVITA follows a "no growth" philosophy, preferring to "spin off" activities to other NGOs as soon as they are established and operating. SVITA also encourages staff to move on to better positions resulting in a controlled but rather high turnover of personnel. The ten-member Board of Directors is drawn largely from the scientific community of Thailand.

c. Staff and resources

SVITA has only eight full-time staff. Most of these are not trained beyond the BA or technical levels. SVITA also has strong links to the scientific community, especially Kasetsart University. It frequently taps expertise on a volunteer basis to supplement its own staff skills. SVITA's capacity for mobilizing outside help has given considerable leverage to ATI's support. Assets of SVITA include a two-story building near the University, computer equipment and software, a small press for printing manuals and books, a technical library, and communication equipment (video camera, etc.).

d. Operating procedures

SVITA's operating style is quite informal and centers greatly on the director, who has had health problems during the past year. This has affected SVITA's reporting to ATI. The most recent report for the rhizobium project was for the first quarter of 1985. ATI has not disbursed funds to SVITA during this period of incomplete reporting. SVITA does not rely heavily on written reporting in carrying out its projects. That SVITA has the operational capacity to turn out reports and publications of high quality is clear, both from its earlier reports for the project and its performance for clients such as USAID and CIDA. The ATI project officer has not pushed

strongly on this point and feels that SVITA has kept him well-informed through his periodic visits.

## 2. Rhizobium production

### a. Objective of the productive activity

The purpose of the rhizobium production project is to help promote the use of nitrogen-fixing rhizobium inoculant among small-scale soybean growers "by testing and demonstrating the technical and commercial viability of decentralized small-scale systems of production, distribution, and sales."<sup>2</sup>

### b. Description of the productive activity

The technology being developed is a small-scale method of producing rhizobium, a nitrogen-fixing bacteria for leguminous crops such as soybeans, peanuts, and mung beans, all of which are important crops in Thailand. Rhizobium has been produced by a batch fermentation process for many years. This has not resulted in widespread use of rhizobium, due largely to distribution problems affecting timely delivery and rhizobium viability. The original project plan called for the rhizobium to be produced by a smaller scale version of the fermentation method, whereby approximately 8 tons of inoculant could be produced each year (compared to the 200 tons per year capacity expected to be soon in operation in Bangkok). This was changed following a training visit to NifTAL in Hawaii by the microbiologist responsible for developing the technology, where he learned about a new method--the dilution technique.

Using the dilution technique, a small (one to ten-liter) batch of rhizobium culture is prepared and then diluted by a ratio of 50 to one. Each liter of the resultant dilute batch is sufficient to prepare about two kilograms of inoculant. Other strains of inoculant suitable for other leguminous crops can be cultured instead without significant changes in the process.

As rhizobium does not have a long shelf life and soybeans are planted by most farmers only one season each year, the project plans for the plant to produce rhizobium only part of the year. SVITA intends to help develop a variety of processed soybean products, based on microbiological processes, to make use of the plant throughout the year. SVITA has begun identifying sources of expertise for these developments.

The project is being implemented through a soybean growers association in a small village in Northern Thailand. The association has just over 1,000 members and was organized prior to SVITA's coming.

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<sup>2</sup>ATI, "Rhizobium Inoculant... Project Plan [No. 34-16]," Washington, DC, 1984, p. 1.

SVITA has worked with the group in a campaign to encourage the farmers to use rhizobium and to produce their own soybean seed, by planting during the rainy season to multiply seed for the dry season, when the main soybean crop is planted. Rhizobium inoculant is most effective when used in combination with high-yielding varieties (HYVs). Since seed for HYVs of soybean are often in short supply, the seed multiplication component was an important part of the project's design.

c. Innovations

The project involves innovations in two production processes, each of which is crucial to its success. The first of these is the small batch dilution process. The principal innovation here is the final stage, where the peat medium is inoculated. In the dilution process, a very small amount of rhizobium culture is inoculated into a 200-gram bag of peat; the final multiplication of the culture occurs within the medium. In order for this to take place, the medium must be sterilized first. In the method being used now by the government, the final multiplication of the culture has already taken place in a large fermenting chamber. A much larger amount of culture is inoculated into non-sterile peat.

The second production innovation is the use of rhizobium by farmers planting soybeans or other leguminous crops. At present, only an estimated five percent of the land in soybeans is planted with inoculated seed. SVITA, and various agricultural specialists, feel that one of the major constraints to increased use of rhizobium is not so much convincing farmers of the value of inoculation, but rather the timely and convenient availability of inoculum. A USAID officer felt that the eight-ton (now revised to five-ton) annual capacity of the plant is still too large to significantly improve the distribution of inoculum. SVITA, however, feels that the location of the plant in Ban Mae in Northern Thailand, rather than 600 kilometers to the south in Bangkok will significantly improve distribution. Personnel at the Mae Jo Research Center, which has responsibility for the soybean research program for Thailand, are also optimistic about the new technique.

A "soft" innovation of the project is the planned-for equity participation of the farmer's cooperative at the project site in the rhizobium production and distribution enterprise.

d. Implementation

The rhizobium inoculum is still being produced in the laboratory at Kasetsart University in Bangkok. A pilot plant is being built in Ban Mae and a manager for the plant with a BSc in microbiology has been identified and will be undergoing training. At the time of the Evaluation Team's visit, an advisor from NIFTAL was also present. He identified problems in the quality of nodulation in the on-going seed multiplication plots and suggested, among other things, that an improved "sticker" for ensuring that the inoculum stick to the seed be used. SVITA has helped the soybean growers association improve its

record-keeping. No controlled trials are being carried out regarding the use of rhizobium, but researchers at Mae Jo expressed clear interest in doing so this winter season. They have already taken part in some presentations. SVITA has been able to mobilize considerable resources and research talent that have contributed substantially to implementation at no cost to this project.

### 3. Conclusions for rhizobium production

#### a. General conclusions

The rhizobium project is high-risk but also has high potential for significant beneficial impact. Success depends on a great variety of interrelated factors. ATI and SVITA understand most of these quite well but have dealt with few of them systematically in their written planning and monitoring documents. Informal information flows have guided the project adequately to date, but better documentation will be needed if lessons learned are to be applied efficiently in replication efforts. ATI has built into the project strong control over the technology adaptation process. Its reliance on SVITA's own capability to marshal other needed resources has been effective thus far, but its lack of specific tracking indicators for necessary complementary activities (e.g., extension services) will make it difficult to quickly identify and respond to unforeseen problems should they arise.

#### b. Commercial viability

A business plan for the rhizobium project will be developed only after data is available from the operations at the soon-to-be completed pilot plant. A marketing study has been carried out which identified both the substantial potential demand for rhizobium for soybean production and the demand for soybeans. It did not examine demand related to other crops such as peanuts or mung beans. The marketing study had only been summarized in English and appeared to identify broad market channels, the proportion of product flowing through each, grade and season price variations, the effect of imports and government policy on prices, production by year and region, volume of imports, and the end use of the soybeans.

#### c. Impact

Since the project began, offshore manufacturers of rhizobium have begun to market their products. Prices have been higher than that which SVITA expects to set and supply very irregular. If the technology proves as efficient as hoped, it is doubtful that these other sources will be competitive.

The project has high potential to improve the incomes of farmers through increasing yields of soybean and improving soil fertility. Rhizobium inoculation is a technology accessible to farmers with limited resources and can reduce the need for more expensive chemical

fertilizers. The key factors will be the degree to which the small-scale technology proposed is able to make rhizobium more widely available and the degree to which supporting extension services are able to convince farmers of the inoculant's effect on crop yields and demonstrate the necessary supporting practices to enhance its effect. SVITA has been successful in the latter.

d. Risk

Risk is present at a number of points in the project. Risks related to the hard technology center on the very precise controls required during each step of the rhizobium culture process. These are being addressed through periodic visits by a NIFTAL expert. There are, however, numerous other factors affecting soybean production and profitability beyond the particular technology being introduced. These will affect the effectiveness of rhizobium in increasing production, the availability of other needed inputs, and/or the benefits resulting from increased production. ATI is relying on SVITA's networking capability to bring additional resources to bear on these factors. Indicators to track SVITA's efforts are weak in some key areas, for example, extension services. The Evaluation Team visited plots where nodulation from rhizobium inoculation was quite low. Although progress reports in 1984 indicated soybean yield increases, no assessment was reported of "farmers, attitudes and ability to properly use rhizobium inoculant..."<sup>3</sup> as called for in the project plan. Although ATI feels that SVITA's past performance warrants confidence, the Evaluation Team feels that such factors also deserve the more controlled monitoring that ATI has required of SVITA in the hard technology process.

e. Replicability

If successful, the project has potential for replication within Thailand, although this is somewhat diminished by the large capacity of the government's rhizobium production plant. The small-scale technology, however, might be replicated in many countries where no such large-scale facility exists. That the two processes will exist side-by-side in Thailand, ATI feels, will be an ideal demonstration for other interested countries in selecting the technology most suited for their particular conditions.

f. Capability

The capability of the plant manager and the degree of expertise needed to operate the plant are key factors in both the commercial viability and the replicability of the technology. At present, SVITA is training a BSc in microbiology to operate the plant. If this level of training is indeed essential, production activities in addition to rhizobium production will need to be developed to make use

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<sup>3</sup>Ibid., p. 7.

of this person's training during the off season. SVITA is looking into potential activities and problems, e.g., feed cake production and potential toxicity. Otherwise, the returns from the sale of rhizobium will be unlikely to sustain a year-round manager.

SVITA is somewhat doubtful that it is able to participate in the equity of the proposed rhizobium production venture, given Thai government policies for foundations and other NGOs. Informal discussions have been taken up with PDA, which has expressed interest in participating through the ATI-PDA venture capital project.

#### 4. Conclusions for SVITA

##### a. Source of ideas

The director of SVITA is a microbiologist with a long-standing interest in rhizobium. She has been instrumental in getting a number of other experts in the Thai research community involved in project planning. An expert at NIFTAL provided the idea for the dilution process after the project had begun.

Dr. Malee was drawn to ATI because it allowed indigenous NGOs full partnership and a collegial, non-dictatorial relationship. Dr. Malee feels that most NGOs prefer not to work with large organizations since they feel dominated by the "bigness". She also liked ATI for its expertise in financial and economic analysis; technical knowledge and network; and systems for tracking project activities.

##### b. Progress

The production plant near Chiang Mai had not been completed in November, 1985 and there was still doubt whether it would be in operation as planned for the dry season soybean planting in early 1986. Key activities in the extension of rhizobium inoculation practices among the farmers of the project area, however, have been carried out on schedule. Given that delays have occurred, closer monitoring would be highly useful in understanding and responding to these.

##### c. Commitment

SVITA's staff and the collaborating researchers and others upon whom SVITA depends all appear to be highly committed and motivated.

d. Information flow

The Evaluation Team agrees with ATI that documentation on this project is incomplete. The team suspects that although data are being collected, they are not complete enough and are certainly not in a form useful to non-Thai readers. SVITA, in order to deploy its limited resources in areas most critical to successful implementation, has consciously chosen to provide only the minimum written documentation necessary to ATI. Effective communication with the USAID Mission has been limited. For example, USAID was surprised at the Evaluation Team's description of the rhizobium plant's capacity. ATI feels that it is well-informed and understands the next steps which are required. The lack of a strong written record will make replication difficult to carry out efficiently. Moreover, the planning for new steps as the need for them becomes apparent is every bit as important as the original planning for the project and requires the same disciplined approach.

e. Key inputs

SVITA's most valuable input has been the mobilization of a considerable amount of voluntary support by researchers and advisors in carrying out this project. SVITA and ATI have both helped develop a network of experts upon which to draw. ATI has allocated ฿ 3.1 million (US\$ 135,700 @ US\$ 1 = ฿ 23), of which ฿ 1.4 million is for production credit for soybean seed multiplication and production (฿ 750,000) and for equity and start-up capital for rhizobium production (฿ 679,000).

C. Population and Community Development Association (Project Nos. 84-0226 and 84-0290)

1. Description and findings for PDA

a. Brief history

The Population and Community Development Foundation (PDA) was founded in 1974 to promote family planning through a community-based approach involving local village volunteers. PDA's paid staff has grown from 30 in 1974 to nearly 600 in 1985. In addition, it has over 16,000 village volunteers. ATI began working with PDA in 1979. It provided an initial grant of \$27,000 to determine the feasibility of a new division to broaden PDA's work from family planning to include community development activities in such areas as water resource development, agriculture, agro-processing, and cottage industries. A later grant of \$203,000 established this division--Community-Based Appropriate Technology and Development Services (CBATDS). Since then, a great number of international donors have further contributed to PDA's growth and it is now the largest Thai non-government organization working in community development in Thailand.

b. Purpose of ATI's projects with PDA

ATI has approved two projects with PDA under the Cooperative Agreement. The first is to

. . . establish a small finance and technical assistance company which employs credit, venture capital, and loan guarantee mechanism to make investments in rural small-scale industries (RSSI) using improved production technology [which meet technological, commercial, and economic criteria]. The Company's objective is to increase income and employment opportunities directly through jobs in small industries and indirectly through increasing demand for raw materials produced by rural farmers.<sup>4</sup>

This mechanism will eventually lead to numerous production activities, the first of which is described below in Section 2.

ATI's second project is to develop and commercialize a biotechnology for the production of animal feed by enriching the protein content of cassava. As it is still in a technology testing stage, it is not yet a productive activity but is described in Section 3.

c. Description of project

The project has established within PDA a venture capital company, the Rural Small-Scale Industries Development Company (RSSIDC). ATI will provide funds totalling \$350,333 over a six-year period, beginning November 1984. To date (November 1985), one RSSI has been established by the RSSIDC--a company producing bamboo-grass mats for export to South Korea for use in the dried seaweed industry. They are currently carrying out studies for Leucaena feed, fish protein concentrate, and rhizobium production and have begun work on the business plan for a tea processing operation.

The protein-enriched cassava (PEC) project, begun in September 1984 was designed with several stages. The first of these, the feasibility stage, was to have taken five months. However, at the end of 16 months, a feasible commercial-scale technology is still being developed.

d. Organization and management

The PDA is divided into five bureaus, including three large line bureaus and two staff bureaus supporting these. The director of the principal staff bureau is now acting director for all of PDA, as the Secretary General has recently been appointed Deputy

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<sup>4</sup>ATI, "PDA Rural Small [Scale] Industries Development Company Project Plan [No. 34-0226]," Washington, DC, 1984, p. 1.

Minister of Industry. The largest bureau is the CBATDS (see Section a), with about 170 staff. This bureau contains four divisions, the two largest of which are responsible for a number of community-based integrated rural development and water resource centers. The RSSIDC forms part of a smaller social marketing division. The director of the CBATDS is managing director of the RSSIDC. The personnel of the different divisions rotate periodically. For example, the head of evaluation was formerly the head of administration and of urban health.

e. Staff and assets

The RSSIDC has been assigned five staff, not counting the managing director. The director has an MS in economics. She is supported by two engineers, an accountant, and a secretary. These staff devote some of their time to activities other than the RSSIDC. However, other PDA staff also contribute to RSSIDC as appropriate. For example, the manager of the Research and Evaluation Division has 15 staff who assist in design and monitoring of all of PDA's projects, including those of the RSSIDC. One of these staff, who has master level training in education, has been given responsibility for monitoring the RSSI project. The accounting and finance divisions and 165 district-level offices also assist as appropriate.

The RSSI project can draw upon, as needed, the extensive assets of the PDA. These include an IBM System 36 microcomputer, IBM PCs, vehicles, and most valuable, the widespread network of PDA staff (165 district supervisors) and village volunteers (in 157 districts). These groups are drawn on to help identify potential opportunities and entrepreneurs for RSSIDC investments.

The director of CBATDS and managing director of the RSSIDC is also the project manager of the PEC.

f. Operating procedures

PDA has well-developed procedures for drawing effectively on its staff and other resources as needed. Its accounting division, for example, currently tracks a total of 39 projects which, due to sub-units in some of these, require between 50 and 60 separate accounts. This capacity has been developed through joint efforts with such large accounting firms as SGV/Thailand. PDA felt that the quality of its business planning has been improved considerably by the ATI-provided Stanford MBA intern who spent part of the summer, 1985 with its staff.

PDA has not yet set up the evaluation system called for in the Project Plan for RSSI. Staff described in some detail their plans for doing so, drawing on previous experience. Their methodology includes sample surveys as well as drawing on existing secondary data available at the amphur level. With respect to specific productive activities financed through the RSSI, close monitoring is envisioned, including

spot checking and mini-surveys to confirm written reports. In carrying out both projects, PDA does assist those managing the activity (researcher or entrepreneur) in such aspects as accounting.

## 2. Bamboo grass mat production

### a. Business objective

The objective is to create a joint venture company in order to manufacture and sell bamboo grass mats to the Thai Bamboo Grass Company (TBG), an experienced exporter. The joint venture--Thai Plait Industries, Ltd. (TPI)--will be owned initially by PDA and TBG. The project will provide part-time employment for over 200 families in a very poor region of Northeast Thailand. It also provides for increasing equity ownership of the production venture (TPI--not the export company TBG) by the producers, who will eventually buy out PDA's 38 percent share.

### b. Description

The TBG lost money on its production of mats in 1983 and suspended operations. Its owners approached PDA and proposed setting up a company (TPI) with villagers owning shares in the company. TBG and PDA feel that incentive provided through part ownership by the producers will help correct finished product quality and delivery problems which led to TBG's earlier losses.

The production process is easily learned and, in fact, familiar to many of the village producers. One person can weave a mat in approximately eight minutes using the simply-constructed hand machine. A person can collect sufficient bamboo grass in one day to make about 100 mats. Additional labor is required to sort and strip the grass but this has not been qualified. Their problem is in finding a reliable market for the mats which they can produce. By forming a joint venture with the export firm, they gain this market expertise, capital, and assistance in business management. The total market for the mats is about 15 million per year, all for use in the Korean seaweed industry. Thailand supplies about seven million of these. This project would supply from two to three million mats of the present Thai market share.

The total capitalization of the company is  $\text{฿}$  2.7 million (US\$ 100,000) with  $\text{฿}$  1.4 million (US\$ 52,000) in equity provided by PDA/RSSIDC, and  $\text{฿}$  1.3 million (US\$ 48,000) in loan financing at 15 percent interest. Start-up costs are  $\text{฿}$  336,000 (US\$ 12,500) and working capital of  $\text{฿}$  2,000,000 (US\$ 74,000). The relatively large amount of working capital is for buying and warehousing the mats until their sale and export in the summer.

The principal on the loan is planned to be repaid beginning in 1987 and 1991. Equity holders will begin receiving their capital back in

1986. RSSIDC will reinvest its earnings and interest in either expansion of the company or establishing another similar company.

The end beneficiaries of the project are principally the rural poor in scattered and remote villages of Northeast Thailand. Nearly all are farmers who have very small landholdings and are underemployed at certain times of the year.

c. Innovations

The principal innovation is employee/worker stock ownership. The producers (weavers) of the mats can buy shares in the company and participate in the management. The technology itself has been used in the area by the TBG for several years. Familiarity with the technology appears to have helped in convincing producers to buy into the company. A large number of producers have already bought shares.

d. Implementation

The project is on schedule. A manager, who formerly worked with PDA elsewhere, has been on the job since September, 1985. Other staff, including an accountant and four mechanics, have also been hired. The latter not only maintain the weaving machines; they also act as extensionist/technicians in quality control and buying operations. A very comprehensive business plan was prepared by the PDA with the substantial input of an ATI intern. The company has leased on a long-term basis, a substantial building and warehouse in the village of Khok Sa-ard. Equipment includes two mat cutters, motorcycles, miscellaneous tools, small equipment and furniture.

Mat production and buying operations had just begun in November. As some of the producers were just beginning, a fairly high proportion (30 percent) of mats were being rejected. However, the manager believed that this rejection rate would quickly drop to near zero as the producers gained more skill.

PDA will make visits to the company and will require regular reports from the manager. The company has set up procedures and forms for buying operations, machine maintenance, inventory, and related operations and is training locally-hired staff in their use.

3. Protein-enriched cassava

a. Purpose

The original project purpose was "to develop and commercialize a bio-technology...for the production of stock feed by enriching the nutritional content of cassava up to 25 percent

protein...".<sup>5</sup> ATI and project staff have since lowered their expectations to about half that. The project aims at achieving the greater control over the microbiological process necessary for a higher rate of protein conversion.

b. Description

The technology being developed is a two-step process. During an initial two-day phase, a mold is used to begin breaking down dried cassava chips. This is followed by a one-day phase where a yeast culture completes the protein-enhancing conversion. The crucial variables which the microbiologist/engineer team is attempting to better control are the aeration, humidity, and temperature of the cassava chip culture. The resulting product can replace the full 64 percent of the swine feed ration now utilizing maize. At present, an end product with a protein content of 8 percent has been achieved, compared to a 2 to 3 percent protein content of untreated cassava. The end product, however, weighs 40 to 50 percent less than the original raw material.

No productive activity yet exists, as the technology has not been perfected. The existing technology has been demonstrated suitable, at the fairly low conversion rate to eight percent protein, for cottage-scale production. However, most swine producers prefer to purchase their inputs and devote themselves full-time to the care of the animals. The project is now concentrating on scaling up the relatively efficient cottage-scale process to a commercial scale.

c. Innovations

The principal technological innovation being developed is the use of a dry (i.e., moist) as opposed to a submerged fermentation process. This results in a totally edible end-product. (In the submerged process, only the yeast cells are harvested and a large mass of wet by-product must be discarded.) The engineers are now working on a means for continuous (vs. batch) processing.

d. Implementation

As the production process has not yet been completely established, production costs have not been determined. Many variables are not yet calculable. As the technology development is behind schedule, more funds will be needed for this first phase. Nutrition and acceptability analyses have been carried out. A market survey has been carried out. However, ATI plans to conduct another market survey, with a larger sample, to test the product of the industrial-scale process.

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<sup>5</sup>ATI, "Protein-Enriched Cassava: Low Cost Feed for Pig and Poultry Project Plan [No. 84-0290]," Washington, DC, 1984, p. 1.

#### 4. Conclusions for the productive activities

##### a. Commercial viability

The commercial viability of the bamboo grass mat project depends on the TBG recapturing a market share it once had, through improving the motivation of its producers, quality control, and management. In establishing TPI, PDA and the TBG have taken strong steps to make these improvements.

The commercial viability of the protein-enriched cassava project depends on two factors which are still uncertain:

- o The quality of the product, which presently still has less than half the protein content than the anticipated in the project plan; and
- o The successful development of a larger than cottage-scale technology.

The cottage-scale technology has resulted in a tested, acceptable substitute for maize in a number of animal feed rations. There is a strong market for such a product, if it can be produced cheaply enough.

##### b. Impact

Both projects have considerable potential to improve the incomes of the rural poor. The bamboo grass mat project also has potential to improve capacity at the local level in the management of small-scale enterprise.

##### c. Information flow

PDA is assisting the TPI in establishing accounting and management procedures. These should be sufficient for managing the enterprise well. Reports to ATI, however, do not adequately document the development of the main innovation--producer ownership.

Since ATI began the PEC project, two other projects have begun research in the area, using somewhat different approaches. These are funded by international donors and a commercial concern.

##### d. Replicability

The only productive activity begun as of November 1985 (bamboo grass mats) has fairly limited replicability, as it is based on a limited market and raw material base. The replicability of the principal innovations of producer-ownership and local-resource utilization are impossible to assess independently of specific products and markets. If a commercial-scale technology is successfully developed, the PEC project shows considerable potential for replication in Thailand and many other areas of the world.

## 5. Conclusions for PDA

### a. Source of ideas

ATI initiated the idea of venture capital financing for productive activities. The only activity yet underway was identified by PDA, which had earlier contact with the owners of the bamboo grass exporting firm. ATI was responsible for identifying and introducing to PDA the principal researcher for the protein-enriched cassava project.

### b. Progress

The protein-enriched cassava project has encountered problems in the development of the technology and is considerably behind the schedule originally conceived in the Project Plan. The Project Review Advisory Committee's initial review gave considerable importance to an outside assessment of the technology. Given the project's delays, this outside assessment would be very useful now. The RSSI project has financed the one productive activity, bamboo grass mats, described above, which has been in operation just since October 1985.

### c. Capability

PDA is generally acknowledged as the biggest and most capable local NGO in Thailand. According to USAID/Thailand, there are no others as competent as PDA and SVITA. One USAID officer noted that they were very effective in public relations. This became very obvious to the Evaluation Team, too, during its very short visit. For example, the site visit to the bamboo grass project was impressively orchestrated for the first buying day in one village. All four of the mechanic/buying agents and various PDA staff were present. The project beneficiaries' pleasure in receiving cash for their several weeks' efforts was unmistakable.

### d. Commitment

The staff of the PDA seemed very committed. Some observers noted that "even PDA", however, had difficulty in holding on to some of its best technical people, as opportunities in the private sector offer greater incentives.

### e. Information flow

Quarterly reports to ATI have been submitted reasonably promptly, although more slowly than specified in the Cooperative Agreement. For example, reports for the PEC and RSSI projects for the period ending in June and July, respectively, were sent to ATI on August 31. The PEC reports have been quite detailed and have included annexed documentation on the project's progress and the delays which have been encountered in technology development. The RSSI reports have

been fairly sketchy by comparison. However, the annual investment plan for RSSI and the business plan for TPI are quite detailed. Quarterly reports for both projects have been submitted in the format requested by ATI.

f. Key inputs

Perhaps ATI's most productive inputs to PDA were its initial grants in 1979, which helped PDA become the large and capable IO it is today. Under the Cooperative Agreement, ATI has provided financing, technical assistance in the preparation of business plans, and links between some of the key players in PDA's projects. PDA has provided management and a wide range of contacts in rural areas of Thailand.

D. ATI Linkages

Since January, 1984, ATI project and technical staff have visited Thailand 19 times, averaging one or two weeks per trip. They have contacted a variety of individuals and organizations, in many cases relying on the networks already established by the IOs with which they are working. However, they are not presently planning to work with any other than the two IOs with which they are already working.

Since the PEC project was funded, its principal researcher has also been hired as a Scientific Affairs Specialist for USAID. In addition, the Executive Director of ATI visited USAID and described its program and objectives. The founder and Executive Director of PDA has recently been named Deputy Minister of Industry. He wanted ATI to assist in the development of a rural industrialization strategy for Thailand. The Deputy Minister of Industry and the Executive Director of ATI both called on the USAID mission seeking support for this work. The USAID Officer for Private Sector Development and Rural Employment showed serious interest in the proposal. However, two months later ATI was informed that USAID did not want to support this effort.

USAID staff interviewed by the Asia Team saw no particular reason for a direct contract relationship with ATI. Restrictions in the cooperative agreement and AID contracting procedures have made it difficult for USAID missions to collaborate and finance ATI activities. ATI's technical manager (in AID/Washington) is working out an "ordering agreement" which can facilitate ATI-USAID mission collaborations.

## IV. NEPAL

### A. Overview

#### 1. The setting for ATI's projects

Nepal is one of the least developed countries in the world. Per capita income is currently estimated at only US\$ 140 per year. About 80 percent of the adult population is illiterate. Life expectancy at birth is only 44 years. Few people have access to unpolluted water or adequate basic health care. The physical obstacles to development are more severe than those in many of the developing countries.<sup>1</sup>

Major constraints to development include:

- o Extremely rugged topography;
- o A dearth of adequately trained development personnel;
- o A rural household production system dependent on traditional technologies and practices leading to relentless exploitation of the environment as a means of survival;
- o A meager and deteriorating resource base which is already taxed beyond its ability to sustain existing population densities in the hills; and
- o Deeply ingrained cultural and economic factors bolstering resistance to attitudinal change with respect to the role of women and family planning.

Fewer NGOs and PVOs work in Nepal than in the Philippines and Thailand. A major reason for this is the difficult working environment for expatriate organizations. All have to work through a central government Council, which places very strict limits on the number of expatriate staff. The Council also closely monitors funds and requires that all foreign exchange be passed through it. There is often a several-week delay before the PVO receives its money (in local currency) back from the Council. Personal relationships play a very important part in how a PVO is able to operate and get along with the Council. Some PVOs report having local staff on their rolls who have influence and through their contacts are able to facilitate the PVO's operation under the Council.

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<sup>1</sup>USAID, "Country Development Strategy Statement, 1984: Nepal," Kathmandu.

## 2. ATI's history in Nepal

ATI began working in Nepal in 1981 and under the grant had carried out projects with four organizations. Its activities were focused mainly on institutional strengthening. One of its projects strengthened the crafts promotion activities of the National Women's Organization, which involved some of the principal staff of the subsequently-founded Association for Crafts Producers (ACP), now supported under the Cooperative Agreement.

ATI has concentrated its initial activities under the Cooperative Agreement on two cottage-scale rural-based industries--wool spinning and turbine-driven agro-processing (see Tables 6 and 7). Additionally, through small grants and consultancies, ATI has begun to develop projects on manually operated irrigation pumps, waterwheel irrigation pumps, hand-operated grain grinding technology, and potato processing.

## 3. The Evaluation Team's field work

The Evaluation Team held discussions with staff of the two implementing organizations for ATI's projects in Nepal and with a number of locally-based appropriate technology specialists and representatives of international PVOs. The Team was able to visit field sites of only one of the projects. The following sections discuss the Team's findings for the two implementing organizations--the ACP and New ERA--and the two productive activities which they are supporting.

### 3. Association for Craft Producers (Project No. 84-0709)

#### 1. Description and findings for ACP

##### a. Brief history

The Association for Craft Producers was founded in August 1984 by Meera Bhattarai with the support of several others who, like herself, had been working with the ATI-funded Skill Development Project of the National Women's Organization (NWO). The decision to separate from the NWO was made independently of ATI shortly before the present ATI project manager was hired. ATI presently provides about 25 percent of ACP's budget through its wool spinning project. The remaining support is provided mainly by World Neighbors and PACT.

##### b. Purpose

The ACP's overall purpose is to provide a variety of services--including design, technical skill training, and marketing assistance--to low-income, limited-resource crafts producers in order to help increase incomes and employment opportunities. ATI's project will assist ACP in providing these services as they are directed at wool spinning.

ASIA: ATI EVALUATION

Table 6: Nepal Wool Spinning

Region:	Asia	Project No.:	84-0709
Country:	Nepal		
Location of Project:	Countrywide		
Name of Project:	Wool Spinning		
Implementing Organization (IO):	Association for Craft Producers (ACP)		
Productive Activity:	Wool spinning--in production		
Obligation of Project	November 13, 1984		
Start of Project Activities	Approximately December 1, 1984		
Number of Months Elapsed at Time of Evaluation:	11 months		
Scheduled End of Project Date:	November 30, 1988		
Total Funding:	\$165,144		
Purpose of Project:	To introduce improved wool spinning technology among small producers.		
Description of Technologies:	The project will use improved, locally produced cradle wool pickers, drum carders and flyer treadle spinning wheels which have been previously tested in Nepal.		
ATI Funds Disbursed to Grantee Through October 31, 1985	\$45,448		

ASIA: ATI EVALUATION

Table 7: Nepal Agro-Processing

Region:	Asia	Project No.:	84-0775
Country:	Nepal		
Location of Project:	Western Hill Region		
Name of Project:	Turbine Driven Agro-Processing		
Implementing Organization (IO):	New ERA		
Productive Activity:	Not yet in production		
Obligation of Project	December 30, 1984		
Start of Project Activities	Approximately January 1, 1985		
Number of Months Elapsed			
at Time of Evaluation:	10 months		
Scheduled End of Project Date:	December 31, 1987		
Total Funding:	\$29,958		
Purpose of Project:	To test the commercial and technical feasibility of a turbine driven heat generator for agricultural processing in rural areas of Nepal.		
Description of Technologies:	The project will use a community-owned, locally-manufactured, water turbine-powered, mechanical heat generator/kettle unit to provide heat for processing citrus fruit, dairy products, soap, vegetables and spices.		
Strengthening Grant to IO:	None		
ATI Funds Disbursed Through			
October 31, 1985	\$10,825		

c. Description of the project

The Project Plan attached to the Project Contract states that ACP will provide support at a number of key points in the technology development and transfer process:

- o Manufacture of spinning equipment;
- o Training and follow-up for extension workers from other NGOs to establish spinning enterprises;
- o Credit to small spinning enterprises for working capital and equipment; and
- o Marketing.

In fact, the ACP has thus far concentrated on training and credit to establish small spinning enterprises. Training has been provided both directly to individuals and groups and also through other NGOs. The original concept has been for ACP to provide all of its services indirectly through other NGOs. Most of these, however, have resisted a commercially sustainable, producer-supported approach and have wanted to donate, in one form or another, the improved equipment to producers. (Most donors' activities in Nepal are highly subsidized). ACP felt it necessary to work with some producers directly, providing them with loans as well as training, in order to fully test the commercial viability of the improved technology.

Another variation from the original project concept is ACP's provision of training mainly to persons who have not been involved in spinning as an income-generating activity previously. In this way, ACP feels it is reaching a more needy target group. ATI is attempting to convince ACP of the greater dissemination value in working with established traditional spinners.

ACP has not wanted to create dependency among the producers on ACP as a source of raw material or as a market outlet, especially where the producers can establish marketing links on their own. As there are opportunities for such linkages, several small carpet workshops, in the area where its first groups have been located, ACP has not generally provided these services to producers who have received technical training. Neither, however, has it provided training in marketing. A marketing advisor, who will help follow-up with producers--providing assistance in management, quality control, and record-keeping--is presently being trained.

ACP has not yet directed a significant proportion of its efforts towards strengthening or supporting enterprises producing the improved spinning equipment. A furniture factory supported by the United Mission to Nepal was commissioned to make 100 spinning wheels. A mutually agreed-upon price for making the improved carder has not yet been reached.

ACP approached New ERA, a local research agency (see Section C below), for possible technical assistance in improving their record-keeping on their members and financial accounting. New ERA subsequently investigated the particular needs of ACP and an agreement was made whereby New ERA provides computer processing of most of ACP accounts and records.

At the time of project design, ATI recognized ACP's relative lack of capacity in monitoring and impact evaluation. About 13 percent of the total project budget is allocated for monitoring and evaluation--including "quarterly monitoring and evaluation--through a subcontract with New ERA. This includes the above-noted computer-processing of accounts.

A socioeconomic survey of 50 trainees of ACP was undertaken by New ERA for ACP. The findings have identified some weaknesses in ACP's communication with and support to producers. These have not been reported to the Executive Director yet pending completion of the final report. An appropriate informal channel for more immediate feedback has not been developed.

d. Organization and management

ACP is a small organization and the Executive Director is responsible for ACP's overall program as well as the wool-spinning project. She is assisted by an expatriate Technical Advisor who feels he is successful in playing, and being perceived as playing, an advisory role only. He feels that a non-directive role is essential in developing ACP's capacity. ACP has begun to register members from among the producers it has trained.

ACP's board of directors has proved invaluable in supporting ACP's independence in a very difficult political environment where the activities of almost all non-governmental agencies are tightly controlled by a central council. Without the advice and support of this board, ACP would not be able to function well, if at all, in the entrepreneurial support mode it is trying to develop. The board gives the Executive Director a great deal of autonomy.

e. Staff and resources for the project

ACP has a total paid staff of twelve, including five people--such as night guards and other unskilled workers--who make only NRs 500 to 600 (about US\$ 30 to 35) per month. The Executive Director has a Bachelor's degree from Tribhuvan University and ten years experience in craft development. The (expatriate) technical advisor has over ten years experience in development with such agencies as CARE and UNICEF in Bangladesh and Nepal. ATI is paying one-third of his salary, about 7.6 percent of the total grant amount. Other staff have minimal education and have been hired in accordance with ACP's intention to work with talented but not highly educated people in

carrying out its programs. An important aspect of development, ACP feels, is that it be carried out through ordinary people and that their skills in management be strengthened through hands-on practice. These other staff include a manager, a designer, and a newly hired marketing extensionist, still in training. ACP requires that its field staff receive hands-on training in the techniques they will be monitoring and supporting in the field. Instructors (i.e., trainers of trainers) in various techniques, such as wool spinning, are paid on a contract basis. The village-level trainers are paid through the revenues earned from sale of yarn produced in the training sessions.

ACP rents a three story building in which it carries out training in a variety of craft activities, including weaving, spinning, knitting, embroidery, block printing, and dying. It also has rented a small building downtown as a marketing outlet for craft items produced by its members.

f. Operating procedures

ACP is developing a system of tracking and follow-up which shows good potential for ensuring that important information is gathered and assessed. A variety of forms for raw material and finished product inventory control are in use and data from these are fed into New ERA's computerized record keeping system. At present the Executive Director and the Manager carry out follow-up with producers' groups but intend to pass this function to the newly hired marketing advisor. New ERA's survey enumerators, who speak Newar, have in some respects been better able to elicit useful feedback from the producers groups than has ACP's Executive Director. The latter, however, seems quite aware of her limitations in certain areas and open to, yet cautious in her interpretations of, feedback from producers.

2. Wool spinning

a. Objective of the productive activity

The purpose of the wool-spinning project is to apply commercially-improved wool-spinning technology among small producers to increase off-farm employment and incomes among the rural poor; and to provide a reliable supply of high quality yard at a competitive price to the hand-knotted carpet industry.<sup>2</sup>

The project intends to verify the hypothesis that Capital efficient, labor-intensive technologies which increase production of hand-spun woolen yard at a quality and price competitive with mechanized units can be delivered to small rural producers through a self-supporting, non-subsidized system in the NGO/PVO sector of Nepal.<sup>3</sup>

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<sup>2</sup>ATI, "Wool Spinning Project Plan [No. 84-0079]," 1984, p. 1.

<sup>3</sup>Ibid, original version, p. 16.

b. Description of the productive activity

The project is promoting improved technologies for carrying out three of the basic steps in producing hand-spun yarn from raw wool. A cradle picker has been introduced to fluff and clean the wool. Traditionally, this has been done quite literally by hand-fluffing small pieces of wool by pulling them apart with the fingers. A rotating drum carder is used to align the fibers in parallel so they may be spun. Traditionally, this has been done with two hand-held paddles covered with carding cloth. Finally, treadle-operated spinning wheels are replacing the traditional hand-turned charka wheels, permitting a spinner to increase daily output by as much as four times.

ACP is presently providing support to four different kinds of production units:

- o ACP's own training unit, where contracted instructors provide training in wool-spinning to persons (almost always women of low caste) who will become trainers, managers, and/or owners of spinning operations in their own village areas;
- o Units established through other NGOs--through trainers trained by ACP. This is the principal means called for in the original project plan to spread the technologies. Some NGOs, however, are donating spinning wheels to individuals and not encouraging them to work together to take advantage of a jointly-owned carder; and
- o Two kinds of units established and backstopped directly by ACP:
  - A five-wheel unit, with improved carder and picker, owned and managed by a single person, responsible for the loan from ACP, who hires other women or girls as spinners; and
  - A similar unit, but managed by a group with each woman owning her own wheel and responsible for her own loan from ACP. One woman took out a loan for the improved picker and carder.

The Evaluation Team visited one of each of these four kinds of production units. Their diversity provides a good test of alternative ways to disseminate appropriate technologies in Nepal.

c. Innovations

In addition to the technology, a key innovation is the organization of wool-spinning producers into commercial units. Traditionally, wool-spinners work as individuals. In many cases,

wool-spinning is not carried out on a commercial basis; if so, it is often an intermittent activity. Many of the present units are carrying out production on a regular basis.

Another innovation is the self-supporting mechanism for training. Villagers are not given stipends for attending training sessions. Sales of yarn produced during the training sessions covers the cost of the trainers.

d. Implementation

As noted above, the original project plan called for training and follow-up for extension workers from other NGOs to establish spinning enterprises. When implementation began, ACP felt that some of the other NGOs were not giving proper attention to the importance of demonstrating commercial viability and decided to set up and backstop some units directly in order that this could be demonstrated.

The original project implied that improved spinning technologies would be introduced among women who were already spinners. ACP felt that the production of most of these women was so much under the control of the larger carpet weavers that the latter would be able to reap most of the benefits of their improved outputs. ACP thus decided to work primarily with women who had not previously been involved in supplying the carpet industry. Most of these have been from farm households, where labor demands have been high during the past few months. This has led to such problems as late delivery, and hasty spinning with accompanying poor quality yarn. ACP is now considering alternatives, such as working more closely with the landless. ACP feels, however, that the landless poor are likely to be less able to pick up the marketing and related entrepreneurial skills needed to be successful.

The survey work by New ERA has revealed some misunderstanding on the part of the producers as to their and ACP's responsibilities to each other. ATI is working to get New ERA and ACP to communicate with each other more informally and more frequently about these and future findings.

3. Conclusions for wool-spinning

a. Commercial viability

The factors which appear at this point (November 1985) to be most important in affecting the commercial viability of the wool-spinning units are the effective linkage of spinning units with their suppliers and buyers, the carpet producers (who both provide them with raw wool and purchase spun yarn). The overall supply and market

was described adequately in the Project Plan.<sup>4</sup> The particular problem areas that have arisen in the course of the project were not explicitly noted. (However, the Project Plan did make clear that ACP had dealt with similar kinds of problems in the past with respect to its other craft activities, and implied that it would have the capacity to deal with such problems as they arose.) ACP is responding appropriately in most areas; ATI is persuading ACP to act in the remaining areas.

b. Impact

The wool-spinning activities are providing income-generation opportunities to low-income families. Most of the spinners are women, a target group which needs such opportunities, yet has difficulty in finding time for such activities amidst many other household responsibilities. Young children often contribute significantly in producing yarn.

c. Source of ideas

Considerable potential for improving hand-spun wool production in Nepal was identified by a World Bank consultant in 1983, although there was no immediate local initiative in response to this. ACP's original proposal to ATI was to expand handicraft production and marketing activities. During the course of project development, ATI discovered the work done by the World Bank consultant on wool spinning and then made the link between ACP's capacity in providing support services to small producers and the potential of the spinning technology.

d. Risk

Most of the women who have taken out loans for improved spinning equipment are doing so for the very first time. ACP has helped give them incentive to do so in part through its high quality training program. ACP follow-up support will help ensure that the risk the women are taking is sufficiently small. To date, such support has not been as strong as it should be. ATI and New ERA are working to remedy this through better identifying where support is most needed.

e. Replicability

As described in the Project Plan, there is considerable demand for yarn for the hand-knotted carpet industry, enough to keep several thousand additional spinners occupied full time. Most of the carpet enterprises, however, are located in the Kathmandu Valley and

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<sup>4</sup>Changes in the international market for Nepalese hand-knotted carpets, if not a temporary trend, will certainly affect the demand for hand-spun yarn negatively. For this reason, ACP and ATI are making efforts to diversify the market for wool yarn by developing alternative end uses (e.g., flat-weave carpets, knitted sweaters).

Pokharay. Given the difficulties of transport and marketing in Nepal, replicating the project to the more remote hills will require considerable support in these areas. Potential exists where other wool-based cottage industries exist, e.g., hand-woven woolen blankets. ATI has received several requests for information on possible replication in Peru and Bhutan.

f. Key inputs

ATI has provided funding for the revolving fund and support for a portion of ACP's recurrent expenses, including one-third of the salary of a full-time technical advisor. ATI identified the need for outside assistance in monitoring and evaluation and has provided funding from ACP to contract for this. ACP has provided expertise in the area of craft production, including quality control and marketing. The technology itself is widely used by craftspersons in the developed world and has not required significant adaptation.

4. Conclusions for ACP

a. Capability

ACP is most capable in supporting cottage industries in the production and marketing of crafts through training and provision of raw materials and market outlets. It is less capable, but showing potential for increased capability, in helping cottage industries establish themselves as commercial ventures responsible for their own marketing and raw material supply. (Few of the intended beneficiaries have commercial experience and almost all will require support in this area.) Capability in monitoring and evaluation is being provided by New ERA. It is not presently intended that this capability be transferred to ACP.

b. Commitment

The principal staff of ACP are clearly very committed to reaching low-income people and to the present project. ACP has experienced some difficulty in identifying persons with a similar level of commitment to fill some of the other positions, for example, that of marketing advisor.

c. Information flow

ATI is still working with ACP to submit its reports in the format called for in the grant agreement. The quarterly reports have shown gradual improvement over the life of the project. The Executive Director was very open with the Evaluation Team about weaknesses in the project and what she was doing to remedy these. Feedback from wool-spinning enterprises to ACP does not flow as well as it should. ACP intends for the market advisor to play a key role in this process. New ERA, through women enumerators who speak Newar, has been more successful in getting feedback from producers; however,

communication between New ERA and ACP is not as complete and timely as it needs to be for effective responses to producer feedback to be made.

C. New ERA (Project No. 84-0775)

1. Description and findings for New ERA

a. Brief history

New ERA was established in 1971 by a group of American and Nepalese educators as the first non-government development organization in Nepal. During the 1970s, Nepalese moved into the organization's leadership. Since 1981, New ERA has been run entirely by Nepalese professionals. New ERA began its association with ATI in 1981 with informal contacts with the ATI regional project officer.

New ERA's efforts focused initially on the field of education. It later expanded its activities to include rural development, communications, human resources, and project evaluation. Training has been directed largely to staff and field workers of national and international agencies involved in development work.

b. Purpose of ATI's project with New ERA

New ERA's purpose is to carry out research and training for development and social change. ATI's project will help develop New ERA as an implementing organization. The turbine-driven agro-processing project is New ERA's first effort in direct implementation. This represents one component of ATI's strategy in Nepal, where local expertise and professional capacity is not focused on the actual promotion of economic development but in evaluating the programs of donor agencies. Through applied research and commercial application projects, ATI intends to tap Nepalese technical capacity and focus it on rural economic development.

c. Organization and management

New ERA is registered in Nepal as a private research organization operating on a nonprofit basis. It is owned by its staff and consultants who hold major shares.

A seven-member Board of Directors decides broad policy issues. Five of the seven are employees of New ERA. All major management and operating decisions are taken by a five-member executive committee. Three of these are nominated by the Board of Directors and two are New ERA staff.

d. Staff and resources

New ERA has a total staff of 40. About 15 of these are professionals. All of the professional staff have a BA or MA, principally in economics.

New ERA has one Compaq and one Apple computer and associated software. It recently (1985) used these to process 17,000 questionnaires as part of a national survey. New ERA does not own any vehicles or any other major equipment. It is presently occupying a rented house but plans to construct its own office building soon.

e. Operating procedures

In addition to this first implementation project, New ERA manages a fairly large portfolio of project planning, monitoring and evaluation activities. New ERA's approach to data collection is comprehensive and professional. For the turbine-driven agro-processing project, it used a one-page questionnaire in a baseline survey of about 600 people in 11 villages, using a modified geographic cluster sampling technique. There will be initial data collection before installation of the agro-processing unit (APU) and evaluations after the first, second, and third years following installation.

2. Turbine-driven agro-processing

a. Objective of the productive activity

The purpose of the turbine-driven agro-processing project is to test the commercial and technical feasibility of a locally designed and manufactured turbine-driven heat generator to be employed in a community-owned agro-processing enterprise manufacturing dairy, horticultural, and agricultural products for local markets.

b. Description of the productive activity

This is an applied research project. A water turbine-powered mechanical heat-generator kettle unit will be used as a low-cost source of heat for processing citrus and dairy products (initially) using simple concentration (boiling) methods. The technology will be expanded to other products including soap, dried fruits, vegetable, and spices during the course of the three-year project period. New ERA will provide technical, management, and extension services to a community-owned enterprise demonstrating the benefits of the technology. The ultimate beneficiaries will be approximately 600 villagers living in a remote hill area of Nepal.

c. Innovations

The principal technical innovation in the project is an alternative use to be made of water turbines; i.e., generation of heat and the subsequent use of this heat for processing of agricultural products for local markets.

A "soft" technology innovation is the establishment and testing of a village-owned and managed productive commercial enterprise.

#### d. Implementation

The project has been delayed, largely due to an overrun on estimated costs for the construction of the agro-processing unit (APU). (The higher costs resulted from new government controls on the use of dynamite.) This will require an additional US\$ 4,000 to be added to the original grant.<sup>5</sup>

Preliminary steps have been taken towards organizing the villagers for managing the APU. A local resident, selected by the local development committee, has been acting as a community organizer for the past two years as part of another New ERA development program. This same person has been selected to serve in this capacity for the new agro-processing project. Forty people have agreed to become members. They will provide labor to build the canal and penstock for the APU.

New ERA reviewed alternative forms of village-level organizations, including a cooperative structure. A problem with the conventional cooperative is that it would have to be registered with the Ministry of Cooperatives. This Ministry would then assign a project officer and the village cooperative would have to pay for his services. This requirement was not viewed favorably by the villagers. Therefore, it has been tentatively decided to register the association as a "cottage industry" since this also simplifies the bureaucratic procedures. ATI had pressed for this alternative, too, because it would foster a more commercial approach and attitude.

The fabrication of the turbine, heat generator and other components of the APU has been completed in Kathmandu by a local manufacturer. The units will now be coupled together with an electric motor for testing before their installation at the site. The testing was to take place a few weeks after the Team's visit in November 1985.

### 3. Conclusions for the agro-processing project

#### a. Commercial viability

As this is an applied research project, ATI has not developed a business plan for this productive activity. A detailed marketing study has not been carried out, but processing and sale of a variety of products in the project area, using fuelwood-based technology, has been described. The heat generator is a relatively inexpensive addition to a much more costly turbine-driven milling and grinding technology which has spread extensively throughout Nepal since before 1980. Given the extreme diversity of local market conditions in Nepal, it is difficult to assess commercial viability based on pro forma data. Where an existing turbine is in operation and raw materials are

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<sup>5</sup>ATI reports (February, 1986) that costs have subsequently been minimized after a second site survey was undertaken at its insistence.

plentiful, as in the present project site, the commercial potential is promising.

b. Impact

The impact of the technology in most cases will be similar to that of the larger milling unit to which it is added. These have generally most directly benefitted the wealthier village residents, who have had the capital to invest in such a unit. The New ERA pilot project, however, involves a community-owned unit. ATI's and New ERA's careful attention to this aspect of the project will help ensure that benefits are shared equitably.

c. Source of ideas

ATI and New ERA each played a role in identifying and developing the idea for this applied research project. New ERA's original proposal to ATI was for a turbine mill unit, to be completely subsidized. ATI was familiar with the results of trials on the heat generator in Nepal and Germany. New ERA had also become aware of the technology through other of its projects in micro-hydro power generation. They developed the project together from there.

d. Risk

The technology itself has been tested in other sites and does not present much risk. Greater risk is involved in the marketing of processed products and in the innovation of community ownership/management. In selecting New ERA to implement this project, ATI has taken some risk, as this will be New ERA's first implementation project. It's proven capacity in research, training, and evaluation, however, provides a good basis for taking this risk.

e. Replicability

If successful, the processing technology could be replicated widely throughout Nepal, in much the same way that the turbine-driven mills have replicated spontaneously. It could also be replicated to other parts of the world which have potential for small hydro-power development.

4. Conclusions for New ERA

a. Capability

New ERA's experience in research and evaluation have given it an excellent understanding of factors affecting technology transfer in Nepal. Its staff seems very competent. The Team was unable to visit the project site to gain a better impression of New ERA's on-the-ground operations.

b. Commitment

New ERA staff seem highly committed to social development and helping rural low-income people.

c. Information flow

Excellent monitoring and evaluation for the agro-processing project will be essential to success in further replicating both the hard and soft innovations. New ERA has developed comprehensive plans and survey designs for both the agro-processing and the wool-spinning projects. These have already proved valuable in the latter project and should continue to do so over the life of each project.

D. ATI Linkages

Since January, 1984, ATI's project officer has visited Nepal five times, ranging from ten days to five weeks per trip. ATI has contacted a variety of individuals and organizations. In 1984, the USAID mission requested that ATI participate in an evaluation-planning exercise on the Appropriate Technology Unit of the Agricultural Development Bank. However, this first attempt at mutual collaboration did not succeed because of the difficulties USAID missions face in financing ATI activities. Currently, ATI is in the process of project development with a number of potential IOs in Nepal, including a local engineering workshop, an agricultural tools manufacturer, and a local PVO. Contact with other organizations--e.g., the Royal Nepal Academy of Science and Technology (RONAST) or the Research Centre for Applied Science and Technology (RECAST)--involved in appropriate technology in Nepal has been limited. In part, this may be due to these organizations' limited interest in or capacity to promote and/or apply appropriate technology in ATI's designated priority fields. Shortly after the Evaluation Team's visit, a member of ATI's Project Review and Advisory Committee travelled to Nepal, among other countries, in part to assess the potential for effective institutional linkages.

ANNEX 1

Statement of Work

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## ARTICLE III - STATEMENT OF WORK

### A. Concerns and Issues to be Addressed

#### 1. ATI's Performance Under the Cooperative Agreement

##### a. ATI's Organization and Strategy for Implementing the Cooperative Agreement

Does ATI's Long-Term Strategy present an adequate blueprint for both carrying out the Cooperative Agreement and for the evolution of ATI? Have ATI's portfolio of subprojects and supporting activities been effectively organized to carry out the objectives of the Cooperative Agreement and the Long-Term Strategy?

##### b. The Relationship of ATI's Subprojects to the Long-Term Strategy

Do the subprojects funded by ATI reflect an investment strategy and tactical decision-making within the organization and the implementing organizations that seeks to (1) achieve the objectives of the Cooperative Agreement and the Long-Term Strategy (2) show the commercial viability of for profit operations, (3) promote viable and sustained enterprise development, (4) maintain a balance between the technical and process aspects of technology transfer on the one hand, and the institutional and popular participation aspects, on the other, and (5) provide monitoring and evaluation of ongoing activities in order to adapt ATI's or the implementing organization's approach as required.

##### c. Preliminary Results of ATI's Subprojects

Are ATI's subprojects adequately designed to meet their objectives? Are ATI's subprojects making adequate progress towards their objectives? What has been the preliminary impact of ATI subprojects on intended beneficiaries?

##### d. Cooperative Agreement Performance Targets

Is ATI making adequate progress in achieving the Cooperative Agreement performance targets ?

#### 2. Lessons of Broader Significance for the Technology Transfer Process and the Promotion of Small- and Medium-Scale Industry

##### a. Quality and Impact of Technical Assistance

Is ATI providing appropriate technical assistance to implementing organizations to enhance the impact of capital investments? Are implementing organizations providing technical assistance as well as credit? Has ATI developed a workable approach to the adaptation of the technologies used

in its subprojects? Does ATI's strategy and practice give adequate attention to the marketing of both products and innovations? Has ATI developed the capacity to manage the technical assistance required to make subprojects successful?

b. Effectiveness of Implementing Organizations

Is ATI's use of cooperating country NGOs as intermediaries in the transfer of technology effective? Is ATI's use of cooperating country NGOs to administer venture capital funds likely to be successful? How effective are cooperatives and community development organizations in organizing and managing profit-making enterprises? Is this a way to reach the poor and isolated locations with profit-making enterprises? Are ATI's project partners manifesting the characteristics which are likely to bring about success in implementing the ATI program? Have they sufficient resources to carry out their ATI funded program? Is the staff capable of planning, managing and assisting enterprises which are striving for commercial viability, sustained technological growth, and adaptability to changing markets, opportunities, and constraints? Is ATI technical assistance adequately designed to fill the gaps?

c. The Supported Enterprises and Technology Transfer

What are the basic financial and economic parameters of the firms ATI supports to develop and market new technologies, products and services? What are the management capabilities within the firms and what types of technical assistance are available and have been provided from all sources? Is the technology likely to be commercially viable in this economic setting, in the time frame of ATI involvement?

3. Looking Forward - Replication of the Innovation Elements of ATI's Successful Appropriate Technology Demonstration Subprojects

- Replication of the Innovative Elements of ATI's Successful Appropriate Technology Demonstration Subprojects. Is ATI's Replication Strategy Addendum workable and likely to achieve its objectives? Is ATI's current organization portfolio consistent with this Strategy? If not, what changes need to be made? Is the research design for ATI's replication research activity sufficient to obtain meaningful results?

ANNEX 2

Asia: List of Persons Contacted

ANNEX 2

Asia: List of Persons Contacted

A. Philippines

Rogelio Pantaleon, Executive Director, Filipinas Foundation (FFI)  
Gary Teves, Director, Agriresearch, Science and Technology  
Division, (S&T), FFI  
Eduardo Tan, Director, Human Resources Division, FFI  
Mayette Cuaño, Manager, Venture Capital Division (VCD), FFI  
Maria Teresa B. Francisco, S&T Division, FFI

Julian Banzon, Consultant on coconut processing,  
University of the Philippines at Los Baños (Retired)  
Raul R. Gonzales, S&T Division, FFI  
Carmelo Cabrera, S&T Division, FFI  
Andy Dawang, Research Unit, Human Resources Division, FFI  
Herminio Teves, Owner, Prototype Coconut Processing Plant (PCPP)  
Dumaguete

Zenaida Teves, Data analysis, PCPP  
Bill Fleischer, Coconut grower, Negros  
George Fleischer, Coconut grower, Negros  
Herminio Teves, Jr., Equipment and procurement, PCPP  
Janice T. Gaston, Marketing Agent, PCPP

Nenette Teves, Supervisor, PCPP  
Gloria Apostol, Bookkeeper, PCPP  
Potenciano "Chito" Roque, Partner, Mushroom production venture,  
Antipolo  
Ludi Roque, Manager, Mushroom production venture  
Ernesto Garilao, Executive Director, Philippine Businessmen for  
Social Progress

Doug Clark, Director, Office of Rural and Agricultural Development  
(ORAD), USAID/Philippines  
Lydia Martinez, Agribusiness specialist, ORAD, USAID/Philippines  
John Tenant, Chief, Office of Capital Development,  
USAID/Philippines  
Clark Billings, Deputy, Office of FFPV  
Eduardo Taylor, Former Director, Institute for Small-Scale  
Industry

B. Thailand

Tawatchai Traithongyoo, Deputy Director, Population and Community  
Development Association (PDA)  
Pairojana Sornjitti, General Manager, Rural Small Scale Industries  
Development Company (RSSI), PDA  
Siriyong Ruewiwat, Manager, RSSI, PDA

Thailand (continued)

Suchada Rojsataporn, Accountant, PDA  
Wilas Techo, Manager, Research and Evaluation Division, PDA  
Malee Suwana-adth, Executive Director, SVITA Foundation  
Karnitha Karnchanachari, Project Manager, SVITA  
Wichien Yongmanitchai, Microbiologist, Kasetsart University  
Khun Daranee, Project Officer, SVITA  
Ajun Wijit Khajornmalee, Director, Chiang Mai Research Center,  
Mae Jo (CMRC)

Ajun Chalut, Director, Soil Division, CMRC  
Ajun Kanlaya, Crop Science Researcher, CMRC  
Khun Supachai, Soybean breeder, CMRC  
Khampan Thongtan, Sub-district Headman, Tambon Ban Mae  
Anant Suwanarit, Village Headman, Ban Kiew Lae Noi

Boonsong Wanalangka, Assistant Village Headman, Ban Kiew Lae Noi  
Boonma Duang Gaeo, Ban Kiew Lae Noi  
Padmanabhan Somasegaran, Microbiologist, NIFTAL Project,  
Maui, Hawaii  
Nantakorn Boonkerd, Acting Director, Biological Nitrogen Fixation  
Resource Center for South and Southeast Asia, Bangkok  
Robert F. Barnes, Office of Science and Technology, USAID/Thailand

Jeff Evans, Private Sector Development Officer, USAID/Thailand  
John Foti, Agriculture Development Officer, USAID/Thailand  
Robert Montgomery, USAID/Thailand  
Lawan Ratanaruang, Women in Development Officer, USAID/Thailand  
Jane Rosser, Regional Technical Advisor/Asia--Small Enterprise  
Development, CARE/Thailand

Wichai Wuthisane, Manager, Bamboo Grass Plait Project, Ban Khok  
Sa-ard  
Khun Boonrot, Manager, Income generation and forestry projects,  
Community-Based Integrated Rural Development Centre at Ban Pai  
Bamboo Grass Mat Weavers at Ban Khok Sa-ard and Ban Huei Hin Lap  
Jaron Kumnuanta, Science and Technology Office, USAID/Thailand  
(Technical Advisor for Protein-Enriched Cassava Project)  
Santi Wiriyawit, Mechanical Engineer, Kasetsart University (KU)

Pipon Boonchanta, Mechanical Engineer, KU  
Wicha Chirachon, Engineer, KU  
Charan Chettanachit, Engineer, KU

Nepal

Meera Bhattarai, Executive Director, Association for Craft  
Producers (ACP)  
Mr. Neema, Manager, ACP  
Mike Kraijniak, Advisor, ACP  
Madhup Dhungana, Deputy Director, New ERA

C. Nepal (continued)

Narayan Kaji Shrestha, Research/Training Officer, New ERA  
Sidhartha Man Tuladhar, Assistant Research Officer, New ERA  
Shree Krishna Baidya, Assistant Research Officer, New ERA  
Sharmila Shrestha, Senior Enumerator, New ERA  
Jenny Baidya, Enumerator, New ERA  
Gary Shaye, Director, Save the Children

Tom Arrens, South Asia Representative, World Neighbors  
Virgil Miedema, Assistant Project Development Officer, USAID/Nepal  
Carl Dutto, Rural Development Officer, USAID/Nepal  
B.N. Acharya, Private Consultant  
Daniel Jantzen, President, Bikash Enterprises  
Al Schlorholtz, Economic Development Secretary, United Mission to  
Nepal

Kiran Man Singh, Planning and Project Development Chief,  
Agricultural Development Bank  
Ramkshari Shrestha and others, Wool Spinners, Kitiput  
Bulumaya Maharjan and others, Wool Spinners, Panga  
Subadhra Pradhan, Community Worker, Plan International,  
Sitapaila Office  
Wool Spinners of Halchowk Panchayat

D. Others

Tom Corl, Manager, Evaluation and Technology Development Group,  
ATI  
Marshall Bear, Regional Manager for Asia, ATI  
Milton Barnett, Member, Project Review Advisory Committee for ATI  
Penny Czarra, Project Officer for Nepal, ATI  
Mike Tiller, Director of Field Operations, ATI  
Ton deWilde, Executive Director, ATI  
Ed Smith, Project Officer, Bureau of Science & Technology (S&T),  
AID/W  
Michael Farbman, Chief, Employment and Enterprise Development  
Division, Office of Rural and Institutional Development, S&T,  
AID/W  
Ruth Zagorin, Agency Director for Human Resources, S&T, AID/W

ANNEX 3

Asia: Itinerary of Evaluation Team

ANNEX 3

Asia: Itinerary of Evaluation Team

Monday-Friday October 28-November 1	Meet with AID and ATI staff in Washington, DC
Saturday-Sunday November 2-3	Travel from Washington, DC to Manila
Monday, November 4	Meet with FFI staff
Tuesday, November 5	AM: Meet with USAID staff  PM: Fly to Dumaguete; visit coconut processing plant
Wednesday, November 6	AM: Visit coconut producers and shops selling processing coconut products  PM: Return to Manila; visit FFI/STRC shop and laboratory
Thursday, November 7	AM: Visit mushroom operation in Antipolo  PM: Meet with Philippine Businesses for Social Progress and USAID staff
Friday, November 8	AM: Review and write-up  PM: Wrap-up meeting with FFI staff
Saturday, November 9	Travel to Bangkok
Sunday, November 10	Document study and preparation
Monday, November 11	AM: Meet with PDA staff  PM: Meet with SVITA staff
Tuesday, November 12	AM: Fly to Chiang Mai; visit rhizobium and soybean project, Ban Mae  PM: Meet with Mae Jo Research Center staff
Wednesday, November 13	AM: Return to Bangkok; meet with SVITA staff and contributing researchers  PM: Visit Biological Nitrogen Fixation Resource Center and Kasetsart University

Thursday, November 14 AM: Meet with USAID staff

PM: Meet with CARE small enterprise development representative and with PDA staff

Friday, November 15 Travel by car to Khon Kaen with PDA staff

Saturday, November 18 Visit bamboo grass mat project, Ban Khok Sa-ard and Ban HinLup

Late PM: Return to Bangkok

Sunday, November 17 Visit protein-enriched cassava project, Kasetsart University

Review and write-up

Monday, November 18 Travel to Kathmandu

Tuesday, November 19 Early AM: Meet with USAID staff

Late AM: Meet with ACP staff; observe training activities

PM: Visit ACP wool spinning project sites, Kitipur and Panga

Late PM: Dinner with Nepali consulting engineer

Wednesday, November 20 AM: Visit NGO wool spinning and training project sites (Devres consultant)

Meet with Appropriate Technology Unit Staff, Agricultural Development Bank (AID direct hire)

Noon: Lunch with World Neighbors representative

PM: ACP sales center

Late PM: Meet with Save the Children representative

Thursday, November 21 AM: Meet with New ERA staff

PM: Meet with US appropriate technology consultant

Late PM: Fly to New Delhi (AID direct hire)

Friday, November 22 AM: Meet with United Mission to Nepal,  
economic development advisor (Devres  
consultant)

PM: Fly to New Delhi (Devres consultant)

Saturday, November 23 Return to Washington, DC

December Further meetings with AID/W and ATI staff;  
Write-up

ANNEX 4

References Cited

## ANNEX 4

### References Cited<sup>1</sup>

- ATI. "Filipinas Foundation Rural Small [Scale] Industries Development Program Project Plan [No. 840389]. Washington, DC: 1984.
- \_\_\_\_\_. "Monitoring and Evaluation Issues: 84-0389, Rural Small Industries Development, Filipinas Foundation, Inc. Philippines". Washington DC: 1985.
- \_\_\_\_\_. "PDA Rural Small Scale Industries Development Company Project Plan [No. 84-0226]". Washington DC: 1984.
- \_\_\_\_\_. "Protein-Enriched Cassava: Low Cost Feed for Pig and Poultry Project Plan [No. 84-0290]". Washington DC: 1984.
- \_\_\_\_\_. "Rhizobium Inoculant-Low Cost Technology for Soybean Production Project Plan [No. 84-16]". Washington DC: 1984.
- \_\_\_\_\_. "Wool Spinning Project Plan [No. 84-0079]". Washington DC: 1984.
- USAID. Country Development Strategy Statement. 1984: Nepal. Kathmandu.
- \_\_\_\_\_. Country Development Strategy Statement. 1986: Thailand. Bangkok: 1985.

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<sup>1</sup>In addition to these references cited in the text of the report, the Asia Team examined a great number of other documents, including ATI's annual work plans, annual and quarterly progress reports to AID, the Cooperative Agreement between AID and ATI, and detailed documentation on each project (e.g. project plans, monitoring and evaluation issues papers, project contracts, quarterly progress and financial reports from IOs, ATI staff trip reports, relevant Progress Review and Advisory Committee meeting minutes, and technical background reports).