
**THAILAND:
HUMAN RESOURCES
DEVELOPMENT PROJECT**

Final Report

United States Agency for International Development

Prepared for: USAID/Thailand

Prepared by: IMRS Co., Ltd.

Project No.: 493-0249-3-0073

April 1991

TABLE OF CONTENTS

Executive Summary	1
A. Assessment of Priority Development Areas	A-1
B. Other Donor HRD Activities	B-1
C. Developing Public/Private Sector Linkages and Models for Labor Skill Development and Technology Transfer	C-1
1. Existing US-Thai linkages	C-1
2. U.S. models that are transferable to Thailand and U.S. institutions prepared to collaborate.....	C-12
3. MOSTE program	C-26
4. Programs for APEC initiative	C-30
D. HRD Program/Project Strategy and Criteria	D-1
E. Pilot Project Development	E-1
<u>Projects to be Proposed to USAID</u>	
1. The Petroleum and Petrochemical College.....	E-1
2. Thai ^{CHAPTERS} of the American Association involved in Engineering and Manufacturing	E-3
3. NMTBA Project	E-4
<u>Project Ideas</u>	
1. Rayong Technical College	E-5
2. Seminar on University Brain Drain	E-6
3. Information Technology Program	E-6
4. Northeastern University - Summer Internships for Thai Students	E-7
5. Seminars with PTIT	E-8
6. Training Unit for Private Vocational Schools Association	E-9

TABLE OF CONTENTS (Con't)

7.	TAT Project	E-9
8.	Northeastern and Rangsit Technical Cooperation Program	E-9
9.	US-Thai-Philippine Initiative	E-10
10.	A Fund to Provide U.S. Professors of Technology to Private and Provincial Universities	E-11

EXECUTIVE SUMMARY

I. Introduction

Since the beginning of 1987, the Thai economy has grown more than 50% in real terms. At the end of 1990, the gross national product was twice as large as it was in 1981, also in real terms. This rate of growth is unprecedented in Thailand's history and in the history of most countries. Such a rapid rate of growth has caused serious problems, as much of the infrastructure has not been able to keep pace with economic development. Thailand began the 1980's with an educational system that was designed to provide literacy and numeracy to all of its agricultural population. It finished the decade with the roughly 60% of the work force in agriculture producing less than 20% of its national wealth. While recognizing that there is a serious mismatch between the industrializing economy of Thailand and its largely agrarian population, it must be acknowledged that those who designed the current educational system sincerely wished to instill universal basic education and promote democracy in the process. As far back as King Rama VII, Thais have recognized the close relationship between education and democracy. Even though much work remains to be done in strengthening the educational system and in promoting democracy, Thailand has succeeded in providing literacy and numeracy to its population.

The challenge of the 1990's will be to enable Thai workers, whose roots are still largely in agriculture, to compete internationally in an industrial sector increasingly complex in its technology. While the size of the task is mammoth, Thailand is fortunate to have a wide variety of institutions, both public and private, that can play a role in meeting the challenge. Among these institutions are some that come from the United States.

The United States has supported Thailand's efforts to strengthen education, to build a free market economy, and to establish private and public institutions that can mobilize opinions and resources to promote the common good. The United States is represented in Thailand by public and private institutions whose resources can be mobilized to meet Thailand's human resource development challenges. In addition to the U.S. institutions already in Thailand, others can be called upon to come to Thailand.

II. The Problem

The central problem is a mismatch between the needs of an industrial sector increasingly complex in its technology and the skills of a largely agrarian population.

The problem exists on two levels, a public policy level and a firm level. On the firm level, most companies currently in Thailand are managing to prosper in spite of constraints in the skill levels. The major human resource problem that they have is recruitment of engineers. Turnover is a problem, but it is more of a problem among unskilled workers than skilled workers. This is partly due to the propensity of Thai laborers to return home to work in the fields during the planting and harvesting seasons; however, this also indicates that the market for unskilled labor in Thailand is tightening. About a quarter of the companies surveyed reported a major problem with turnover among unskilled workers, another quarter plus reported some problem. Among engineers and technicians, only 15% of the companies described the problem as major although about 40% indicated that they did have some problem with engineer and technician turnover. Turnover problems among managers, administrators, and vocational school graduates are still less serious.

A survey of 157 companies confirmed the findings of the 1990 Ernst and Young report that the shortage of engineers is the most critical human resource constraint facing the private sector. A shortage of computer science staff was rated as almost as serious as the shortage of engineers.

Technicians, especially those with experience, are also in short supply. While recruiting managers posed problems for fewer companies, there were problems in finding managers in specialized skills such as finance, human resource development and accounting. While English language skills are a problem for some companies for managers, administrators and some technicians, the companies did not indicate that English language skills were needed beyond this group of people. Most engineers in Thailand are functional in English. They assimilate the new technologies and then train lower level workers. Improved English skills may be necessary to attract higher value jobs to Thailand even if English skills are not a prime concern of many companies currently in Thailand.

It is surprising that more companies did not report serious problems. Most of the companies were selected from directories of the Federation of Thai Industries and chambers of commerce. The bias in the sample was thus towards larger and, for Thailand, more technologically advanced companies. The reason that the companies do not report more problems is that their activities were designed with an awareness of the human resource base in Thailand. It is probable that companies that require a large pool of

highly skilled labor do not come to Thailand. This is a public policy problem.

The companies that do not come to Thailand because they need a highly trained work force and those in Thailand that decide not to expand for the same reason are the companies with the high value added jobs. Their absence or stunted development has negative long term implications for Thailand's development, especially now that the phenomenon of low wage, surplus labor is largely over.

While many companies have come to Thailand because of the abundant and low wage labor force, rapid growth in the demand for labor has absorbed most of the previously surplus labor. Companies that rely on abundant, low wage labor for their competitive advantage are often going to Indonesia and China rather than Thailand. This trend will accelerate in the 1990's.

Thailand is left with no other option than to upgrade the labor skills of its work force. The success of the public and private sectors in this task will largely determine whether or not Thailand will grow rapidly from the mid-1990's into the next century.

III. Potential Collaborators in the Search for Solutions and in Their Implementation

Our assessment of the willingness of private companies, American universities, Thai universities and other organizations assisting in the implementation of solutions is more reserved than the Ernst and Young study. The central problem in implementing programs is mobilizing funds.

The Thai private sector, including private universities, is highly cost conscious. When the private Rangsit University was established, it did not bring in foreign Ph.d.'s to start the program, it recruited professors from Thai public universities along with a complement of overseas Thais who were ready to come home. Even with the shortage of skilled manpower in Thailand, the free market salaries of these academics are a quarter of the salary of a similarly educated American. Those who control the funds will have to be convinced that the programs are cost-benefit effective.

Thailand does not have a tradition of corporate philanthropy. Contributions from the Thai private sector will be modest and will usually involve a clear explanation of the benefits that the donor will receive from the "donation." The foreign business community in Thailand and, in particular, the U.S. community can provide an example; however, its contribution will be modest in comparison to the size of the task.

Thai public universities have many needs competing for few resources. The government budgets for the universities provide limited funds for building linkages.

American universities will not be much more forthcoming. Before visiting the U.S., the research team received faxes from some U.S. universities suggesting that the team not bother to visit unless the principle of full cost reimbursement was to be respected. In general, American universities are not interested in committing significant staff time without external financial assistance from either the partner university or a donor agency, e.g. USAID or the World Bank. This assessment is also less optimistic than the Ernst and Young report.

Tuition fees are one mechanism for raising funds to finance linkages and insure their institutionalization. This is a viable option; however, greater reliance on tuition to cover education expenses will increase the bias towards educating the affluent. While scholarships can open possibilities to the less fortunate, there will be few scholarships and the scholarship programs that have existed in the past have not always been neutral in their selection process.

While there are major restrictions on the nature and the amount of contribution that can be realistically expected of the potential collaborators, there is room for innovative, appropriate scale programming. The following collaboration can be expected from potential USAID partners:

1. Royal Thai Government

The Royal Thai Government recognizes the severity of the mismatch between private sector needs and the current human resource base in Thailand. The government is investing heavily in developing new institutions and university programs and is trying to develop mechanisms to avoid the bureaucracy that it recognizes has become burdensome. Among the major government projects are the 105 million baht building that will house the Petroleum and Petrochemical College at Chulalongkorn University and the 472 million baht campus for the Rajamangala Institute of Technology in Rangsit. For some of these projects, USAID can invest modest amounts to institutionalize a U.S. linkage and improve the quality of the program. At both the Ministry of Education and the Ministry of University Affairs, there is a strong desire to respond to the needs of the private sector and to build market mechanisms into their programs. Both ministries now allow educational institutions to reinvest proceeds from tuition fees into their programs rather than pass the funds to the Ministry of Finance. These ministries are also interested in assisting in the mobilization of resources from the private sector.

2. Thai Universities and Vocational Institutions

Thai universities and vocational institutions are prepared to contribute staff time to building programs; however, most professors would expect compensation for the implementation of programs. Such remuneration is necessary to stem the flight of teachers and professors from Thai universities and vocational schools. The universities have many highly qualified professors, some with Ph.d.'s from U.S. institutions. They have a wealth of expertise that can be brought to human resource development programs.

3. The Business Community

Perhaps the most useful role of the business community will be in furnishing the market demand for training and educational programs. As this demand is self-funded and long term, it will be the mechanism for institutionalizing linkages. The business community through tuition refund programs may be a way to open up education possibilities for the less affluent Thais.

4. U.S. Universities

The U.S. universities have a wealth of pedagogical expertise in addition to area expertise in subjects germane to Thailand's industrial development (e.g. petroleum and petrochemicals, electronics, information technology, production control). The users of this expertise will have to pay for it in most instances. Thai universities will and should compare the costs of sending their professors to the U.S. for further education and the costs of bringing the U.S. professors to Thailand. The custom in U.S. universities of granting professors sabbatical leave may provide a means of obtaining this expertise at affordable prices if Thai universities had a mechanism for identifying professors who desired doing their sabbatical in Thailand. The Thai-U.S. Educational Foundation may provide such a mechanism.

IV. Strategy and Criteria

The central goal of the proposed USAID human resources development strategy is:

To build long term, sustainable Thai-U.S. linkages between the private sectors, research and training institutions, and universities.

After three years of double-digit growth, Thailand is now an Advanced Developing Country and is well on the road to becoming a Newly Industrialized Country. In an industrial economy, linkages between the private companies and educational institutions can be mutually beneficial. Linkages between these institutions between countries can also be mutually beneficial and strengthen bridges between countries. These institutional linkages can continue beyond USAID's presence in Thailand and can act as testimonies to the long term collaboration between Thailand and the United States.

USAID can facilitate these linkages through pursuing the following objectives:

1. Assist Thailand in overcoming its short and medium term needs for technicians, engineers, and managers.

The shortage of technicians, engineers, and managers has two dimensions. The shortage poses problems for companies that operate in Thailand or are considering operating in Thailand and for Thai public policy because these highly skilled workers are needed to increase the value added to products produced in Thailand.

2. Assist Thailand in the medium and long term in its transition from a country whose competitive advantage is based on low wages to one in which the competitive advantage is based on the value added by its human resources.

Thailand's competitive advantage based upon low income labor is being eroded by overall economic success. The minimum wage and the overall wage structure are rising, as the pool of surplus agricultural labor rapidly disappears. The country must shift to higher value added production to meet the expectations of the labor force and remain competitive internationally.

3. Where possible, promote more equitable access to training and education.

The lack of access to quality education and training for poor residents of Bangkok and provincial populations is the root of the high and increasing disparities in incomes. Most of the better primary, secondary and tertiary educational institutions are in Bangkok. High rates of tuition in private institutions and undocumented entrance fees in both public and private institutions combined with few scholarships and educational loans exclude all but the most affluent from quality education.

4. Support programs that include continuing education.

Thailand currently has the lowest secondary school enrollments of any country in ASEAN. It will take at least five years and perhaps a decade or more to catch up. It will need to continue educating its work force after workers' formal education is completed in order to close the gap between the skill levels of Thai workers and those of the other ASEAN countries.

5. Promote institutional and commercial linkages between Thailand and the U.S.

Thailand is interested in an active U.S. presence in the Thai economy. Because Thailand's recent economic success has been predicated on its openness to the world economy, the country is interested in promoting diversification of nationalities among foreign investors. Such diversification of ownership allows Thailand to benefit from the technological advances all over the world. It is also in the interests of the U.S. as Thailand has one of the fastest growing economies in the world and represents both a growing market and a center for access to expanding regional markets.

In selecting projects for funding, USAID can be guided by the following criteria.

1. Programs should serve as models for replication in Thailand.

Given the large number of educational institutions in Thailand, USAID will only be able to work with a small portion of them. Through establishing models that can be replicated in other institutions, USAID can act as a catalyst for change in a wider number of institutions.

2. Programs should emphasize areas in which the U.S. has and is perceived by Thais as having a competitive advantage.

Thais generally regard the U.S. universities as among the best in the world, and U.S. technology is widely respected in the fields of computers, petrochemicals, and construction crafts, among others. By concentrating on these areas, USAID will maximize the chances that U.S.-Thai commercial transactions will result from the interventions and that these interventions will be institutionalized.

3. Programs should have significant leveraging from the private sector, particularly the U.S. private sector in Thailand.

By insisting upon private sector involvement in USAID interventions and the private sector's co-financing of these ventures, USAID can assure that the intervention passes the "market test" and addresses a real need. By emphasizing the involvement of the U.S. private sector, USAID can increase the likelihood that the linkage with the U.S. will be maintained after the end of USAID funding. As one of the objectives of some of the programs will be to increase Thailand's access and to facilitate Thailand's utilization of new U.S. technologies now and in the future, the involvement of the U.S. companies is important as they are the source of much of the new technologies. Leveraging is also necessary given limited USAID resources.

4. Programs should strengthen existing institutions rather than create new ones.

With the large numbers of universities and vocational schools that already exist in Thailand in both the public and private sectors, there is little need to create new ones. The administrative burden on the project holders and on USAID is lighter for strengthening institutions than for creating new ones. The strengthening of institutions requires fewer resources and shorter implementation periods.

5. Programs should impose minimal management burden on USAID.

By the mid-1990's, the USAID Mission will be reduced to a Representative Office, possibly within the Embassy. USAID foresees that this office will be staffed by no more than three American officers and a complement of Thai staff.

6. Programs should concentrate on the following sectors:

- petrochemicals and plastics
- manufacturing
- information technology
- services (financial services and tourism)

7. Where possible, programs should be confined to private sector institutions.

Private educational institutions have been neglected by the donor community. Many of these institutions are dynamic and poised to make a major contribution to Thailand's human resource development. Strengthening private sector programs will foster competition and raise the standards of all educational institutions.

In pursuing the objectives, USAID may wish to consider the following projects:

1. The Petroleum and Petrochemical College (PETC)

The PETC wishes to develop a joint program with U.S. universities in petrochemicals and polymers.

2. A Thai Chapter of the American Associations Involved in Engineering and Manufacturing

As a first step in bringing these associations to Thailand, Rangsit University intends to collaborate with local businessmen in establishing a Thai chapter of the American Production and Inventory Control Society (APICS).

3. The National Machine Tool Builders Association (NMTBA) Project

The NMTBA is interested in facilitating its memberships penetration of the Thai market through donations of U.S. equipment to educational and research associations. They may require assistance in market research and establishing a distribution network.

The following are other project ideas that may be of interest to USAID:

1. Rayong Technical College

The PTIT in collaboration with KMIT is working with the Rayong Technical College to enable the college to better serve the needs of companies along the Eastern Seaboard.

2. Seminar on University Brain Drain and Salaries of Professors in Public Universities

The Thailand-U.S. Educational Foundation is interested in sponsoring a seminar on the university brain drain and ways to stem it.

3. Information Technology Program

The Information Technology Program at Chulalongkorn University will grant undergraduate and graduate degrees in computer science and information technology. The committee charged with the development of the project is considering the optimal mix of English and Thai as the medium of instruction, higher rates of tuition to provide funds for equipment and upgrading and retaining faculty, and possible collaboration with foreign universities.

4. Northeastern University Program for Summer Internships for Thai Students

The Northeastern University internship program could include seminars with U.S. companies in Thailand before the students leave for the U.S.

5. Seminars with Petroleum Institute of Thailand (PTIT)

The PTIT has identified four priority areas in which the U.S. has technology with commercial applications in Thailand. The PTIT would like assistance in bringing U.S. experts to Thailand for industry seminars to present the U.S. technologies. These fields are:

1. Gas technology
2. Energy efficiency
3. Environmental technology
4. Information services

6. Training Unit for Private Vocational Schools Association

There is a need for a training unit that would serve as a resource for the over 300 private vocational schools in the Association.

7. The Tourism Authority of Thailand (TAT) Project

The TAT wishes to bring private investors to collaborate on an expansion and upgrading of its training facility in Bang San. The TAT is willing to reduce its participation to a minority shareholding.

8. Northeastern and Rangsit Universities Technical Cooperation Program

These two universities would like to collaborate on joint masters programs in management engineering and computer and information technology.

9. U.S. - Thai - Philippine Initiative

Assumption University, which began its engineering program in 1990, is interested in collaborating with U.S. and Philippine universities to strengthen its programs. The U.S. participation would include short term technical assistance to both the Philippine and Thai universities, and the Philippine university would provide longer term visiting professors.

10. A Fund to Provide U.S. Professors of Technology to Private and Provincial Universities

The Thailand-U.S. Educational Foundation wishes to institute a fund that would provide partial funding to U.S. professors of technology for spending their sabbaticals at private or provincial universities in Thailand. The Thai universities would contribute housing and a stipend. While USAID would be asked to fund most of the Foundation's funding in the initial years, the Foundation would take responsibility for raising an increasing portion of its funding through donations from the private sector.

A. ASSESSMENT OF PRIORITY DEVELOPMENT AREAS

1. GOVERNMENT, RESEARCH INSTITUTIONS AND PROFESSIONAL ORGANIZATIONS

The research team discussed human resources development (HRD) issues in Thailand with key officials of the government (planners and decision and policy makers) and research institutions and professional organizations. Appendix I lists these respondents.

The interview topics included the role of their respective organizations in HRD and their ongoing and planned HRD activities. The research team also solicited their views and opinions on the priority development areas in HRD and the ways to promote their development.

The research team was impressed by the recognition among professors and university administrators, as well as bureaucrats in the Ministries, of the negative consequences of a bureaucracy that is overgrown, inefficient and lethargic. All levels seem to be searching for means to reform the system. The Ministry of University Affairs, in particular, seems to be encouraging experimentation and the creation of special programs that are administered separately and with more flexibility than the standard programs. This flexibility is an asset for foreign and Thai universities that wish to initiate innovative programs. The Ministry of Education appears to be less open to experiments because it is responsible for much larger, homogeneous programs.

Among the issues cited by respondents were:

1.1 SALARY STRUCTURE OF GOVERNMENT EMPLOYEES INCLUDING PUBLIC UNIVERSITY PROFESSORS AND SCHOOL TEACHERS

A majority of government officials mentioned the need to upgrade salaries of professors, scientists and engineers to a level that would be more comparable to the package offered by the private sector. It was also generally surmised that it would be difficult to effect these changes because of government bureaucracy. Under existing laws and regulations, civil servants that occupy similar positions, irrespective of educational qualifications and job descriptions, receive the same monthly salaries. In order for the government to adjust pay scales, it has to do it across the board, without bias to "selected" positions.

Some respondents were adamant about the urgency of the matter and indicated that those concerned ought to think about possibilities of amending existing regulations.

Should the government fail in this task, the stock of competent university professors, scientists and engineers in government service is expected to dwindle at a faster rate because of the increasing tendency for professors to take jobs in industry, particularly among the younger professors. The problem will become more serious as the older professors begin to retire.

Chulalongkorn University has recently upgraded the salaries of professors in several technical disciplines. This public university is in a unique position because it owns tracts of land in central Bangkok, rents from which go to the university. Some professors have suggested that the private sector donate professorial chairs to universities and even vocational schools. The "chairs" would provide a supplement to the civil servant salary paid to the professor by the government. It has been suggested that the "chair" would provide a 5,000 baht per month supplement to vocational school teachers and a supplement of 10,000 to 20,000 baht to university professors. The additional revenue along with the honor of receiving a "chair" would be sufficient to keep the best professors in the university.

1.2 SHORTAGE OF ENGINEERS, TECHNICIANS AND OTHER SKILLED MANPOWER

The Office of the National Economic and Social Development Board (NESDB) estimated that present demand for engineers is 8,000 a year. Universities and other institutions of higher learning produce engineering graduates at a rate of 3,000 per annum. There is an obvious undersupply of engineers which results in (a) skills substitution; (b) rapid increases in the salaries of engineers; (c) "pirating" of personnel between factories and industries; and, (d) hiring away of government officers by industry.

Government planners and policy makers have effected measures towards bridging the gap between supply and demand of engineers and other skilled manpower. Under the 7th Five-Year National Economic and Social Development Plan (1992-1996), the government aims to increase the number of engineers that graduate per year to 6,000 by the year 1996. The government will support educational institutions in achieving this goal; graduates shall be increased by increments of 600 every year. In order to reach the goal, the Ministry of University Affairs has encouraged private universities to establish engineering programs.

There are a couple of obstacles to meeting this goal. The high schools in Thailand are generally weak in preparing students in math and science. Some professors are concerned that the high schools are not preparing a sufficient number of students adequately prepared in math and science to undertake university engineering programs. In order for the government to meet its target, the academic level of students that enter engineering programs will decline. Secondly, the universities with existing engineering programs are complaining of a shortage of faculty. In order to double the number of students and not sacrifice quality, roughly twice the number of professors will be needed. It is not apparent where these additional professors will come from. Lastly, as ambitious as the program is, it is still inadequate. Assuming that growth in Thailand continues on the fast track and grows by about ten percent per annum, the Thai economy in 1996 will be 60% larger in real terms than it is in 1991. Such an economy would need about 60% more engineers than the present economy or about 12,800 engineers per year. Local output of engineers would still be less than half of industrial demand.

In the case of technical/vocational education, the 6th Plan aims to increase the percentage of technical graduates over commercial graduates. During the Plan's review period in 1989, it was found out that a lot of students still preferred taking commercial courses over technical courses.

1.3 INTERNAL BRAIN DRAIN

Internal brain drain or the drawing away of professionals from the government to the private sector is conceived as directly related to the relatively low salaries received by professionals from the government.

Large numbers of government professionals are being lured away by the attractive salary and fringe benefits package presented by industry. This issue is a regular item in the agenda of meetings; however, respective parties have been unable to find a solution to the problem.

1.4 QUALITY OF EDUCATION AND TEACHERS

Government officials acknowledge the fact that the quality of education in primary and secondary schools needs to be improved. This problem is due to the low educational level of many of the teachers. There needs to be systematic programs for upgrading teachers. The Office of the National Education Commission has stipulated in the 7th Plan the conduct of pre-service and in-service training programs for teachers with an emphasis on science and mathematics.

More units in mathematics and science will likewise be incorporated into the curriculum of Grades 1 to 9 (Prathom 1 to Mathayom 3) as a way of improving basic knowledge of science and technology.

1.5 COMPULSORY EDUCATION

In its effort to increase the level of educational attainment of the youth and enhance their employment opportunities, the government is embarking on a program to increase compulsory education from the sixth grade (Prathom 6) to the ninth grade (Mathayom 3).

In the past, factories did not discriminate between Prathom 6 and Mathayom 3 graduates in the payment of wages. Now, most Japanese firms require Mathayom 3 for their new workers. This trend has prompted parents to reconsider sending their children to secondary school.

1.6 INDUSTRY-UNIVERSITY RELATIONSHIP

Collaboration between the educational sector and industry already exists to some extent. A typical example is the Apprenticeship Program that the King Mongkut's Institute of Technology (KMIT) at Nonthaburi jointly conducts with a number of industrial factories in Greater Bangkok. The program is a two-way linkage: (1) KMIT students work in factories for a period of at least 6 months; (2) factory workers attend continuing education courses at KMIT for updating their skills in newly-developed technologies.

Many companies accept vocational and university students for short term internships. The companies that participate in the programs include banks and multinational corporations. Traditionally, the students were assigned to a junior staff person and asked to do relatively menial tasks, such as filing. As companies have become more concerned about the shortage of skilled workers, they have begun investing in their internship programs through dedicating staff time to making them a worthwhile educational experience. Internships are seen by companies as a means of recruiting staff and generally promoting companies' relations with the public.

1.7 GOVERNMENT-INDUSTRY COLLABORATION

The Director of the National Center for Genetic Engineering and Biotechnology, Ministry of Science, Technology and

Energy stressed the need for government to help the private sector and industry in carrying out the latter's R&D projects through the provision of tax incentives in the procurement of equipment. Expenses incurred by the company in training its personnel and workers should also be tax deductible.

On the part of industry, it can provide (1) time to meet with government representatives to discuss pressing problem in HRD; and, (2) financial support R&D activities of ministries directly involved in the promotion of Thailand's human capital (e.g. Ministries of Education; Science, Technology and Energy; University of Affairs; Industry).

2. RESULTS OF COMPANY SURVEY CONDUCTED IN BANGKOK AND SELECTED PROVINCES

2.1 SAMPLE

A total of 157 companies were interviewed through the telephone and personal visits. The names of the respondents and their corporate affiliations are listed in Appendix II. While more than 70% of total surveyed companies are located within the Bangkok Metropolitan Area (Bangkok, Nonthaburi, Pathum Thani, Samut Prakarn and Samut Sakhon), the rest (30%) of the surveyed factories are located in Rayong, Choburi, Chachoengsao and Nakhon Ratchasima provinces.

The major sectors included manufacturing, service, trading/distribution and computer-related. Each sector was further subdivided for sample selection. Table 1 shows the distribution of samples by sector and sub-sector.

2.2 RESPONDENTS

Among the respondents were presidents, vice-presidents, managing/assistant managing directors, general/office managers, personnel managers/officers, factory/production managers, human resources department managers and other company personnel such as corporate consultant, planning division head, controller, sales manager, coordinator, engineering manager, accountant. While the initial intention was to interview managing directors, many companies referred the researchers to other staff members.

2.3 PROBLEMS

The execution of the survey encountered several problems: (1) the time frame of the survey (late November 1990 through mid February 1991) coincided with holidays and the end of the accounting period for many companies; (2) many managing directors were unavailable; (3) the person designated by the companies to answer on their behalf was not always knowledgeable about HRD questions; (4) companies that preferred to answer the questionnaire by mail and fax often did not complete the questionnaires fully and researchers had to follow up with the respondents.

Table 1 : Distribution of Respondents by Type of Business

Type of Business	Number of Companies
<u>MANUFACTURING</u>	<u>110</u>
Automotive/Auto Parts	12
Chemicals	6
Electrical and Electronics	11
Food Processing	16
Pharmaceuticals	4
Petroleum/Petrochemicals	10
Textile/Garment	15
Industrial Machinery	3
Cement	2
Plastic	12
Printing	2
Pulp and Paper	2
Rubber-based Products	3
Footwear	4
Iron, Steel & Metal Related	4
Glass/Other Construction Mat.	4
<u>SERVICES</u>	<u>33</u>
Construction	16
Commercial Banks	5
Finance	4
Hotel and Tourism	5
Insurance	3
<u>TRADING/DISTRIBUTION</u>	<u>9</u>
Retail Trade & Dept. Stores	3
Wholesalers/Importers	2
Exporters	4
<u>COMPUTER RELATED</u>	<u>5</u>
Total	157

Source: IMRS Survey of Companies, 1991.

Appendix III-A describes the details of the sampling procedure in the selection of respondents while the questionnaire is given in Appendix III-B.

3. DETAILED RESULTS OF THE SURVEY

3.1 PROFILES OF COMPANIES

3.1.1 Company Ownership

Seventy-four or 47.1% of interviewed companies are 100% Thai owned. Six are 100% American owned, three by Europeans, three by Japanese, and three by other nationalities. There are four companies that are owned equally by Thais (50%) and Taiwanese, Japanese and Europeans (the other 50%).

Another 42 companies are owned jointly by Thais being the major shareholder (shares from 51% to 96%) with foreign partners holding minority shares (from 4% to 49%).

There are 12 other partnerships (between Thais and at least two other nationalities) with Thais holding more shares. Foreigners owned a majority of nine companies; Thais owned a minority of these firms. One company was a joint venture between Europeans and Canadians.

Distribution of companies by type of ownership is given in Appendix IV.

3.1.2 Number of Employees

Almost 38% of the companies are large companies which employ more than 500 people while only 10% are considered small (50 employees or less). Another 10% have between 51 and 100 employees while the rest (about 40%) have more than 100 but less than 500 employees.

Table 2 shows the distribution of companies by number of employees.

Table 2: Distribution of Companies by Number of Employees

Number of employees	Number of companies
<= 50	16
51-100	14
101-200	22
201-300	20
301-400	13
401-500	13
>500	59
TOTAL	157

Source: IMRS Survey of Companies, 1991.

3.1.3 Average Number of Employees by Position and Type of Business

Commercial banks employ the largest number of managerial and administrative employees in Bangkok and selected provinces. Among the five banks interviewed, there were on average, 365 managerial positions and 2,462 administrative positions for a Thai commercial bank. Automotive and autopart companies employ the second largest number of managers and administrative staff, followed closely by cement. Details of the distribution are presented in Table 3.

Table 3 : Average Number of Managerial and Administrative Staff by Type of Business

Type of Business	Type of Employees	
	Managerial	Administrative
Automotive/Auto Parts	116	341
Chemicals	8	24
Electrical and Electronics	16	49
Food Processing	15	70
Pharmaceuticals	8	18
Petroleum/Petrochemicals	25	59
Textile/Garment	10	48
Industrial Machinery	6	7
Cement	86	259
Plastic	11	22
Printing	12	56
Pulp and Paper	21	110
Rubber-based Products	10	18
Footwear	10	19
Iron and Steel	6	14
Glass & Construction Mat.	12	30
Construction	12	20
Commercial banks	365	2,462
Finance	34	158
Hotel and Tourism	63	98
Insurance	21	56
Retail Trade & Dept. Stores	44	62
Wholesalers/Importers	10	12
Exporters	6	21
Computer Related	16	22

Source: IMRS Survey of Companies, 1991.

3.1.4 Type of Employees by Educational Attainment

The cement industry sector stood out among the rest as employing, on the average, the most number of engineers (105) and also the most number of non-skilled workers (1,516). It also ranked first in having the most number of employees who were trained in technical and vocational education (727).

The petroleum/petrochemicals companies employ the second largest average number of engineers (38). Only two sampled sectors do not engage engineering graduates on their staff: insurance and printing. Rather surprising is the fact that hotels hire as many as 31 engineering graduates for their staffs, three more than the number that construction companies hire (28). Commercial banks hire the most number of trainees (197 per bank).

Appendix V shows the average number of employees by type of business and level of education.

3.1.5 Recruitment Methods

A majority of companies in all sectors use newspaper advertisements for hiring employees. Positions that are commonly advertised in newspapers are managers, administrators, engineers, technical and vocational personnel. Managerial level positions are also filled through the personal contacts of management. (Traditional Thai companies tend to hire family and friends for managerial positions). It is also common for companies to train and promote "old" employees to management positions as it encourages loyalty among staff.

Non-skilled workers are recruited through announcements at factory sites or connections with company employees. As expected, trainees are hired from educational institutions usually as part of their internship or apprenticeship programs. Engineers, technicians and vocational graduates are also employed directly from their institutions of learning. Few companies use recruitment agencies in hiring staff. Unsolicited applications are not popular with most companies. Only a handful recruit through industrial clubs and associations.

Appendix VI shows details of recruitment methods adopted by companies.

3.1.6 Work Experience Required of Applicants

For managerial positions, almost all companies require applicants to have at least three years of relevant work experience. More than half of the respondents (74 out of 145) require five years or more relevant work experience to hire managers. Only 5% (or 7 companies) actually hired managers with 3-5 years work experience in other fields. Another 4% (6 companies) ventured to hire applicants without any experience in managerial positions. Very few companies gauge the applicant's GPA when hiring personnel. This study confirms the findings of the Ernst and Young report that generally the level of experience of Thai managers is low. This is unavoidable; the Thai economy at the end of 1990 was 50% larger in real terms than it was at the beginning of 1987 and hence probably needed roughly 50% more managers. The growth in the number of managers had to be met with relatively inexperienced people.

One-third of companies (34%) recruit administrative staff with three years relevant work experience; 21% require only one year of relevant experience and another 13% require five

years of experience in the same field. Ten companies hire administrative staff with experience in other fields. Twenty-six percent have filled in administrative posts without requiring any experience.

Engineers are hired by companies with varying requirements. While 44 companies out of 129 (34%) who responded employ fresh graduates, 34 (26%) require one year experience in the same or related field, 27 (21%) and 17 (13%) require three years and five years relevant work experience, respectively. Only 6 companies (5%) employ engineers with experience in other fields.

Most applicants with technical and vocational education qualifications are not required to have work experience. More than 40% of 143 companies hire technical graduates directly from school while 64% of 146 companies engage the services of vocational graduates with no prior work experience. Among 73 companies (58%), work experience in a related field is still a must for technical staff (other than engineers). An additional 10 companies hire technicians who have worked in other fields.

Work experience requirements do not vary from sector to sector as can be seen in Appendix VII which presents distribution of companies by work experience requirement and by type of employees for all industries and for each sector.

3.1.7 Membership in Trade Associations and Clubs

Most companies are registered members of at least two associations. A fairly big percentage of respondent companies (40%) are members of the Federation of Thai Industries (FTI) and its provincial chapters. The next highest membership is with the Thai Management Association (TMA) at 26 (17%). Twenty-five (25) out of 157 (or 16%) are members of the Employers' Confederation of Thailand (ECOT). Some 20 companies are associated with the Personnel Management Association of Thailand; 9 are members of the Technological Promotion Association (Thai-Japan); 8 companies are members of the Thai Contractors Association; 5 companies are affiliated with the American Chamber of Commerce; another 5 companies are members of the British Chamber of Commerce.

There are more than fifty other clubs, associations, committees, councils, forums, etc. which were cited by respondents; however, only one or two companies reported being affiliated with each organization. These are listed in Appendix VIII. About a third of companies were not associated with any club or trade organization.

These results on memberships in trade associations are not necessarily representative of Thai companies. In selecting

the sample of companies, the research team consulted directories of trade associations and chambers of commerce in addition to other directories (e.g. Million Baht Directory).

3.2 TYPES OF MANPOWER TRAINING AND HUMAN RESOURCES DEVELOPMENT PROGRAMS AFFORDED TO EMPLOYEES

Nearly all companies surveyed provide training programs or short courses to their staff and workers either in-house or outside the company (in Thailand and foreign countries) as a means to improve not only their working skills but also to enhance their attitude towards the company.

Newly-recruited employees, regardless of position, participate in orientation. Also, most employees receive on-the-job training, including managers, administrators, technicians and engineers. These programs last from one month to one year.

More companies arrange in-house training programs using company trainers than outside instructors. Many companies feel that this is more cost-effective and makes the programs better suited to their needs. A good number of companies also send their staff to attend outside training programs conducted by local associations, consulting firms and universities. Not as many companies send their staff to participate in overseas training programs. Only a few allow their staff to attend continuing education programs either in local institutions like Chulalongkorn University, Thammasat University and the National Institute of Development Administration or overseas (for Masters and Ph.D.'s).

Management skills improvement programs are also provided by companies to their staff (mostly to managerial, administrative, engineers and technical staff). A relatively small number of companies provide assistance to their staff to allow them to improve their communication (oral and written) skills in English.

3.3 GRANTING OF STUDY LEAVES TO STAFF

Only 44 out of 157 (28%) companies grant or have granted study leaves to their staff. The rest (72%) do not have a study leave program. Of the 49, 28 (57%) bond their staff to work for the company for a certain period of time proportional to the time spent in studying (in Thailand or abroad). For bonded students, their companies normally provide the leave and pay the tuition. Companies usually require "awardees" to work for them an equivalent of one

year for one year or a fraction of a year spent away. Some require two years for a year of study while a few require three years or more for a year of study. The breakdown is shown in Table 4.

Table 4 : Distribution of Companies With or Without Study Leave Programs

With Study Leave Programs		Without Study Leave Program	Total
Bonded	Not Bonded		
28	16	113	157

Source: IMRS Survey of Companies, 1991.

A further breakdown of companies that bond their employees by number of years is given below:

No. of Years No. of Companies

1	9
1-2	3
1-3	2
2	6
2-3	1
3	5
3-5	1
4	1

Total	28

3.4 LINKAGES WITH INSTITUTIONS OF LEARNING

About 15% of companies surveyed have established informal linkages with local institutions of learning. Some send their staff and workers for training to Chulalongkorn University, Thammasat University, King Mongkut's Institute of Technology (Lad Krabang), Rajamangkala Institute of Technology and other technical and vocational institutes. Others in the hotel industry send their staff for advanced training in hotel management to foreign institutions (e.g. U.S. and Switzerland). These "linkages" are shown in Table 5.

3.5 HRD PROBLEMS

3.5.1 Hiring of Personnel

Respondents were asked whether they have met problems related to hiring personnel and, if so, how acute the problem is. About half of the companies surveyed (47%) indicated that they have a very acute problem in hiring engineers. Most companies (58%) stated that they do not have serious problems hiring managers and administrative staff although some 29% and 35% claimed they are having some problems in recruiting managers and administrative personnel, respectively.

Distribution of companies according to degree of problems experienced in hiring employees is presented in Table 6.

Table 5 : Company-Institution Linkages

COMPANY	INSTITUTION
Siam Motors	Chulalongkorn University
Thai Arrow Products	KMIT (Thonburi)
Bangkok Livestock Processing	Chulalongkorn University
Shangri-La Hotel	International Hotel and Industry Management School
Dusit Thani Hotel	Universities in U.S.A and Switzerland
Central Plaza Bangkok Hotel	Foreign University
Thai President Foods	Local University
Thai Nam Plastic Industry	Technological Promotion Association (Thai-Japan)
Thai-Hitachi Enamel Wire	Technological Promotion Association (Thai-Japan)
Siam Auto Part	Thammasat University
Thai Kodama	KMIT (Lad Krabang)
Pan Asia Footwear	Local technical institute
Thai Precision Manufacturing	Mother company in Japan
Top Trend Manufacturing	Technological Promotion Association (Thai-Japan)
C.P. Poly Industry	Sunno, Japan
Thai Special Wire	Kasetsart University
P. Pattanachan Construction	Nakhon Ratchasima Tech. Col.
Michelin Siam	Cholburi Technical Institute
NIC Starch Products	Khon Kaen University
Bangkok Industrial Gas	Sattahip Technical Institute
Union Shoes	Chachoengsao-Cholburi Technical School
Thai Petrochemical Industry	Technical Institute, Bangkok
Thai Olefins	Rajamangkala Institute of Technology

Source: IMRS Survey of Companies, 1991.

Table 6 : Distribution of Companies According to Degree of Problem in Hiring Personnel

Type of Personnel	Acuteness of Problem			Total Respondents
	Very Acute	Little	None	
Managerial staff	20	44	89	153
Administrative staff	11	52	87	150
Engineers	60	28	41	129
Technicians	27	55	59	141
Staff w/ vocational training	8	51	87	146

Source: IMRS Survey of Companies, 1991.

3.5.2 Turnover of Personnel

Table 7 shows the number of companies which indicated turnover of personnel as a problem. Contrary to the assumption that a majority of companies experience high turnover rate of employees as a severe problem, less than 20 companies indicated that they perceived high turnover as a serious problem. About 50 companies stated that they are experiencing some problems with turnover. Most companies, 76, stated that turnover of employees is not a problem at all.

Looking at the problems cited by type of personnel, more companies (35) reported leaving of non-skilled workers as the gravest problem followed by technicians (21) and engineers (19). A total of 105 respondents stated that turnover of managerial staff is not a problem while 89 indicated that administrative staff very rarely leave their companies. About a third of total respondents reported that they have experienced some problems in turnover of staff: managers (38), administrative staff (53), engineers (53), technicians (54), staff with vocational training (52), and non-skilled workers (42).

Table 7 : Distribution of Companies With Problems in Turnover of Personnel

Type of Personnel	Acuteness of Problem			Total Respondents
	Very Acute	Little	None	
Managerial staff	4	38	105	147
Administrative staff	7	53	89	149
Engineers	19	53	50	122
Technicians	21	54	66	141
Staff w/ vocational training	10	52	78	140
Non-skilled workers	35	42	65	142

Source: IMRS Survey of Companies, 1991.

The 1989 World Bank Country Economic Memorandum for Thailand surmised that the surplus of agricultural labor in Thailand was largely a phenomenon of the past. The results of this survey support that view. As most laborers who leave agriculture join the industrial sector as non-skilled workers, increased turnover among this group indicates that they have more options for work and the excess supply of non-skilled workers is disappearing because of the growth in demand. While some of the turnover problem with unskilled workers is due to their tendency to return home to their families with the family farm, the market for unskilled workers is tightening.

The growth in demand for non-skilled workers is a positive development for a more equitable distribution of income. If the shortage of workers is becoming more acute at the non-skilled worker level, the salaries of these workers will rise faster over time relative to the rest of the work force. As they currently receive the lowest wages, the gap in incomes should begin to narrow.

One new glass factory in Samrong, an industrial area near Bangkok, attracted a loyal work force through paying wages that were about five percent higher than the prevailing rate paid by established factories in the area. The prevailing rate was already ten percent higher than the minimum wage.

The fact that the shortage is most acute among non-skilled workers and not among skilled workers reinforces the urgency of upgrading the human resource base in Thailand. Unlike skilled workers, Thailand cannot realistically increase its supply of unskilled workers. The only way to meet the increasing demand for work done by unskilled laborers is to increase the laborers' productivity, which requires upgrading their skills.

3.5.3 High Salary Scales in the Market

It was found out the current salary and wage rates did not pose a problem to a larger portion of respondents (74 out of 144 or 51%). Only 22 or 15% mentioned that they considered rates to be an acute problem and 48 or 33% stated that they were only a minor problem. Looking at each sector and comparing results with total respondent firms, the problem appeared to be highly insignificant. For example, only one company each from electrical, plastic and textile sectors stated that high salary scales were a big problem. For the rest of the sectors, at most two firms reported it as an acute problem. An exception was the construction industry, four construction companies reported high wage rates as really problematic. These findings are given in Table 8.

3.6 SPECIFIC TYPES OF PROBLEMS REGARDING HIRING OF PERSONNEL

The problems cited by respondents include difficulty in hiring engineers, computer staff and technicians, accountants, hotel management and other managerial staff.

Respondents cited some causes of problems in hiring or retaining qualified personnel and skilled manpower:

- most engineers and technicians expect higher fringe benefits;
- shortage in qualified computer technicians;
- "pirating" of trained engineers and technicians by other companies which offer higher salaries;
- inequitable salary scales within the company;
- limited supply of skilled professionals (esp. engineers);
- shortage of technical graduates;
- workers return home during the harvest season.

Table 8 : Distribution of Companies with Problems Related to High Salaries/Wage Rates By Type of Business

Type of Business	Acuteness of Problem			Total
	Very Acute	Little	None	
Automotive	2	3	7	12
Chemicals	0	1	5	6
Electrical	1	2	5	8
Food Processing	0	8	5	13
Pharmaceuticals	1	1	2	4
Petrochemicals	2	3	4	9
Textile/Garment	1	5	6	12
Industrial Machinery	0	1	2	3
Cement	1	1	0	2
Plastic	1	7	4	12
Printing	2	0	0	2
Pulp and Paper	0	1	1	2
Rubber-based Products	0	2	1	3
Footwear	0	1	2	3
Iron and Steel	1	0	3	4
Glass/Construction Mat	1	1	1	3
Construction	4	3	8	15
Commercial Banks	1	2	2	5
Finance	0	1	3	4
Hotel and Tourism	0	1	4	5
Insurance	0	0	3	3
Retail Trade	1	1	1	3
Wholesalers/Imports	0	1	1	2
Exporters	2	0	2	4
Computer Related	1	2	2	5
Total	22	48	74	144

Source: IMRS Survey of Companies, 1991.

3.7 CONSEQUENCES OF PROBLEMS ENCOUNTERED

Companies were asked how the problems in hiring personnel had affected their operations. There was a very low response rate to this question. Twenty-four respondents said that hiring problems resulted in lower production output by 14%, on average. Some 21 companies reported that the result was lower quality of production while 16 stated that it delayed introduction of new products. (For the services sector, companies stated that being unable to hire qualified personnel lowered the quality of services granted to customers). Only 12 stated that the result was lower revenue targets by 17%, on average. A total of 44 respondents mentioned other consequences which varied from company to company.

3.8 AVERAGE TURNOVER RATE IN THE COMPANY

Annual turnover of personnel was highest in computer related (32%), pulp and paper (32%), and exporting companies (34%). Low turnover rates were observed in the following industries: hotel and tourism (2%), cement (4%), chemicals (5%), petroleum/petrochemicals (3%) and printing (2%).

With regard to engineers, turnover was high in the textile/garment sector (37%), plastics (30%), pulp and paper (26%), construction (18%), petrochemicals (16%), electrical (16%) and food processing (16%). Annual turnover of technicians was high in the following types of business: plastics (24%), construction (21%) and textiles (20%).

3.9 SEVERITY OF MANPOWER SHORTAGE

Respondents (especially in the manufacturing sector) invariably identified shortage of computer systems staff as either a critical or an important problem. Sectors that expressed this concern include chemical, food processing, petroleum and petrochemicals, cement, pharmaceuticals, textile manufacturing; construction, hotel and tourism and insurance services; and, computer-related industries.

Undersupply of engineers was also cited as a serious problem facing industry. Table 9 presents these data.

Pharmaceutical firms indicated that they are in dire need of chemical engineers and pharmacists. To summarize, a majority of the firms interviewed specified shortages of three types of engineers: mechanical, industrial; electrical/electronics.

Sixteen (16) interviewed companies in the food processing sector reported that the shortage of skilled manpower as the most detrimental shortage. Most companies in the petroleum/petrochemical sector were also in a similar predicament.

Half of the companies interviewed in sectors like automotive, plastics, electrical/electronics, textile and construction indicated manpower shortage problems while about one-third did not have any shortage problem; the rest stated that skills presented to them were not applicable or that they did not employ such skills.

Table 9 : Type of Engineers Direly Needed in Selected Industrial Sectors

Industrial Sector	Type of Engineer
Automotive/Auto Parts	Mechanical
Chemical	Chemical; Electrical; Mechanical; Industrial
Electrical/Electronics	Electrical/Electronics; Industrial
Food Processing	Electrical/Electronics; Mechanical; Industrial
Petroleum/Petrochemicals	Electrical/Electronics; Mechanical; Chemical
Textile/Garment	Electrical/Electronics; Industrial; Mechanical
Cement	Electrical/Electronics
Plastics	Mechanical; Industrial; Electrical/Electronics
Glass and other Construction Materials	Mechanical; Industrial; Electrical; Chemical
Construction	Mechanical; Electrical; Environmental; Chemical
Computer Related	Electrical/Electronics

Source: IMRS Survey of Companies, 1991.

Shortage of skills in the following disciplines were also indicated as creating problems in the efficient running of businesses and factories. However, the degree of importance is somewhat less than computer systems staff and engineers.

- (a) technical education
- (b) skilled labor
- (c) English for administrators and managers
- (d) English for technical staff
- (e) human resources
- (f) accounting
- (g) materials management
- (h) operations management
- (i) finance
- (j) marketing

3.10 EXTENT OF SKILLS SUBSTITUTION

Respondent companies resort or have resorted to skills substitution when hiring personnel. According to respondents, they have had to accept applicants for positions that require skills other than what they possess because of shortage of qualified applicants.

Skills substitution is highly prevalent in the various fields of engineering: chemical (46 out of 56 respondents or 82% reported that they substitute either moderately or to a large extent), mechanical (70 out of 89 or 79%), environmental (78%), electrical/electronics (73%) and industrial (71%).

Skills in accounting (71%), finance (70%), technical training (67%), and computer systems (66%) were also commonly substituted for other skills.

The extent of substitution for English skills was moderate for administrators/managers and technical staff. Details of these substitution rates are presented in Appendix IX-A.

Among the sectors surveyed, construction companies were perceived to practice skills substitution to a larger extent than others. They commonly hire employees without the proper qualifications to fit into the jobs of engineers (mechanical, industrial, electrical, chemical, environmental and other disciplines), accountants, financial analysts, and computer systems staff. The same firms also expressed their predicament over the deficiency in the English skills of administrators and technical staff.

To a large extent, those in the automotive and auto parts industry hire personnel with other skills to fill in the positions of mechanical engineers and finance graduates. Substitution also exists in the fields of computer systems and marketing.

In the chemical sector, companies reported moderate substitution of mechanical, electrical and industrial engineers, and computer systems staff.

Most electrical/electronics companies mentioned that they usually substitute for computer staff, electrical and mechanical engineers. They also reported that a moderate substitution of skilled workers is being done.

In the food processing sector, skills that are substituted are electrical, mechanical and chemical engineering, technical training, accounting and English (for managers and technical staff).

The petroleum and petrochemical sectors' tendency to substitute is similar to that of the food processing sector where skills substitution is prevalent in engineering (electrical, mechanical and industrial) and technical training. Other skills identified are in marketing, finance, and human resources.

Companies in computer related industries stated that accountants and financial analysts were difficult to find so that they had to hire persons with inadequate qualifications.

Exporters also complained of a lack of qualified accountants.

Other sectors such as cement, rubber, pulp and paper and footwear have had to look for substitutes for engineers.

Appendix IX-B presents the distribution of companies in each industrial sector by the degree of substitution of skills (to a large extent, moderately, very little, none).

3.11 METHODS APPLIED TO PREVENT MANPOWER SHORTAGE

One hundred and thirty-five (135) companies overwhelmingly supported the intensification of in-house training efforts as the best means to reduce problems in manpower shortage. The second-ranked method was to increase salaries, wages and incentives (125 respondents). The third, fourth and fifth methods employed by companies were to (a) improve work environment, (b) intensify campus recruiting and, (c) utilize less qualified personnel than desired, respectively. It is evident that respondents valued the importance of training their staff and workers to upgrade their existing capabilities as well as learn new skills in handling jobs to which they were unaccustomed. In this way, managers can rotate their employees and assign them to do jobs that need urgent attention. Least popular methods were slowing the pace of technology transfer and recruitment of overseas Thais. The recruitment of overseas Thais was an option for only large companies. Table 10 illustrates these findings.

**Table 10 : Distribution of Companies by Method Applied
in Reducing Problems in Manpower Shortage**

Method	Number of Companies
Intensify in-house training efforts	135
Increase salaries, wages and incentives	125
Recruit employees from other firms	56
Utilize less qualified personnel than desired	73
Contract out work which the firm would rather undertake itself	36
Utilize expatriates more than the firm would like	22
Delay product introductions, projects	10
Intensify campus recruiting	85
Collaboration through associations	31
Slow the pace of technology transfer	7
Improve work environment	114
Recruit overseas Thais	13
Intensify public relations efforts	61
Support continuing education	63
Others	11

Source: IMRS Survey of Companies, 1991.

3.12 MANPOWER ISSUES BROUGHT TO THE ATTENTION OF THE GOVERNMENT

Less than one-third of the surveyed companies responded to this question. Of the 45 which did respond, more than one-half stated that the shortage of manpower (both quantity and quality) was brought to the attention of the government by the club to which they were affiliated (e.g. Federation of Thai Industries, American Chamber of Commerce, Thai Chamber of Commerce). They also mentioned to the government the shortages of engineers and technicians, pharmacists and personnel with English language skills.

Other issues that were discussed within their respective committees and associations and which were then forwarded to the concerned government agency for information and action are:

- (a) minimum wage rates;
- (b) social welfare;
- (c) legal aspects including taxes and duty rates.

3.13 ROLE OF THE PRIVATE SECTOR

A total of 110 out of 157 or 70% of companies gave opinions on the role of the private sector in the human resources development program. This high response rate indicated that the interviewees were concerned about the critical situation and would like to offer their views on what the private sector or industry could contribute to address the problems.

Respondents felt that private industry should support the following:

(1) participation in the design of curriculum or courses (including apprenticeship programs) in universities and technical schools to make them useful and applicable to industry.

This statement of willingness to cooperate with educational institutions is a healthy sign that industrialists realize the urgent need for their involvement in this endeavor.

(2) strengthening further of relationships with educational institutions by (a) providing scholarships to students through assistance of private associations and (b) donating equipment to school laboratories.

Again, the intent of several big companies to give financial support to universities, technical institutes and vocational schools will contribute to the enhancement of human resources development.

(3) improvement of working knowledge of employees and upgrading of manpower skills by (a) investing in in-house and outside training programs and seminars for office workers, (b) arranging training courses for skilled factory workers, (c) conducting training on-the-job for non-skilled workers, and (d) sending employees to participate in continuing education programs.

There is an apparent increase in the level of interest and understanding among companies to invest in the training of their personnel. They are beginning to believe that the more they train employees, the more productive they will become. Still a number of respondents were concerned about their trained personnel leaving for companies that pay better salaries and wages.

(4) building of strong employer-employee relationship, e.g. by providing competitive compensation and benefit packages in order to decrease the turnover of personnel.

Companies that really adopt this policy can retain a large number of their better people.

(5) coordination with government in manpower planning by (a) conducting periodic surveys on labor market requirements and providing results to concerned sectors in government and, (b) joining consultative meetings as forums of discussion with government on matters related to manpower.

This linkage of industry with government is considered a fundamental step towards achieving better understanding of problems besetting both sectors in the development of Thailand's manpower resources. Companies hope that these consultative meetings will produce remedial measures to solve such problems.

3.14 ROLE OF GOVERNMENT

Eighty percent of all companies (126 out of 157) were vocal about what they thought the role of the government should be in the development of human resources in Thailand. A number of them emphasized the need to incorporate the human resources component into the five-year National Development Plan. In doing this, they stated that the government should consult the private sector and industry regarding their manpower needs in the short term.¹

The major aspects cited by respondents are given below:

(1) provide equal educational opportunities to Thais in urban and rural areas.

Respondents stated that the government should keep a low profile in its educational development efforts in Bangkok and other urban centers (which should be left to the private sector), and concentrate more in the development of institutions of learning in the rural areas. Their reasoning is that since the private educational sector is profit-oriented, they are more likely to prosper in urban areas where more residents are affluent. Government-run schools cannot compete with these privately-owned institutes of learning. The government could then concentrate its resources on supporting schools in the provinces.

-
1. The Royal Thai Government's central economic planning planning body, the National Economic and Social Development Board, created a Human Resources Committee specifically to attend to this matter. The human resources component has already been integrated to the 7th Five-Year National Economic and Social Development Plan.

(2) improve the educational system.

The government should (a) increase the budget for education in order to establish more institutions of higher learning as well as polytechnic institutes, (b) supervise closely the preparation of technical curriculum to be more attuned towards the requirements of business and industry, and (c) advocate more actively the teaching of English language courses in schools (both spoken and written) at all levels.

(3) improve the remuneration of professors, teachers and trainers.

Remuneration packages in the teaching profession are much lower than in the private sector and industry. Respondents focussed on increasing salaries and benefit packages to professors and teachers to prevent their exodus to industry or overseas.

(4) upgrade the quality of teachers in collaboration with academic institutions.

While respondents see the need for government to support teachers financially, they were equally outspoken in advising the government to upgrade the quality of teachers who train the future skilled manpower of the country. They particularly encouraged teachers to introduce a style of teaching which is more interactive and less "spoon fed." Interactive teaching is typical of the American educational system and is seen as encouraging students to freely express their opinions.

3.15 ROLE OF EDUCATIONAL INSTITUTIONS

More than 80% of respondents voiced their opinion about the role of educational institutions in human resources development.

Important comments are:

(1) foster closer relationships with industry (e.g. by sending professors to factories to train employees and workers).

Collaborative efforts towards the development of human resources are either bilateral or multilateral and are characterized by a give and take process. Those in the industry have expressed their willingness to cooperate with government as well as educational institutions. They would like to hear educators acknowledge the "partnership" by supplying a greater number of qualified trainers to companies and factories in need of their expertise.

(2) develop, maintain and update curricula appropriate to the needs of industry and business.

Most comments pertain to the need to modify engineering degree/technical or technological programs that will allow more practical training. They also stressed the importance of a compulsory apprenticeship or internship programs (either in factories or offices) for students in the universities and all vocational and technical institutes. These programs should be longer and more intensive for junior and senior students to understand better the work environment.

To further strengthen curricula, educational institutions should increase the number of English language and computer courses or the number of hours devoted to each course. Computers and English are inseparable; Thais can no longer put off learning and understanding English because of its widespread usage in computer languages (with perhaps the exception of Thai word processing packages and Thai versions of Lotus 123 and DBASE 3 Plus). The wide use of computers in business and industry forces employees to be computer literate and to function in the main language of computers -- English.

(3) upgrade the skills of teachers and professors.

Respondents felt that officials of the educational system are morally responsible to parents in providing the best education to their children; therefore, they also have the responsibility to select only qualified mentors to teach and train youth.

Educators were also advised to follow developments in manufacturing technology and upgrade laboratory equipment and their skills accordingly.

(4) expand the higher educational base upcountry to reach the less privileged Thais.

Respondents enjoined the educational sector to establish more schools and universities in the provinces to increase the skilled manpower and to help less affluent but talented Thais who cannot afford to study in Bangkok.

3.16 COMPANY CONTRIBUTIONS TO ADDRESS THE PROBLEMS IN HUMAN RESOURCES

Barely one-third of the total respondents were able to offer concrete ideas on what their own company was willing to contribute to address the current problems in human resources. Larger companies (employing more than 100 people) were more willing to give contributions than smaller

companies as the latter thought that they were too small to effect changes.

Listed below are what companies were willing to contribute:

- attend club meetings and discuss with fellow members relevant and pressing manpower issues;
- attend consultative meetings among the private sector, government and universities.
- donate money to educational institutions to help them improve their laboratory facilities;
- participate in seminars and symposiums to share their experiences in industry with universities, other educational institutions and the government;
- support continuing education programs for their employees;
- provide five-month scholarships in hotel management to poor but deserving students and later train them in their hotels for another five months.

B. OTHER DONOR HRD ACTIVITIES

SUMMARY

This section describes ongoing human resource development programs, projects and activities of other major donors with which USAID/Thailand can potentially collaborate and then summarizes the activities of each of the major bilateral and multilateral donors. The team discussed strategies and/or HRD programs extensively with representatives of both multilateral and bilateral organizations whose presence in Thailand has contributed significantly to the human resources development program of the Royal Thai Government.

They were also asked of their attitude towards having joint programs with USAID/Thailand. In general, multilateral organizations like the UN agencies were interested in collaboration with USAID; bilateral organizations were more skeptical about the arrangement citing difficulties in administration and management of joint projects. Some implied that, in the past, collaborative programs with USAID in other countries were not smoothly implemented.

Multilateral organizations include the relevant agencies of the United Nations such as the United Nations Development Programme (UNDP), International Labour Organization (ILO) and United Nations Industrial Development Organization (UNIDO); the World Bank and the Delegation of the Mission of the European Communities.

Bilateral organizations that were contacted consist of the following:

- Canadian Embassy through Canadian International Development Agency (CIDA);
- Japanese International Cooperation Agency (JICA);
- The German Embassy through Carl Duisberg Gessellschaft (CDG);
- The Australian Embassy and Australian Education Center;
- The British Council;
- The Royal Netherlands Embassy.

The names of respondents and their respective missions are listed in Appendix X.

Assistance to Thailand by multilateral organizations comes in various forms:

- provision of advisory services by technical/professional experts;
- participation in group training programs, seminars, short-term courses;
- donation of equipment;
- funding assistance to government agencies in carrying out development projects (e.g. survey of manpower requirements by the private sector; establishment of a production technology division at Samut Prakarn Technical College).

The bilateral assistance programs by different missions are focussed on the following aspects:

- provision of technical/professional experts;
- fellowships;
- training programs, seminars, short-term courses;
- donation of equipment; and
- capital grant assistance.

CRITERIA FOR COLLABORATION

Before considering joint programs, USAID/Thailand must regard carefully the administrative implications. As one of the criteria of project selection is the minimization of the administrative burden on USAID, it may be counterproductive to enter into joint programs with other donor organizations in which the administrative regulations of both organizations would have to be respected.

With the conclusion of the U.S.-Canadian Free Trade Zone, it is particularly appropriate for USAID to develop collaborative programs with CIDA. With the growing interdependence of the North American economies, it makes sense for Canada to be a partner in U.S.-Thai linkages.

POTENTIAL COLLABORATIVE PROGRAMS IN HUMAN RESOURCES DEVELOPMENT BETWEEN THE USAID/THAILAND AND MAJOR DONOR ORGANIZATIONS

A. ESTABLISHMENT OF A PRODUCTION TECHNOLOGY TRAINING DIVISION AT SAMUT PRAKARN TECHNICAL COLLEGE

This is an ongoing project funded by the United Nations Development Programme (UNDP) and being implemented by the International Labour Organization (ILO) in cooperation with the Royal Thai Government's Department of Vocational

Education (DOVE). The total UNDP assistance for this project is about U.S.\$1.5 million.

The Project was created in response to the rapid changes taking place in technologies used in the metal working and plastics industries, especially the application of computers controlling the processes. At present, approximately 500 computer-numerically-controlled (CNC) machines are in use in Thailand, mainly in Thai-foreign joint ventures whose production must meet world market standards. This need for computer applications is expected to sharply increase over the next five to ten years.

While the funding for the Project will run out by 1992, the outputs are not expected to be fully realized at the project's end because of unforeseen rises in costs of equipment and materials. USAID/Thailand can provide additional financial support to the Project knowing that American companies in Thailand could benefit from the CNC technicians produced by Samut Prakarn Technical College. (One reservation is that the Project purchased mostly German not U.S.-made equipment). The USAID could still participate in the project by adding a complement of U.S. equipment to what has already been procured. The NMTBA, which is still looking for a suitable place to showcase products of its members, may also be another collaborative partner.

B. SEMINARS AND GROUP TRAINING PROGRAMS FOR TECHNICAL AND MANAGERIAL PERSONNEL IN INDUSTRY AND INDUSTRIAL INSTITUTIONS

The United Nations Industrial Development Organization (UNIDO) arranges seminars and group training programs for technical and managerial personnel in industry and industrial institutions in developing countries, in cooperation with governments, firms and organizations having specialized knowledge and experience in a particular field. USAID may wish to co-sponsor with UNIDO training programs that last from one to six weeks and are specifically catered for Thais. Currently, the program receives funding from UNDP.

The objectives of these programs are to furnish the participants with intensive practical experience in a relatively short time and to upgrade their theoretical knowledge. The programs are monitored by experts and usually include four elements: a theoretical introduction, studies, in-plant training and study tours.

C. SUPPORT IN POLICY STUDIES AND CURRICULUM DEVELOPMENT

The Canadian International Development Agency (CIDA) is very much involved in supporting policy studies, seminars, training and curriculum development in universities, technical colleges and professional associations.

Newly formed faculties of engineering and other technical courses in public and private institutions of higher learning need technical assistance in developing their curricula to better serve the needs of industry which will absorb their future graduates. USAID/Thailand, together with CIDA, can provide financial support to these universities and colleges in "hiring" U.S., Canadian and Thai experts to draw up their curricula.

D. DEVELOPMENT OF ENGLISH LANGUAGE SKILLS AT TEACHERS'S COLLEGES

The British Council has started developing English language skills in teachers's colleges. This is one area that USAID/Thailand can work with the British Council as the need for English language skills is becoming more and more acute in service oriented sectors such as hotels and tourism.

Thirty out of the 36 teachers colleges are found in the provinces. They are the main source of tertiary education for less affluent Thais. In recent years, the teachers' colleges have diversified their courses to include tourism, business and accountancy. In general, graduates remain in the provinces in which they studied. Through supporting the teachers colleges, USAID/Thailand can increase the skills available outside of the Greater Bangkok Metropolitan Area.

1. UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

1.1 BACKGROUND

The United Nations Development Programme (UNDP) is the chief donor body of the United Nations. Its budget allocation for assistance programs in Thailand in this field amounted to U.S.\$ 25 million during the fourth country programme period 1987-1991. This was allotted under the theme "Human Resources and Social Development" which comprised 17 projects. Out of these, nine were completed in 1989 (i.e. funding was fully utilized in that year) while funding for eight projects continued in 1990. It was expected that an additional two projects would be completed in 1990 leaving only six ongoing projects in 1991. UNDP's country program cycle for Thailand coincides with the RTG's Development Plan five-year period. For the next cycle (1992-1996), UNDP has programmed the same amount, U.S.\$ 25 million.

In general, UNDP is mandated to focus on five global priorities: environment, management development, technical cooperation among developing countries (TCDC), women in development (WID) and education.

The UNDP's assistance program to Thailand is primarily tied up with the Royal Thai Government's Five-Year Development Plan. The UNDP liaises with the government through the Department of Technical and Economic Cooperation (DTEC) under the Office of the Prime Minister in identifying priority programs of the Royal Thai Government.

1.2 PROJECTS

Thus, for the next five years, UNDP's focus will be the 7th Five-Year Development Plan (1992-1996). In response to one of the thrusts of the 7th Plan which is the increase in the production of competent scientists and engineers, UNDP is funding a project to survey current manpower supply and demand in Thailand. Survey results shall be used to confirm the stipulated policies and strategies of the 7th Plan drafted by the government policy-makers and planners. In particular, the project will study the manpower status and structure, project quantitative needs, examine present on-the-job training and evolve strategies of production and development of manpower in accordance with the needs of the labor market.

UNDP has sponsored the establishment of a production technology division at the Samut Prakarn Technical College

since 1987 and will fund the project until the end of 1991. The project is being administered by the International Labour Organization (ILO) in cooperation with the Royal Thai Government's Department of Vocational Education (DOVE). The total UNDP assistance for this project is about U.S.\$1.5 million. More details of the project are discussed in section 3.1.

Other UNDP-funded projects which are being implemented by the ILO are in the fields of:

- occupational safety and health;
- labor based construction-cum-rural self-employment;
and,
- major occupational hazards control system.

In 1990, UNDP started giving assistance in the field of technical and vocational education by sending vocational education teachers to train at Hawthorn University's Staff Development Institute in Australia. The two-year (1990-91) program has a budget of U.S.\$646,110.

UNDP is also funding the "Science Park Project" which is being undertaken by the Ministry of Science, Technology and Energy. The project shall study the feasibility of establishing science parks in Thailand reminiscent of those in the U.S. (A science park is a place intended for a desired number of companies to join together in building their research and development centers/laboratories within the same compound and create a harmonious environment whereby exchange of research methodologies and information is more the rule than the exception).

2. UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)

2.1 BACKGROUND

UNIDO is both a donor and implementing agency with funds coming from other sources (mostly from the UNDP) as well as from its own budget.

UNIDO organizes two types of group training programs for technical and managerial personnel in industry and industrial institutions in developing countries, in cooperation with governments, firms and organizations. These are in-plant group training programs, which last from two to five months, and seminars and other group training programs, lasting from one to six weeks.

The objectives of the in-plant group training programs are to furnish the participants with intensive practical experience in a relatively short time and to upgrade their theoretical knowledge. The programs are monitored by experts and usually include four elements: a theoretical introduction, studies, in-plant training and study tours. At the end of each program, an evaluation session is held, during which participants are provided with the opportunity to assess the value of what they have learned in the light of conditions in their home countries. The seminars and other group training programs have the same objectives. They offer theoretical instruction and, to the extent feasible, practical work.

The programs are held on a regional or inter-regional basis. The general requirements for admission are a university degree or equivalent and several years of practical experience in the particular field.

UNIDO does not have a human resources program specifically for Thailand. However, the organization works in coordination with the industrial sector and some government participants. On the government side, UNIDO liaises with the Ministry of Industry's External Relations Division. Recipients of assistance from UNIDO sometimes provide a counterpart fund in specific projects.

UNIDO funded training seminars held at the National Institute for Development Administration (NIDA) for the personnel of the Industrial Economic and Planning Division (IEPD) of the Ministry of Industry. The project was called the "strengthening of IEPD on industrial policy and planning."

UNIDO has a close linkage with the private sector through the Federation of Thai Industries and its member clubs such as Pharmaceuticals, Air Conditioning and Printing in close coordination with research and development centers at Chulalongkorn University. UNIDO provides assistance in the form of technical experts, fellowships and equipment.

2.2 IDENTIFIED PROBLEMS AND RECOMMENDED SOLUTIONS

UNIDO's Country Director pointed out that the shortage of skilled technical manpower (both at the higher and vocational levels) is a prevalent problem. In order to help overcome this problem, there is an urgent need to establish new training centers and strengthen existing training facilities especially in the provinces to support manpower needs of small and medium scale industries.

In support of decentralized industrial development, more private schools should be set up in the provinces equipped with adequate facilities and the "right" environment. An example is the experience of the Republic of South Korea which developed an educational system that was more responsive to the needs in the provinces through collaboration with the private sector.

2.3 COLLABORATIONS AMONG VARIOUS SECTORS

Private industry should provide assistance in the form of fellowships to vocational/technical colleges in the provinces.

It would be mutually-beneficial for both industrial and academic sectors for factories to allow student apprentices to train on-the-job at the factory and for factory workers to have the opportunity to participate in continuing education colleges to learn about new technological advances. Faculty from the institutes could also go to factories to provide in-house training for workers.

3. INTERNATIONAL LABOUR ORGANIZATION (ILO)

The rapid growth of the economy in 1989 was reflected in changes to the country programs for Thailand. UNDP is still the major source of funds for ILO technical cooperation. The ILO has been requested to assist and advise the government on some of the critical issues concerning labor. A new development within the government was the move to implement a social security system. Two advisory missions were undertaken by the ILO to assist the Committee of the House of Representatives in its review of the Labor Welfare Fund Bill. A Social Security Bill embodying a wide range of contingencies was submitted to Parliament in May 1989 and was approved in July 1989. As a result of the advisory missions, UNDP approved a project on the planning of social security implementation.

In the context of the current socioeconomic situation in Thailand, UNDP suggested several new areas for technical assistance, including environment, private sector management, women in development and closer cooperation with the NGOs.

ILO programs in Thailand cover vocational training, labor-based road construction, occupational safety and health, major hazard control and family planning.

4. THE WORLD BANK

The World Bank's strategy in Thailand over the next five years will be finalized sometime in mid January 1991. The report shall contain the World Bank's position in its loan package to Thailand and identify priority areas (which was done in coordination with the Royal Thai Government's policy makers and planners).

4.1 COMMENTS AND VIEWS ABOUT HUMAN RESOURCE NEEDS IN THAILAND

The Chief of the Mission stressed the need to improve curricula in higher education, both public and private, with particular attention to teachers' colleges. A study funded by the World Bank recommended the upgrading of these teachers' colleges to community colleges.

There is also a great need to improve private education, increase efficiency, increase enrollment and upgrade the quality of education at the primary level.

Thailand's concern should be more on the shortage of qualified technicians or technological graduates that emerge from secondary levels of education rather than engineers.

4.2 COLLABORATION AMONG VARIOUS SECTORS

Vocational training for workers should be financed by industry with some subsidy coming from the educational sector.

The government should revise its budget allocation policy by shifting funds from universities to teachers' colleges. It should also look more into licensing and accreditation requirements and regulating these institutions.

5. DELEGATION OF THE COMMISSION OF EUROPEAN COMMUNITIES (EC)

5.1 BACKGROUND

The Delegation of the Commission of European Communities (EC) represents the 12 member countries. As with other governments, the EC tries to include its HRD within all its programs; it also has specific programs on HRD but on a limited scale.

The EC's program on HRD involves the following activities which are offered to non-EC countries:

- seminars for public officials (e.g. public administration);
- seminars and workshops for the private sector (e.g. joint venture management, technology transfers, socioeconomic development, mining safety) usually conducted by INSEAD in Paris;
- business familiarization programs for young executives organized by the European School of Management in Paris;
- advanced training in EC countries for graduates and professionals from non-EC countries (postgraduate courses in agriculture, engineering, informatics, health and management) which last from two weeks to 18 months.

5.2 PROJECTS

Specific HRD projects in Thailand include the following:

5.2.1 Tourism

The EC is trying to develop international standards in tourism schools so that upon completion of a course, an individual receives a certificate clearly specifying the level of proficiency he or she has attained.

5.2.2 Development Administration

This involves training of public officials on how to deal with large development projects and coordinate among departments or divisions more effectively.

5.2.3 Customs Administration

The EC is in the process of developing a training module for customs officers. They have "audited" Thailand's customs procedures, and are helping to make them more efficient and less bureaucratic. The review also included looking into the skills of the customs officers in order to determine the levels of retraining that have to be administered to them with respect to learning new procedures.

5.2.4 Research

The EC encourages individuals to undertake joint research on areas that match their criteria (a basic criterion is that the research has to be conducted in coordination with at least two European institutes). These research projects are funded by the EC.

6. THE CANADIAN EMBASSY

6.1 BACKGROUND

Human Resources Development is the key principle of aid programs in Asia. HRD programs and projects are implemented through the Canadian International Development Agency (CIDA) which defines HRD as "enhancing the capabilities of individuals, institutions and organizations through training and education programs so they can deal with development problems and better participate in the development process." This definition is presumed to underlie all programs of the Canadian government in Asia. Programs in the Asian region tend to be people-oriented rather than infrastructure not related to HRD (i.e. build schools not bridges).

Every five years, CIDA conducts consultative meetings with the Thai government to determine the Thai government priorities and try to match these with those of Canada. There are four priority areas defined by the Canadians:

- HRD;
- economic management;
- industrial private sector development; and
- natural resources.

After consultation with the Thai government, CIDA evaluates and decides on the projects that the organization wishes to undertake in each area, submits them to DTEC for information and then to Canada for final approval.

6.2 PROJECTS

Ongoing HRD-related projects include:

6.2.1 Scholarship program at Rattanakosin

The program is offered to qualified Thais who are chosen according to their GPA. Announcements of the program are published in newspapers, making it an open competition among applicants.

6.3 EDUCATIONAL INSTITUTION LINKAGES

At present, there are 14 linkages between Thai and Canadian educational institutions. They involve exchanges of professors and students. In some cases, the linkages stem from purely personal contacts between Thais and Canadians; however, a greater number of linkages emerge from more formal relations and better screening of potential partners.

The participating institutions receive a maximum of half a million U.S. dollars each. CIDA's policy is being modified to support only those institutional linkages which could be sustained after the funding has run out. Institutions at both sides should clearly define their plans for the future. (For future linkages, CIDA has earmarked a total of U.S.\$1 million to each institution).

6.4 OTHER PROGRAMS

CIDA is also very much involved in supporting policy studies, seminars, training and curriculum development. The coverage has been broadened to include universities, technical colleges and professional associations.

Examples of these programs are:

- a joint-research project with TDRI for the Economic Council of Canada to strengthen the HRD program;
- a short-term training program for 30 Ph.D's and MS's of the Department of Mineral Resources.

CIDA also provides direct funding for doing their own projects to:

- TDRI;
- IFCT (International Finance Corporation of Thailand);
- and,
- students.

7. THE BRITISH COUNCIL

7.1 BACKGROUND

The British Government's bilateral aid program in Human Resources Development in Thailand is done through the British Council, a non-government body that runs independently of the British embassy. The operational budget of the British Council comes from several channels:

- the Foreign Office;
- Overseas Development Administration (ODA) either directly as a contribution to costs or through programs administered for the ODA;
- revenues earned as consultants for the World Bank, Asian Development Bank, African Development Bank, etc.; and
- revenues earned through the English Language School.

The British government, through the ODA and in consultation with the Thai government, prioritizes areas on policy development and aid programs. The British Council's role is to identify and conceptualize project ideas for the ODA to consider.

7.2 PROJECTS

7.2.1 Placement of Thai scholars

The British Council in cooperation with the Ministry of Science, Technology and Energy (MOSTE) has urged the Thai government to place, in the United Kingdom, Thai students and faculty for their master's and Ph.D.'s. There were 80 students placed in 1989 and only 30 in 1990. The British Council is finding difficulty in recruiting engineering students for two reasons: (a) their starting salaries are very inviting and they do not see why they should further their studies; (b) bonded scholarships require students to come back and work for the government two or three times the amount of time they spent away (they do not wish to work for the government).

7.2.2 Language Training

The British Council has been involved in supporting the national education system to improve English language skills for the last 25 years. The British Council helped set up the Chulalongkorn Language Institute in 1981 with ODA funding and an ODA advisor. The Institute was designed to act as a national center for developing skills in other

universities. It was successful at Chulalongkorn but tended to guard its information: it came to regard the other universities as "poor cousins" making the institute not national but only to serve the purpose of Chulalongkorn faculty and students. (This was the view of one of Chula's board members).

7.2.3 Masters Program at KMIT Thonburi

The British Council also started a Masters program in Linguistics at KMIT Thonburi in 1985. The aim was to develop skills at the supervisory level in understanding the language process. It was assumed people at this level, given the know-how, could speak confidently on matters and methods of language training. Eight to ten of the faculty went to the U.K. for a masters in linguistics, and a British advisor was stationed at the KMIT for four years and consulted for an additional 1.5 years. The program provided hardware and materials and is now progressing smoothly. Fifteen to twenty senior staff from various institutions participate each year.

7.2.4 Curriculum Development at Srinakarinviroj University

The British Council has also developed a diploma level course for high school teachers at Srinakarinviroj University. The course was aimed for teachers to learn how to teach English as a second language. The project was funded by ODA and managed by the Council. It involved sending Thais to the U.K. for their masters, and acquiring a fair amount of hardware (audio-visual equipment, etc.). The problem now is there are not enough students who enroll in these courses. According to the respondent, the problems in English language training for teachers, in general, is the lack of coordination among various departments at the Ministry of Education.

7.2.5 Improvement of school curricula

The British Council has been working extensively on improving primary and secondary school curricula. In this connection, the government has renewed its interest in a national English examination for M.3 and M.6 students which was dropped in 1973. Cambridge University is in the initial stages of preparing the content of the examination. The ODA has provided four advisors to help develop the syllabus. The academic year 1992-1993 will be the pilot year for administering the examination at the national level. If the test run is successful, other national examinations shall be developed by the same group.

7.2.6 Development of English language skills at Teachers' Colleges

Another area in which the British Council is trying to help develop English language skills is the teachers's colleges. Recently, fewer students have enrolled in these colleges so that they started diversifying into vocational training colleges to attract more students. The British Council believes that teachers's colleges are very effective training centers because they usually serve the local population; furthermore the graduates remain and find work in the locality. These colleges delve in tourism, business, accountancy, etc. They tend to have good contacts with local companies. For example, students studying tourism in one of the colleges work (or train) at the local airport for three weeks helping tourists.

Of the 36 teachers's colleges, eight have language centers for the college and the community. One or two even have English medium tourism courses.

The British Council also runs its own English Language School.

7.3 INTER- UNIVERSITY LINKS

Linkages are mostly in the areas of biotechnology, aquaculture, soil science, remote sensing, water sources, and petroleum (most of which are covered in the 6th National Development Plan). There are two types of linkages:

- Formal, or big "L" linkages with formal objectives, agreed programs and research, exchange of staff, resources and memoranda of agreement. At the end of each project, an outside consultant evaluates the results.
- Less formal, or small "l" linkages with academics. The British Council acts as a go-between for British academics looking for linkages to Thailand. Within some projects, there are also "l" linkages that involve exchanges of students.

7.4 COMMENTS/OBSERVATIONS

An observation made was that some Thai universities, e.g. Chulalongkorn University, feel that it is prestigious to have linkages with as many foreign institutions as possible. Their concern is in the quantity rather than the quality. Chulalongkorn University has over 100 foreign linkages (mostly small "1" linkages; however, there is very little concentration with respect to country or topic.

Of the annual budget of 1.5 million pounds allotted for bilateral aid to Thailand, a greater portion goes into funding of scholarships. Thailand is no longer considered in need of "aid."

The British Council has also faulted DTEC's system of screening candidates for its scholarship program. DTEC's system of go/no go is heavily dependent on the results of the English language test which applicants take before being ranked: no need for further study (which is very few); in need of further study (the bulk of applicants); and, not good enough to warrant further study. It is the last category that causes problems. If a candidate is rated "no more study - not good enough," then he is not allowed to go any further. This grading has caused problems for candidates who are excellent in their fields of study and only require English language training to further their study. This DTEC system has resulted in the British Council losing several good candidates.

8. JAPANESE INTERNATIONAL COOPERATION AGENCY (JICA)

8.1 BACKGROUND

JICA's main functions in Thailand are as follows:

- Liaison with concerned government organizations as to the implementation of technical cooperation and capital grant assistance;
- Orientation for participants to training programs in Japan;
- Coordination with Japanese experts and survey teams dispatched to Thailand;
- Coordination with Japanese volunteers (JOCV);
- Public relations activities to promote JICA's role in Thailand.

JICA's role in human resources development is covered under project-type technical cooperation in four areas, namely:

- acceptance of trainees in Japan (with JICA grants);
- provision of advisory services through dispatch of Japanese experts;
- donation of equipment; and,
- capital grant assistance.

8.2 PROGRAMS

8.2.1 Training Programs

One of the greatest contributions of JICA to human resources development is the arrangement of training programs in various fields of study (agriculture, construction, transportation, telecommunications, nuclear power) for participants mostly coming from developing countries. JICA offers over 200 group training courses each year in response to the common needs of developing countries, and also makes individual training arrangements to address the specific needs of individual countries.

Besides training in Japan, JICA organizes training courses in other countries, contributing necessary funds. These are generally called the third country training programs designed to provide training at the institutes abroad in collaboration with the host country to accommodate participants from neighboring countries.

There are ten JICA training centers in Japan. Each center has living quarters, classrooms, a library, sports center and other recreation facilities. Some centers are devoted to specific technical fields. For example, the Kanagawa

International Fisheries Training Center has a facility for making fish tackle and also owns two training boats. It conducts training courses on coastal fishing and fishery management, among others. Another example is the Tsukuba International Agriculture Training Center which offers courses on rice cultivation, rice production mechanization, irrigation and drainage, and vegetable crop production.

8.2.2 Technical Advice

JICA sends Japanese experts abroad to provide technical guidance, consulting and advisory services to government agencies, technical training centers, experimental stations and research institutes that are engaged in planning, survey and research activities in developing countries. This is one way of transferring knowledge and skills in relevant fields that are suited to the needs of the countries from which the participants come. These experts are active in various fields such as agriculture, forestry, fisheries, medicine, civil engineering, transportation, telecommunications, mining, manufacturing, etc. Experts are classified into two types:

- (a) experts individually assigned in organizations of the recipient governments as technical or administrative advisors;
- and (b) experts that are dispatched as members of technical advisory groups to training centers or institutes established through Japanese technical cooperation projects.

8.2.3 Donation of Equipment

The objective is to contribute to the economic and social growth of developing countries through the supply of needed equipment at the request of the countries. Types of equipment donated under this program include agricultural instruments and machinery, machine tools, textile machines, fishing equipment, medical equipment, electronic microscopes and telecommunications and broadcasting equipment.

8.2.4 Capital Grant Assistance

This is a form of fund assistance which is extended to developing countries without an obligation to repay, on the basis of international agreements and other commitments. This type of assistance includes general grant aid, aid for fisheries, food aid, aid for the increase of food production and others. The provision of capital grant assistance for the construction of schools, research institutes and other institutions falls under general grant aid.

8.3 PERFORMANCE OF JICA IN THAILAND (with a focus on HRD)

To the King Mongkut's Institute of Technology (KMIT), JICA has provided the following as part of its typical technical cooperation program:

- dispatch of technical experts in the telecommunications field;
- donation of telecommunications equipment; and,
- acceptance of KMIT faculty to its training programs and seminars on telecommunications engineering.

JICA provided technical experts and donated equipment to the Institute for Skills Development in the Northeast (located at Khon Kaen province).

It provided capital grant assistance for the following:

- establishment of the Institute of Biotechnology and Genetic Engineering;
- establishment of the Institute for Skills Development in Ubon Ratchatani;
- improvement of radiotherapy equipment at Chiang Mai University;
- establishment of the Institute for Skills Development in Northeast Thailand;
- equipment supply for the establishment of the Metal Working and Machinery Industries Development Institute (MIDI);
- improvement of facilities of Kasetsart University;
- establishment of Irrigation Engineering Center;
- establishment of the Institute for Japanese Studies at Thammasat University.

Criteria for giving assistance to Thailand are summarized below:

- priority sectoral programs identified in the Five-Year Development Plan;
- requirements outlined by the Department of Economic and Cooperation (DTEC);
- upon special request by the Royal Thai Government.

In view of the rapid growth of the Thai economy, the budget for donation of equipment has been reduced.

JICA's grant aid to Thailand from 1983 to 1989 is characterized by decreasing amounts from U.S.\$90 million in 1983 to only U.S.\$66 million in 1989 (a decrease of 27% between the two periods in U.S. dollars and 42% in Japanese Yen).

Table 1: JICA Aid to Thailand, 1983-1989

Year	Million Yen	Million U.S.\$
1983	13,575	90
1984	13,114	87
1985	12,399	83
1986	11,973	81
1987	11,624	80
1988	9,983	69
1989	9,541	66

9. THE GERMAN EMBASSY AND THE CARL DUISBERG GESSELSCHAFT

9.1 BACKGROUND

Annually, the German and Thai governments meet to determine the allocation of the German bilateral aid budget. Last year it totaled 28 million DM to Thailand. As with other governments, the German Embassy determines projects (or agrees to the projects put forward by their meetings with Thai government officials) but does not implement them.

The GTZ and the CDG are the implementing agencies in Thailand. The GTZ (German agency for technical cooperation) is responsible for translating intergovernmental agreements into practice. It prepares and implements development programs and projects designed to transmit technical economic and organizational knowledge and skills and improve the preconditions for their application. The GTZ appraises, assesses and plans the projects. It also selects, assigns and takes care of experts; and takes care the procurement of relevant materials.

The CDG (Carl Duisberg Gesselschaft) is Germany's agency for international professional training and development. It organizes and develops training programs in a wide range of areas from handicrafts to insurance and construction.

The German government has the following priorities in Thailand:

- environment and natural resources;
- rural development;
- telecommunications;
- irrigation; and,
- vocational and technical training.

In general, the vocational and technical training is geared toward technical colleges as opposed to universities. They try to be more practical rather than theoretical.

The German Embassy in collaboration with the technical colleges determines the priorities and needs. Usually, experts and equipment are brought over from Germany to train teachers and students. Other projects also include sending Thais to Germany for technical training so that when they return to Thailand, they can serve as trainers and work on projects.

9.2 COMPLETED PROJECTS

Vocational and technical training projects that have been completed include:

9.2.1 The Technical School in Pathumthani

This was designed to train students and teachers in mechanics. They still periodically run workshops for outsiders.

9.2.2 The King Mongkut's Institute of Technology

The first project implemented at the institute involved developing a center for teaching aids. Materials and equipment to help the faculty at the Institute were developed. The center now services other schools / universities as well.

9.2.3 The Southern Institute for Skills Development

The Institute trains teachers and students in technical skills.

9.3 ONGOING PROJECTS

9.3.1 The King Mongkut's Institute of Technology

The project involves the promotion of the faculty of engineering wherein professors and students are trained in electronics and manufacturing engineering at the undergraduate level.

9.3.2 Apprentice Training Center at Tangluan

This project primarily involves on-the-job training conducted either by German experts or Thais trained in Germany.

9.3.3 Fellowships

Each year, the German Embassy awards scholarship grants to five Thai faculty members to further their studies at the Asian Institute of Technology.

9.3.4 Scholarship Programs

There are two types of scholarship programs that the German Embassy awards to Thais: (1) project related - that is, a number of scholarships are awarded to those involved in the project (as nominated by German and Thai project leaders); (2) main scholarship program which awards annually about 40 scholarships to Thai students (undergraduate and graduate levels) through the nomination from DTEC.

9.3.5 Short-term Training Courses

Again, the German Embassy collaborates with DTEC in nominating deserving Thai government officers to attend these 2-4 month training courses conducted either in Germany or in the region.

9.4 PLANNED PROJECTS

9.4.1 The Sukhothai Thammathirat University, Printing Department

The emphasis will be in helping the Printing Department develop training aids, materials and programs.

9.5 CARL DUISBERG GESSELLSCHAFT (CDG)

The CDG is a German non-profit agency for training and personnel development. The Bangkok-based South East Asia Program (SEAPO) office is the only one in a developing country. The CDG in Thailand was originally set up as an arm of the GTZ, the technical project implementing agency for the German government. It became a separate entity in October 1984.

Almost all of the funding comes from the German Federal Ministry for Economic Cooperation (BMZ), the German government's development assistance department.

CDG-SEAPO programs have evolved to concentrate in three areas: environmental management, water resources development and small industries development in rural areas. These priorities came through the study of needs in these areas/regions, and the fields of interest and expertise of the head of the CDG in Bangkok, Mr. Tharun.

Project ideas are developed at the CDG in coordination with the local organizations most likely to be involved in implementation. The CDG has a policy of constantly working with partners and designing the projects together so they

are sustainable. These partners are universities, government departments and/or other agencies. It is through the local partner that the expertise is found to run the project. Foreigners are only used when local expertise is not available and also to strengthen local expertise.

CDG projects are designed only for training. Projects are evaluated at the end; for example, a workshop involving the participants will be held to discuss project development, implementation and plans for follow-up.

CDG's first set of projects are nearing the evaluation stage and they are confident about positive results.

There are seven full time staff working for the CDG office located at the AIT compound. They hire on a contract basis for specific projects. It is felt that its limited autonomy had helped reduce bureaucracy - a key to the success of their operations.

9.6 OTHER IMPLEMENTING AGENCIES

Other German government projects in Thailand are implemented by:

- DAAD - scholarships and formal education (mainly at AIT)
- GTZ - technical assistance
- DSE - training in agriculture, rural development and public administration
- KSW - financial assistance

10. THE ROYAL NETHERLANDS EMBASSY

10.1 BACKGROUND

The Royal Netherlands Embassy's bilateral program with Thailand in the area of human resources development has focussed mainly on the following:

- fellowship programs;
- financial support to educational institutions;
- technical advisory services.

10.2 PROGRAMS

10.2.1 Fellowship Programs

Under the fellowship program, about 70 to 80 Thai scholars per year attend post graduate courses in the Netherlands which last from two to twelve months for non-degree courses and two years for masters degree programs. Among the sectors covered are management science, agriculture and housing studies. The program is run by the Embassy in cooperation with DTEC, which screens and nominates government candidates.

The Royal Netherlands Government also supports local fellowship programs by directly providing funding assistance to educational institutions situated in Thailand, e.g. Asian Institute of Technology (library, staff promotion - payment for salaries of Asian faculty).

10.2.2 Other Projects

The Royal Netherlands Government has also provided funding support to the Southeast Asian Fisheries Development and Education Center (SEAFDEC), the Southeast Asian Ministers of Education Organization (SEAMEO), the Asian Center for Population and Development, and Don Bosco Technical School in Bangkok. In the past, it has sent between 20 to 30 fellows each year to Don Bosco.

Another assistance project being undertaken is the Embassy's tie up with the Department of Industrial Promotion within the Ministry of Industry. The project's objective is to promote rural industrialization by training provincial industrial officers to upgrade their skills in industrial management in areas such as accountancy, management, marketing and labor organizations. They are sent to the Dutch Management Institute in the Netherlands to undergo training in various fields.

Not directly related to industry but also a human resource activity is its "Small Farmers Participation Project" which is jointly undertaken with the Department of Agricultural Extension of the Ministry of Agriculture and Cooperatives. The project aims to improve the working methods of the Department of Agricultural Extension (DAE) which interacts with small farmers in the rural areas. The strategy is to work more on the software rather than the hardware aspect. Dutch experts talk with farmers together with DAE personnel to encourage and motivate the farmers into doing farm work.

10.2.3 Project Plans

Starting in 1991, the Royal Netherlands Government plans to veer away from purely bilateral programs (from which only Thailand directly benefits) to concentrate more on regional development programs such as the Mekhong Regional Program which would include Thailand, Cambodia, Burma, Laos and Vietnam. This program started in Chiang Mai with the establishment of the Arabica Coffee Research Institute, and has benefited the Thai farmers and small entrepreneurs. With the view of serving the needs of Thai neighbors, the Institute can invite Laotian coffee growers or would-be coffee growers and educate them using Thai trainers. The project is expected to extend to include Vietnam, Burma and Cambodia.

11. THE AUSTRALIAN EMBASSY AND THE AUSTRALIAN EDUCATION CENTER

11.1 BACKGROUND

Australia's bilateral aid to Thailand amounted to U.S.\$20 million in 1990.

There are six priority areas that Australia has identified for their aid to Thailand:

- education and training;
- rural development and agriculture;
- energy;
- transport and communications;
- land use (resource management); and,
- environment.

11.2 PROJECTS

There are twelve major projects being implemented in Thailand for the Australian government. Two of these projects include the construction of the bridge over the Mekhong river between Laos and Thailand, and the village water project.

Projects are initiated through DTEC. Priority areas such as women in development, the environment and education are addressed in each of these projects. For example, part of the Mekhong River Project includes sending one Thai and one Laotian engineer to Australia to work with the contractor in planning the bridge. Six more technicians will be trained on the job in construction techniques.

Human resources development is addressed within all projects funded by the Australian government in Thailand. The sponsored student program is what they consider to be the closest to human resources development. This program comprises 25% of the total bilateral aid budget. Students have been sponsored by the Australian government to study in Australia since the bilateral aid program started.

Students are nominated by the Thai government to take up post graduate programs in Australia. They are given English language training in Thailand, and if necessary, in Australia. There are no specific disciplines prioritized in this program. About 160 students were sponsored in 1990.

There is a second scholarship program called Equity and Merit for students not nominated by the government. Students can apply themselves for a one-year scholarship to study English in Australia. These students are ranked

according to marks and chosen by merit. Some freshmen students at Khon Kaen University have been awarded the same scholarship. These are usually awarded to students from poorer families and regions. Fifty-seven students were sent to Australia on this program in 1990.

There are no vocational training projects run by the Australians. This is an area in which they are interested but at present they have no specific plans to undertake any project.

A total of 190 Thai students (government and non-government nominated) who are sponsored by the Australian government are at present in Australia.

11.3 AUSTRALIAN EDUCATION CENTER

The Australian Education Center is set up to provide a one-stop information/assistance service for people interested in studying in Australia at any level. It has a very open atmosphere.

The Center manages part of the fellowship and core programs for International Development Program (IDP). The fellowship program involves scholarships for academic staff. This service is jointly funded by IDP, Australian International Development Aid Branch (AIDAB), the World Bank and the Asian Development Bank (ADB). There are twenty academics on scholarships studying at the post graduate level in this program in Australia. The Center helps Thai professors in facilitating their travel arrangements to Australia.

The Core Program is designed to strengthen the teaching research and administrative programs of Chiang Mai, Silapakorn and Prince of Songkhla Universities. This is a four-year program funded by the Australian government in the amount of A\$6.2 million. The Center does not manage the program which is done by IDP in Canberra but liaises with Canberra when necessary.

Another function of the Center is to help IDP identify and locate project possibilities in Thailand. It tenders projects to the government on the IDP's behalf. An example is the tender for a UNDP-sponsored project for the development of a new course design for the King Mongkut's Institute of Technology.

The Center also runs the English Language Center of Australia (ELCA) at UTCC. It offers English language courses including intensive courses, regular courses, English for specific courses (test preparation, for hotel and tourism, etc.) and English for special groups.

The Center runs the English language tests on a regular basis. They use the International English Language Testing System (IELTS) which they consider a more accurate yardstick of English language skills. This test, developed jointly by the University of Cambridge, the British Council and IDP, is use-specific and evaluates abilities in four areas - English speaking ability and comprehension, and writing ability and comprehension. This test varies according to the student's intended field of study - science, general arts or business. It also varies according to the intensity of the use of the language.

The Center is financed partially by the Australian government (20%) and mainly from revenues collected from member universities of the AEC.

The Center also conducts seminars for Thais or Thai residents who wish to go to Australia, about the Australian education system and how to go about studying there.

12. THE FRENCH EMBASSY

12.1 BACKGROUND

In human resources development, the French Embassy has three main programs:

- scholarships;
- collaboration with the AIT; and,
- development projects.

12.2 SCHOLARSHIPS

The scholarship program comes in two forms - with other projects or alone (self-application by an individual). Project-oriented scholarships are mainly reserved for postgraduate education usually related to doctoral work in France. Candidates for Ph.D. programs are nominated by universities. Individual scholarships are mainly awarded to students at the undergraduate and master degree levels.

12.3 PROJECTS

Every three years, priority projects are chosen in cooperation with DTEC. The following are projects being implemented in several fields. They involve any or a combination of the following types of assistance:

- provision of French experts and specialists;
- short term training;
- seminars.

12.3.1 Anthropology

Mahidol University (working with hilltribes upcountry and Muslims in Bangkok).

12.3.2 Law/Public Administration

Thammasat, Chulalongkorn and Ramkhamhaeng Universities (a special center for French Law has been set up at Thammasat).

12.3.3 Archaeology

Silapakorn University (includes training at the French Institute for Archaeology in India; brings in experts; some training is done on site where the French are helping in the restoration of temples in Thailand).

12.3.4 Sanitary Engineering

Chulalongkorn University (related to waste water treatment in chemical factories; also conducted a meeting concerning the Chao Phya River).

12.3.5 Natural Rubber and Polymer Chemistry

Prince of Songkhla University

12.3.6 Biotechnology

The Red Cross Society (involves training of people who do blood transfusions).

12.3.7 Industrial Engineering

Created a center for the management of industrial engineering.

12.3.8 Production of Energy

Electricity Generating Authority of Thailand (EGAT) - (research with respect to nuclear energy).

12.3.9 Medicine

Siriraj Hospital (professional training for specialist physicians and nurses).

12.3.10 Agrarian Systems

Kasetsart, Prince of Songkhla Universities (training of economic and agricultural specialists especially related to rubber, cotton and fresh vegetables).

12.3.11 Linguistic Cooperation

Various universities (cooperation among French language institutes; training of teachers).

12.3.12 Thai-French Mechanical Engineering Institute

Planned (still at the conceptualization stage with a meeting planned for August 1991; envisioned to follow the model of the French-Singaporean Institute which was designed to upgrade mechanical engineering skills).

12.4 BUDGET

The French spend about 2 billion francs (about U.S.\$360 million) per year in HRD (not only for Thailand but for the region). About half of this amount is allotted for scholarships.

C. DEVELOPING PUBLIC/PRIVATE SECTOR LINKAGES AND MODELS FOR LABOR SKILL DEVELOPMENT AND TECHNOLOGY TRANSFER

1. EXISTING U.S.-THAI UNIVERSITY LINKAGES

1.1 OBJECTIVE

The objective of contacting the Thai universities was to identify the current linkages between U.S. and Thai universities and to examine the scope of these linkages and their potential for expansion.

1.2 THE THAI UNIVERSITIES

Thailand's higher education began some 75 years ago when Chulalongkorn University was established in 1916 as the first university in Thailand. Since then higher education in Thailand has slowly expanded with the establishment of other public universities and private universities located within Bangkok and other provinces. Public universities have played the larger role in providing university education. Both public and private universities operate under the jurisdiction of the Ministry of University Affairs. While Thailand does not have independent certification bodies, the Ministry approves the curricula of new programs in both the public and private universities and monitors new programs in the private universities during their start-up phase. As some of the private universities are profit oriented, there is concern in the Ministry that these universities will sacrifice quality to enhance profits. The Ministry's oversight has been reasonably effective in insuring that the quality of university programs is acceptable.

Since 1987, the economic boom has expanded the demand for high-level manpower, especially engineers, computer scientists and managers. The rate of growth in demand has outstripped the capacity of the universities to expand their programs, particularly in the public universities. The private sector is more responsive as seen by the establishment of engineering programs in existing private universities as well as the creation of new engineering-oriented universities. However, the production of needed manpower requires a lead time of at least four years. Thailand will have to face a continuing serious shortage of technical manpower especially engineers and skilled technicians for at least a few years.

Currently, there are 18 public universities/colleges and 26 private universities/colleges in Thailand. All except two

are under the control of the Ministry of University Affairs, which are under the control of the Ministry of Education. Fifteen public universities offer programs leading to Bachelors Degree of Science, ten of them have also programs in engineering and one other has only engineering. Only six private universities offer engineering degree programs. Respondents from Thai universities are listed in Appendix XI.

1.3 SAMPLED UNIVERSITIES

The universities were chosen on the basis of having engineering programs or planning to start engineering programs. Nine out of eleven (88%) engineering-oriented public universities, five engineering-oriented (83%) and one social science-oriented private universities, totaling 15, were selected for in-depth interviews. Six interviewed public universities are located within the Bangkok Metropolitan Area and three others are located in provincial areas. Five private universities are located in Bangkok and one in Chiang Mai. Seven surveyed public universities have undergraduate and graduate programs in engineering. Mahidol and Thammasat universities, both are public, have just started their engineering programs in 1990. All of the surveyed private universities do not offer graduate programs. Most interviewed personnel were deans of engineering. In some cases the respondents were the presidents and vice-presidents of the universities. Some universities invited the interviewer to tour their laboratories and classrooms.

1.4 RESULTS OF THE SURVEY

1.4.1 General

Most long-established public universities have had collaborative linkages with foreign universities, mainly in industrialized countries in Europe, United States, Australia, Japan and some developing countries in Asia and the Pacific. Private universities have limited linkages with foreign universities due to their young age and their concentration on bachelors degrees. However, some have established linkages with U.S. universities in student exchange programs. All public universities are financially supported by the government, while all private universities are financially self-supported, mainly or totally from tuition fees.

1.4.2 Collaboration with U.S. Universities

Thai Universities have established linkages with a number of U.S. universities in several areas. Some universities have signed collaborative agreements at the university level and others at the faculty level. However, in general, the linkages appear to be more on paper than in fact. The linkages result from either a project funded from an external source or from encounters with academics from the U.S. and Thai academic communities. The project-related linkages tend to phase out with the project funding. Generally, as high-ranking administrators, the president or the dean has opportunities to meet with the presidents or the deans of foreign universities, either through their visits to foreign universities or the visits of foreign university administrators. If both sides are willing to collaborate, an agreement can be easily prepared. To make the agreement operational, projects are prepared by the relevant faculties of the two universities and funds are sought. The major hurdles are the identification of sources of funding and the implementation of the project. Because of the financial hurdle, most agreements do not go beyond the agreement on paper. Thai-U.S. university linkages (with particular emphasis on engineering) are presented in Appendix XII.

In general, most linkages involve the following:

1. Exchange of faculty members, or programs to upgrade Thai faculty at U.S. universities
2. Joint post-graduate programs
3. Solicitation of equipment
4. Joint R&D projects
5. Exchanges of students

Chiang Mai University

Chiang Mai University is located in Chiang Mai Province in the North of Thailand. The university has established linkages with U.S. universities in several areas. For the Faculty of Engineering, there has been a collaborative program in the exchange of faculty members with the University of California at Santa Barbara. Young faculty members have been sent to Santa Barbara for further study. Chiang Mai University has discussed with George Washington University the establishment of a graduate program in engineering technology. The university has signed a university level collaboration agreement with Oregon State University. There is a plan to sign a similar agreement

with the Faculty of Engineering at the University of Illinois in the near future. The university also cooperates with MIE University in the field of agricultural engineering.

The linkages have not borne fruit because of a dearth of concrete program ideas and a shortage of funding sources. The university intends to emphasize the joint engineering technology graduate program with George Washington University and feels that it has the best chance of becoming operational.

Chulalongkorn University

Chulalongkorn University has signed agreements with a number of U.S. universities. In engineering, the university had a program with the University of Texas to upgrade faculty, which the Thai faculty felt was a success. The university signed an agreement with the University of Washington but nothing resulted from the agreement. At present, the Faculty of Engineering is interested in establishing a joint graduate program in Engineering Management with George Washington University. Other graduate engineering programs are planning to collaborate with the University of Missouri at Rolla.

The Sasin Graduate Institute of Business Administration, an independent institution of higher education of Chulalongkorn University, established in 1982, is a joint academic endeavor among Chulalongkorn University, the J.L. Kellogg Graduate School of Management of Northwestern University, and the Wharton School of the University of Pennsylvania. While the Sasin Program has been criticized for the slowness with which it has incorporated Thai professors into its curriculum, their program remains the most institutionalized program in Thailand that involves American professors.

Kasetsart University

In the past the university has had good relations with the University of Oregon in the areas of agriculture in upgrading faculty members.

The Faculty of Engineering has no linkages with U.S. universities at present. They are interested in establishing linkages with foreign institutions of learning. They are currently being assisted by JICA in a long-term program to upgrade the Faculty of Agricultural Engineering.

Khon Kaen University

Khon Kaen University is located in the Northeast of Thailand. The Canadian International Development Agency (CIDA) assisted in its establishment.

The university has a collaboration program with Iowa State University in the field of humanities and social sciences, and with Case Western Reserve University in a student exchange program for medical sciences. Some medical students from Case Western Reserve University are now at Khon Kaen University.

Mahidol University

Mahidol University has had some linkages with U.S. universities; however, they are mostly in fields pertaining to medicine. Mahidol University began its engineering program in 1990, the Faculty of Engineering is now in the course of establishing a linkage with the University of Hawaii in Computer Information Systems.

King Mongkut's Institute of Technology North Bangkok

King Mongkut's Institute of Technology North Bangkok (KMITNB) was established in 1959 as the Thai-German Technical School under the Department of Vocational Education, Ministry of Education. The aim was to train and produce skilled workers in four areas, i.e., Machine Mechanics, Electrical Mechanics, Automotive Mechanics and Industrial Piping and Welding. The course duration was three years after the lower secondary school. The program was patterned after German vocational training models, which emphasize intensive practical training in workshops. In 1962, the School was upgraded to a technical institute and began offering two year diploma's that were equivalent to the community college associate degrees in the U.S. The School name was changed to Thai-German Technical Institute. In 1971 the Thai-German Technical Institute became the King Mongkut's Institute of Technology and gained the status of a university under the Ministry of University Affairs. The institute began offering courses leading to Bachelors degrees. Finally in 1986, this campus became an independent university with the name of King Mongkut's Institute of Technology North Bangkok.

The institute received German technical support during the First Project (1959-1968) and the Second Project (1969-1979). During the Second Project, the Thai-German Technical Teachers College became the Faculty of Technical Education and Science. The Third Project, which began in 1980 established the Thai-German Teaching Aid Center. The Fourth Project is developing the Faculty of Engineering.

During 30 years of cooperation, the Royal Thai Government and the German government have signed ten agreements or exchanges of notes.

With U.S. universities, there are no official linkages at present. However, informal linkages have been established with Oklahoma State University and the University of Ohio at Columbus. In addition, the President of KMITNB visited several U.S. universities.

Siam University

Siam University is a private university which began as a technical school; the university was upgraded in 1986. The university offers engineering programs at the bachelors degree level. The university, however, has established linkages with several U.S. universities, such as California State University at Long Beach, University of Bridgeport, Northrop University and Mercy College.

South East Asia College

This college also began as a vocational and technical school. It now offers engineering programs leading to a Bachelors degree in engineering in two fields, namely, electrical and electronics.

The College has three faculties: Engineering, Industrial Technology and Business Administration. A graduate program is offered only in Business Administration.

At present, the College has no cooperation with any foreign institutions of learning.

Prince of Songkhla University

Prince of Songkhla University has a southern coastal resources project. The aims of the project are to collect data on coastal resources and conduct research. The project received U.S.\$1.5 million from USAID for a six year period from 1990 to 1995. The project is headed by Dr. Phasook Kullavanij, the President of Prince of Songkhla University. The cooperating institution is the University of Rhode Island (URI).

The university has agreed to cooperate with the University of Missouri at Rolla for its graduate programs in engineering.

From 1973 through 1980, the university received a soft loan from the World Bank amounting to U.S.\$1.9 million to help develop the Faculty of Science. The project assisted in

upgrading faculty members, buying teaching equipment and constructing buildings to house the faculty. The Colombo Plan and USAID provided scholarships for faculty members.

Thammasat University

Thammasat university is known as one of the country's preeminent universities in liberal arts and social sciences. It has diversified into health sciences and physical sciences only recently. While the main campus of the university is in Bangkok, the Faculty of Engineering will be at the Rangsit Center in Pathumthani Province, about 40 km. from Bangkok. The first batch of 100 engineering students was enrolled into two programs, electrical and mechanical engineering, for the 1990-1991 academic year. When the program is fully operational, there will be five fields of engineering, i.e., electrical, mechanical, industrial, chemical and civil engineering. The university plans to have 1,000 engineering students within 4 years. The faculty will eventually be able to handle up to 2,000 students.

The faculty is expecting Japanese technical assistance through JICA to establish an Engineering Equipment Center, which will be used to assist industry as well as teaching. The total value of assistance will be about 100 million baht. The faculty only began its program in 1990 and has yet to sign any cooperation agreements with foreign universities.

Rajamangala Institutes of Technology

These institutes began as technical colleges which produced engineering teachers in a one year program after technical certificates, the certificates were the equivalent of vocational high school diplomas. Later, it offered a degree program for teachers in vocational schools and technical colleges. The names of the institutes were changed to Vocational and Technological Colleges in 1975. The present name, Rajamangala Institutes of Technology, was given by His Majesty the King in 1988.

RIT is responsible for the provision of technological education at three levels : Certificate, Diploma and Bachelors degree. RIT comprises 11 faculties, 31 campuses and 5 centers.

The Institute has signed an agreement with Oklahoma State University for faculty development. RIT is sending young staff to OSU for further study and is paying their costs out of the RIT budget. OSU accepts RIT staff with preferential consideration. Other universities having informal connections with RIT are the University of Missouri and the University of Mississippi.

Assumption University (formerly ABAC)

Assumption University began as Assumption Business Administration College (ABAC). The Ministry of University Affairs upgraded its status to university in 1990.

Assumption University has a program with Wollongong University in Australia for training of staff members in science and engineering. With U.S. universities, there are collaboration agreements in Business Administration with a few universities, including the University of Southern Illinois and Pittsburgh University. The university also has a student exchange program with Loyola of Maryland for its hotel management program.

Rangsit University

Rangsit University is a private university offering higher education programs at the university level. Currently there are 12 faculties, including medical sciences, science, engineering, and business administration.

The university campus is new. It is situated on a 100-rai (40 acre) estate in the Muang Ek housing project at Rangsit in Patumthani province, 30 km North of Bangkok.

The Engineering Faculty was established in 1988 and offers engineering programs leading to a Bachelors degree of engineering in 6 fields, namely, electrical, civil, industrial, mechanical, chemical and computer. The first group of engineering students is expected to finish their education in 1993. The quality of education is controlled by the Private Higher Education Institution Regulation of the Ministry of University Affairs.

The university has signed an agreement with Northeastern University for a student exchange program. The basis of agreement is that each university will cover the expenses of students from the other university while the students are away from their home institution. Rangsit University also has an exchange program in hotel management. The University of Stratclyde in Scotland has agreed to receive students who complete two years at Rangsit into the third year of their Bachelors program.

Mahanakorn College

Mahanakorn College is a private institution of learning offering engineering programs leading to a Bachelor of engineering in several fields. The College was established in 1990 and enrolled its first class of about 400 students in July 1990. Its goal is to increase the number of

students enrolled in 1993 to 2,500 in different engineering fields, namely, electrical, electronics, telecommunication, control and instrumentation, computer, mechanical, chemical and civil engineering.

The College emphasizes staff development and has a linkage with the University of New South Wales in Australia for upgrading faculty and exchanging students. The university neither has nor plans any linkages with U.S. universities in the near future.

Payap University

Payap University is a private university located in Chiang Mai. The University does not have engineering programs but is considering establishing one soon.

At present, the University has established linkages with some U.S. universities, such as, Northern Illinois University for a staff exchange program and Withworth College for a student exchange program.

1.5 FUTURE PLANNED LINKAGES

Most public universities expressed their desire to strengthen graduate engineering programs, which they felt required assistance from foreign universities that have strong programs in specific fields. The public universities feel that the undergraduate engineering programs are running effectively and are not in need of foreign assistance.

Chiang Mai University and Chulalongkorn University would like to establish joint masters programs with George Washington University in engineering technology and engineering management.

Chulalongkorn University and Prince of Songkhla University would like to join hands in a joint engineering graduate program with the University of Missouri at Rolla.

Most private universities, which have new engineering programs, have not yet developed concepts of future linkages with U.S. universities. The exception is Rangsit University which expressed its plan to expand its collaboration with Northeastern University into Masters degree programs in engineering management and information technology.

1.6 LINKAGES WITH THE BUSINESS COMMUNITY

The linkages of most universities with the business community have been through the universities provision of research and consultancy services, engineering testing services, and training services to the business community. Some large business enterprises donate educational equipment and scholarships to the universities. Most universities offer continuing education programs.

The use of professors as consultants by the private sector has grown since the economic boom began in 1987. Because of the shortage of engineers in Thailand, companies are relying more on professors to supply technical advice. In moderation, this practice is mutually beneficial for both the companies and industry. The professors become more sensitive to the needs of industry and they carry this hands on industrial experience back to the classroom. The additional income reduces the gap between professors' salaries and the salaries in the private sector and may help induce some professors not to leave academia to take a position in the private sector. In addition to the consultancy service, the companies develop informal relationships with the universities, become aware of relevant research being done in Thailand, and become more aware of areas of possible collaboration with universities.

1.7 GENERAL COMMENTS

The following are some general comments from the university respondents concerning human resources development, particularly the development of technical manpower.

- 1.7.1 Public universities have undertaken special programs to increase their output of engineers. These are usually evening programs that admit students, often on a continuing education basis, that would usually not be able to gain admittance to the regular program. Some professors believe that these programs are not as effective as the regular programs and that the dropout rates are relatively high. At Kasetsart University's Faculty of Engineering for example, out of a total of 300 students that registered in the first semester of 1990, only 220 re-registered (a 27% dropout rate).
- 1.7.2 Thailand's education system needs to be reformed from the primary level through university level if Thailand is to become a newly industrialized country. The levels of participation in secondary schools are the lowest of any of the ASEAN countries. The teachers

training institutes are generally weak, and the brightest graduates gravitate to the private sector.

- 1.7.3 The government should consider rendering assistance to private colleges/ universities in the development of teaching materials and the provision of educational equipment. This in turn would help raise the standards of graduates without putting heavy burden on parents to cover the cost of education.
- 1.7.4 Basic education should place more emphasis on mathematics, science and foreign languages to prepare the Thai work force for a technology-based society.
- 1.7.5 The shortage of technical manpower is both at the levels of skilled technicians and engineers. Due consideration should be given to both.
- 1.7.6 The government does not pay sufficient attention to postgraduate scientific and technological education which is of importance to the country in preparing qualified manpower to cope with advanced technology and to move the country toward more self-reliance in the development of technology.
- 1.7.7 It would be useful for USAID to sponsor a meeting of private universities to help identify areas needed to be upgraded.

2. U.S. MODELS THAT ARE TRANSFERABLE TO THAILAND AND U.S. INSTITUTIONS PREPARED TO COLLABORATE

2.1 INTRODUCTION

USAID/Thailand engaged IMRS to identify and develop specific pilot projects which would (1) foster sustainable linkages between U.S. and Thai universities, (2) adapt and transfer to Thailand appropriate U.S. public/private sector and university/business models to help Thai businesses and industries meet their priority labor skills needs, and (3) incorporate the sharing of costs by the Thai and U.S. universities and other organizations participating in the pilot projects.

The objectives of the U.S. trip were to identify appropriate models for Thailand and to elicit interest from academia and the business community in collaborative programs, linkages or partnerships with Thai counterparts. The research team met with a number of business and trade associations, U.S. governmental agencies, donor agencies and universities. The list of respondents from U.S. universities is given in Appendix XIII while those from other sectors are listed in Appendix XIV.

This section presents the different models "derived" from universities, public institutions (National Science Foundation) and private organizations (National Education Corporation and Food Processing Machinery and Supplies Association) in the United States. These models are conceived as potentially transferable to Thailand provided that all elements necessary for the "transfer" are present or obtainable (e.g. technical capability of Thai institutions; availability of financial support; willingness of private sector to participate).

Discussions with officials and professors in different U.S. universities that were visited indicated that their willingness to collaborate with Thai institutions hinges upon the availability of a funding source. e.g. USAID. Although a majority of U.S. institutions have instituted a policy to "globalize" their curriculum and faculty, their expansion efforts are stymied by the fact that they do not have sufficient financial resources to support this objective. This is particularly true with state universities which are almost entirely financially dependent from their state governments.

2.2 U.S. MODELS

2.2.1 Faculty Exchanges

Formal and informal exchanges of professors have been ongoing between U.S. and Thai universities for decades. The exchange program normally involves U.S. professors giving lectures and participating in research projects at Thai institutions for a specified period (usually a term) and Thai professors going to the United States to further their studies (masters and Ph.D.'s). Unfortunately most of these associations have been short-lived (once the funding runs out, the linkages also stops). While it is regrettable that the exchange of faculty does not continue after the funding ends, the termination of the exchange does not indicate that the program has been a failure. Indeed, Thai academics cite the education provided in the U.S. and the exchanges of faculty as the most appreciated aspect of the USAID program in Thailand.

This model can be developed in U.S. and Thai universities which are willing to establish long-lasting linkages or linkages which are sustainable. The principle obstacle is developing a mechanism for financing the linkages over the long term.

2.2.2 Curriculum Development

Some U.S. universities and colleges have developed an expertise in developing applied programs that aim at producing graduates who can easily adapt to their working environment with a minimum of on-the-job training. These curricula are usually designed in close consultation with industry to insure that the students receive instruction in the areas of interest to industry and require a minimum of on-the-job training. In such programs, the curricula are constantly modified to keep up-to-date with industrial changes.

Hence, development of curriculum which is responsive to the needs of business and industry has been a forte of these U.S. programs. Thai institutions, whose curricula (especially in engineering and technical training) have been targets of criticisms from the private sector about their theoretical orientation, can directly benefit from the expertise of U.S. academia in this field.

Thai academia already has significant experience with these models. This is not surprising as a large percentage of Thai academics, particularly in technological fields and management, have U.S. graduate degrees. They are aware of these models and, in many instances, have tried to adapt these models to the situation in Thailand.

These attempts have included incorporating the private sector into the governing councils, including private sector representatives on curricula committees, encouraging professors to gain industry experience through consulting activities, and creating internship programs for Thai students. In public universities, the attempt to include industry leaders on governing boards did not succeed because of the amount of time that such boards consume of its members time. Thai civil servants have more time to devote to such committees. The Ministry of University Affairs indicates that industry representatives are named to all curricula committees for new technical programs that the Ministry is asked to approve. Furthermore, these industry representatives are specialists in the field under consideration. While the mechanism is in place, the Thai academic community apparently needs assistance in making this mechanism effective in making curricula responsive to the changing needs in industry. Schools such as MSOE may assist through providing guidance on the effective administration of industry committees. However, it is also possible that the U.S. models have not successfully transferred due to cultural differences and the Thai preference for conflict avoidance: Thais who are donating their time to a committee may find it more appropriate to be too busy for a meeting rather than to argue for their point of view at that meeting. While the universities have in the past few years become a major resource for industry in the provision of consulting services, the contact has been a mixed blessing for the universities. Increased involvement in consulting has made professors more aware of the opportunities open in private industry. Some of the consulting projects have resulted in the company that engages the consulting services of a professor making an offer to the professor for a full time position. There are also cases in which professors become overly involved in their consulting activities to the detriment of their teaching responsibilities.

2.2.3 Programs to Upgrade Faculty

The programs may involve sending university staff in the U.S. for advanced degree education and/or bringing in visiting professors to Thai universities to strengthen teaching methodologies and research. American education is a valuable commodity. From the world's greatest research universities to technical schools and junior colleges, the U.S. offers boundless opportunities in higher education. It offers the broadest collection of high quality education programs and among the best faculty that are recognized internationally for their teaching and scholarly research.

U.S. institutions are noted for their state-of-the-art research facilities. Students may have access to

supercomputing centers for architecture, design and applications; institutes for human and artificial intelligence; facilities for such specialized research areas as computer-assisted image analysis; nuclear research reactors; foreign language laboratories; or, the largest computer-based instructional system in the world.

2.2.4 International Cooperative Education Program

Cooperative education, which alternates periods of academic and practical work in the student's major field of study, has long been recognized and accepted among major U.S. companies as an efficient means of providing students with a solid foundation in applications of technology.

The international cooperative education program, which is an extension of the cooperative education, has two aspects: (1) the return of foreign students to their home countries during the summer vacations, and (2) the employment of these students in the U.S. during their summer break.

The first aspect relates to the home country placement project that was initiated by Northeastern University. The project involves internships for foreign nationals studying in the United States with American companies that have established branches overseas with the aim of having these students work for the company in their home country after completing their studies. The second aspect is more of the typical cooperative education program to which American students are exposed. It extends the program to include foreign students in U.S. universities.

2.2.5 Distance Education

The concept of distance education is not entirely new in Thailand. Open universities like Ramkhamhaeng and Sukhothai Thammathirat have adopted programs which allow students in several classrooms to follow lectures given by one professor (Ramkhamhaeng model) and students in the provinces to participate in a course conducted in Bangkok by getting transcripts of lectures from the university's learning center in the province (Sukhothai model).

Distance education in the United States has gained ground in several universities wherein professors' lectures are telecast to other classrooms, which makes following the lectures more convenient for students and increases the number of students that can benefit.

There are also examples in the U.S. of courses that are offered over television. This would be appropriate for the open universities as many of their students are working full time.

A language class could be done this way. Lectures and tapes could be done on TV. Language labs and conversation classes could be done over the telephone as a conference call. This may become more possible after the installation of the extra 3 million telephone lines planned by the CP-British Telecoms project.

This concept may be adopted in Thai universities that are experiencing a shortage of qualified professors.

2.2.6 Cooperative Research Centers

Industry/university cooperative research centers have been created under the auspices of the National Science Foundation for university research centers to undertake "generic" research that is not focused on the needs of an individual company but more to the needs of an industry.

A Center is defined as a university-based, typically interdisciplinary, program of research supported jointly by a number of companies. The advantages of this collaborative model lie in its relatively modest financial and administrative costs, especially in light of the potential benefits to participation. For firm sponsors, the benefits are exposure to potential research ideas and projects, as well as to potential employees (graduate students and post-doctoral researchers). Continuity of funding without requiring changes in traditional academic values is the major benefit to university departments.

In Thailand, only the King Mongkut's Institute of Technology (KMIT) at Lad Krabang is known to have strong collaboration with the electronics industry. Other institutions such as Chulalongkorn and Kasetsart Universities generally undertake research projects that serve individual company needs. Both have adequate laboratories and facilities to support their research activities. Almost all university faculty members in technical fields have done consulting work with independent firms. The willingness of the university to conduct research for industry is certainly echoed by professors. More and more faculty members are expressing the need for collaboration with industry; this will necessarily involve applied research.

2.2.7 Foreign Branches

In the 1980's, U.S. and Malaysian universities began offering joint degree programs. Typically, Malaysian students study for two years in the Malaysian University and then transfer to the U.S. university for the third and fourth year of their B.A. program. The Malaysian government hoped this would reduce the cost of studying overseas, and would better prepare the students academically before they left Malaysia. Two years older before leaving home, graduates of these "split" degree programs also adapt better in the U.S. because they have been exposed to an American-style system while still in Malaysia. With deeper roots in Malaysia, they are more likely to return after completing their studies in the U.S.

This model may have applicability to Thai universities; however, Thailand is not yet at the stage at which it can accept these programs to the same extent as Malaysia has. While Malaysia's population is only a third of that of Thailand, there are over twice as many Malaysians as Thais studying in the U.S. In 1985 Malaysia had 23,000 students in the U.S. In 1989, the U.S. Embassy in Bangkok issued 3,200 student visas to Thais, implying that there are roughly nine thousand Thais in U.S. universities, assuming that they spend an average of three years studying at the university. The per capita income of Malaysia is about twice that of Thailand; according to the World Bank, the per capita income of Malaysia was U.S.\$1,970 in 1988 and of Thailand was U.S.\$1,000. Malaysians are also better prepared for studies overseas as their English language training in secondary schools is superior to the training in Thailand. While the demand for such programs in Thailand will be smaller than in Malaysia, initially, institutions with English as a medium of instruction could participate.

2.2.8 Vocational-Technical Training Programs for Industry Workers

The National Education Corporation (NEC) at Irvine, California is the largest private vocational-technical education system in the world. The NEC offers a vast array of training programs from very elementary to highly advanced technology. One of its assets is its access to a large number of talented professionals and materials relating to vocational-technical training.

Other features of NEC, its infrastructure and training programs are enumerated below:

(1) NEC has over 50 training facilities in the United States. They are all privately owned and profit oriented. They are self sustaining so they must meet local industry

needs. Their graduates are qualified and find jobs easily. Being large allows them to be innovative in their approach, e.g. they conduct research programs.

(2) They have developed programs to meet industry requirements in the communities in which the schools are located; consequently, they have programs from home industry type to high manufacturing technology. They attract instructors from industry through incentive programs and equitable pay.

(3) Their size allows them to develop materials and training aids in quantity, and they can draw expertise in program development from their member schools. They have several programs that are proprietary as well as a vast amount of materials.

2.2.9 Rutgers Program with the Singapore Institute of Management

Under this model, a U.S. university, Rutgers, awards a masters degree to students who have attended all course work at a foreign institution of learning, the Singapore Institute of Management.

A Master of Science in Human Resource Management is being offered at the Singapore Institute of Management (SIM). The program, which was adopted from the Rutgers Program of the State University of New Jersey, is designed for experienced personnel managers and specialists who wish to broaden and update their skills base, achieve a greater understanding of the reasoning underlying practice, and develop a strategic approach towards human resource management. While all the courses are conducted at the SIM, it is Rutgers of the State University of New Jersey which awards diplomas to graduates.

2.2.10 Joint Research Programs between Universities and Industrial Associations

The Food Processing Machinery and Supplies Association (FPMSA) interfaces with various food associations in the U.S. through institutional linkages with U.S. universities in the conduct of training, exchange of information, and development of product standards. The relationships are tied with the research programs of the universities' agricultural extension departments.

The National Food Processors Association (NFPA), an affiliate of FPMSA, is concerned with food safety. NFPA uses university laboratories to conduct food safety tests.

A similar collaborative agreement between Thai universities and industrial association can be forged.

2.3 U.S. INSTITUTIONS PREPARED TO COLLABORATE WITH THAIS

2.3.1 Milwaukee School of Engineering (MSOE)

The elements of the MSOE program that are applicable to Thailand are the applied nature of the research work, the strong ties between the business community and the school, and the emphasis on preparing students for engineering careers. IMRS has discussed the MSOE model with both public and private institutions, with and without the presence of members of the MSOE team.

The public universities have attempted to incorporate the private sector on their boards of directors. When this was tried at Chulalongkorn University, it failed because the private sector members were unable to spend the amount of time that was required to be on the various committees of the board. Nevertheless, there are informal contacts with the private sector, which have been boosted by the increasing use of professors in technical fields as consultants by the private sector.

The private sector universities are more receptive. Firstly, they are more open to the idea of collaborating closely with the private sector. Secondly, as the engineering programs in the private sector are new; they are more open to suggestions on how to strengthen their programs. It may be that by adopting a more applied emphasis in their engineering programs, the private universities can differentiate their programs from the public university programs that tend to be more theoretical in approach and create a niche for themselves as the producers of engineers capable of moving easily into an industrial environment. There are, for example, reports from companies particularly in the provinces that engineers from some of the public universities have high expectations but require hands-on training in doing applied engineering.

2.3.2 Virginia Polytechnic Institute and State University (VPI&SU)

The Virginia Polytechnic Institute and State University (VPI&SU) has a strong distance education program via satellite. Professors' lectures are telecast to other classrooms, which makes following the lectures more convenient for students and increases the number of students that can benefit. With the proliferation of personal computers, increased accessibility to mainframe computing, and video technology, remote instruction has provided Virginia Tech many opportunities to expand its mission.

2.3.3 Northeastern University and its Network

The International Cooperative Education Office provides a wide variety of services to both domestic and international students at Northeastern University.

In recent years the high number of international student enrollments at Northeastern has been accompanied by an increase in interest on the part of U.S. students who wish to pursue their cooperative education abroad. Thus the role of the International Cooperative Education Office is to address the needs of both U.S. and foreign students.

Home Country Placement

The Office of International Cooperative Education is developing coop programs in countries from which Northeastern attracts large numbers of students and in which the economic and social conditions make such efforts viable. Initial focus has centered on the establishment of programs in engineering, computer science and business administration in South East Asia, the Far East and Europe.

The Home Country Placement Project involves bringing together qualified foreign national students studying in the U.S. and U.S. firms having overseas business interests, for purposes of employing such students on cooperative education assignments in their home countries. Many companies participate in the programs as a part of their recruitment strategy. Northeastern University places annually over 9,000 students with more than 2,500 enterprises and has developed the Home Country Placement Project to meet the needs of both students and the private sector.

A network for international cooperative education has evolved, comprising of four cooperative education institutions which have sizable enrollments of foreign students. These enrollments are primarily in the areas of engineering, business, computer science and the sciences. Institutions currently in the network are:

Drexel University, Philadelphia, Pennsylvania
Northeastern University, Boston, Massachusetts
Pace University, New York, New York
Rochester Institute of Technology, Rochester, New York

Through its on-line database of international candidates from these institutions, the Network is able to provide companies with a timely and cost-effective sourcing mechanism for pre-professionals for their overseas business units.

How Thailand Can Participate In The Program

In a study conducted in Thailand by Dr. Robert Vozzella, Director of the Home Country Placement Project, and Prof. Leonard Zion, Project Coordinator, the members of the American Chamber of Commerce in Thailand (AmCham) indicated that they faced a serious problem regarding high annual turnover of personnel. As a means of increasing their numbers of U.S. graduates in the short term and their retention rates of those graduates, AmCham members expressed their interest in participating in the Home Country Placement Program.

A proposal for a cooperative education program has been submitted to the USAID/Thailand mission. Initially, the program will run under the auspices of the Northeastern Network for International Cooperative Education. It could be expanded later to include additional cooperative education institutions as further expressions of private sector interests are received. Activities would focus on securing access to Thai students currently enrolled in the U.S. coop educational institutions as well as selecting students from Thai institutions who would be candidates for sponsored enrollment in U.S. coop institution. Corporate co-sponsorship with the public sector will be encouraged.

2.3.4 Cornell University

Cornell University's hotel administration program is widely known. The University's School of Hotel Administration has several international linkages, including the following:

- a "Cornell Program" in an institution in Paris, France with the same curriculum as that offered at Cornell. This is the only program that has the right to advertise the program as the "Cornell Program." Degrees are conferred by the Paris institution.
- provision of advisory services to other schools, which do not have the right to use Cornell's name;
- faculty exchanges.

Establishing Linkages in Thailand

Cornell's program in Paris is the first in which the university has lent its name. It would be reluctant to repeat the experience in Thailand at least in the short to medium term. Nevertheless, it may be possible to begin with collaboration at a lower level, e.g. curriculum development, faculty exchanges, and short term courses and to deepen the collaboration over time.

The School of Hotel Administration has faculty to develop a proposal for collaboration with the Tourism Authority of Thailand (TAT) and/or Chiang Mai University. The School of Hotel Administration is interested in discussing specific objectives with the Thai counterpart institutions.

Collaboration with Chiang Mai University would, at least initially, involve curriculum development and faculty training. A program for the TAT would include technical training, seminars, and short courses.

2.3.5 University of Detroit

The University of Detroit's College of Business and Administration has a hospitality management program which covers a wide range of subjects including management of hotels, restaurants, entertainment (amusement parks, recreational places, etc.). The program seems well suited to the TAT's training needs. Initial discussions with interested parties in Thailand could be conducted and proposals could be drafted in consultation with Thais.

2.3.6 University of Akron and Case Western Reserve University

The University of Akron is the only university in the U.S. that has a College of Polymer Science and Polymer Engineering. These science and engineering programs match the needs of the proposed masters program in polymer engineering at Chulalongkorn University's PETC.

Case Western Reserve University also has a strong program in polymer science and engineering. Case Western is well known for its polymer work. Both polymer science and polymer engineering are contained in one program under the Department of Macromolecular Science.

Both the University of Akron and Case Western Reserve University are closely linked to industry through the Edison Polymer Innovation Corporation (EPIC).

Case Western sent academic teams to help set up a polymer graduate program in Algeria and Spain. They are capable of doing the same in Thailand. Some groundwork had been laid down for future cooperation between PETC and Case Western prior to the team's visit. The Chairman of the Department of Macromolecular Science authorized sending a team of professors to PETC to help set up the M.S. in polymers program. It is feasible that the University of Akron and Case Western will pool resources to further enhance the PETC graduate program in polymers.

2.3.7 University of Oklahoma and Oklahoma State University

The University of Oklahoma (UO) and Oklahoma State University (OSU) are well known for their chemical engineering programs which include petrochemicals, the other advanced degree program that the PETC wishes to strengthen.

The Chemical Engineering Departments of both universities are about the same size (each with 13 academic staff). The Departments from the two universities are willing to pool resources to collaborate with PETC. As both are members of the Association of the Big 8 Universities, the Association can coordinate the linkage on behalf of its members. This would allow the PETC to avail itself of the resources of the other six members of the Big 8.

2.3.8 MUCIA

MUCIA has expressed interest in collaboration with Thai universities.

MUCIA or Midwest Universities Consortium for International Activities, Inc. is the oldest and most experienced of the multiuniversity associations devoted to international education. Established in 1964 with support from the Ford Foundation, it now has eight members - the University of Illinois, Indiana University, University of Iowa, Michigan State University, University of Minnesota, The Ohio State University, Purdue University and the University of Wisconsin. MUCIA has a long term project financed by the World Bank in Indonesia that could provide a model of a program to upgrade university professors in Thailand.

(1) Indonesia: First University Development Project (World Bank), 1983-1987

This World Bank funded project was jointly implemented by the Government of Indonesia (through the Directorate General for Higher Education of the Ministry of Education and Culture) and MUCIA. The project's purpose was to strengthen university education in Indonesia by sending university staff abroad for advanced degree education and by bringing visiting professors/consultants to Indonesian universities to work with local staff in strengthening teaching and research. The project focused on the fields of math and science, engineering, agricultural sciences, and economics and on working mostly with three Indonesian universities: the University of Indonesia, Gadjah Mada University, and Andalas University.

There was a total of 152 degrees completed during the project (108 Masters, 41 Ph.D.'s, and two diplomas). There were 100 students whose degrees were in progress as of June

1987, since the participating Indonesian universities continued to identify and nominate staff for fellowships during the life of the project. Many students were thus able to begin but not complete their work before the project's ending date. These students have continued their studies under the second phase of the project. During the first phase of the project, only 14 students withdrew from their studies before completing a degree.

Public universities in Thailand are believed to be firmly established in the fields of agriculture, math and science, and engineering. The need is more on the strengthening of faculty of private universities which are struggling to cope with the increasing demand for graduates in various disciplines, foremost of which is engineering and other technical fields.

This is more or less the same as in Indonesia. The project is to strengthen existing departments.

(2) Indonesia: Second University Development Project (World Bank), 1987-1992

A scarcity of trained workers and managers is one of the most urgent barriers to social and economic growth in Indonesia. The challenge to higher education is to develop the human resource base fast enough to keep pace with population and economic growth. To meet this challenge, the Indonesian Government embarked on the Indonesia Second University Development Project, the successor to the First University Development Project, which proved to be highly successful.

This project will provide degree training for more than 800 individuals and non degree training for approximately 290 participants in the fields of life sciences, biotechnology, microelectronics, food and nutrition, engineering, economics, social sciences, computer science, marine sciences, ocean engineering, gas technology and instructional materials development.

The Project also provides for the development of five undergraduate curriculum programs in ocean engineering, gas technology, materials development, marine sciences and computer science.

Participating institutions are Bandung Institute of Technology, Bogor Agricultural University, Gadjah Mada University, University of Indonesia and The Open University.

Some aspects of these models for the development of higher education in Indonesia may be applicable to institutions in Thailand especially in the development of curriculum (e.g. information technology, hotel management).

2.3.9 National Education Corporation

NEC would be receptive to helping Thai training companies (for a fee) establish training programs based on NEC models. In the past NEC had programs overseas, notably in Malaysia. The NEC closed the program because of operational problems with running an overseas office. It is not eager to repeat the experience; however, a Thai potential partner might be able to interest NEC provided that NEC was not required to make any financial contribution.

2.3.10 Food Processing Machinery and Supplies Association (FPMSA)

Thailand's Food Processing Industries Club under the Federation of Thai Industries could adopt some of FPMSA AND NFPA activities. At present, the Food Processing Industries Club organizes and holds seminars and conferences in Thailand. The Club also sends official delegations to trade fairs. It is a section within the ASEAN Chamber of Commerce and Industry which produced, for example, the Preferential Trading Agreements (PTAs) on processed meats, beverage concentrates, starch, oils and fats, desiccated coconut and fruits. The Club, however, has only loose links with the United Nations Food and Agricultural Organization. The Club exchanges information with all countries that import food from Thailand, but it has little contact with other food-producing countries. Clearly, the Club can do more to enhance the skills of its manpower base as well as to upgrade the quality of its members's products.

3. MOSTE PROGRAM

3.1 AN OVERVIEW

The Ministry of Science, Technology, and Energy is in the process of sending 789 Thai academics for degrees (Bachelors, Masters and Doctorates) at foreign universities. A total of 441 of the academics or 56% are targeted for U.S. universities. The goal of the program is to increase the supply of experts in fields crucial for Thailand's economic development.

The program will fund all expenses (tuition, travel, room and board, and incidentals). The recipients are bonded to return to Thailand and work for the designated Thai governmental agency for two years for every year that they study abroad. Should individuals choose to leave government service before completing their required period of service, they can reimburse the government three times the amount of money that the government invested in their education.

The Royal Thai Government has established three research centers: The National Center for Genetic Engineering and Biotechnology, The National Center for Metallurgy and Material Technology, and the National Center for Electronics and Computer Technology. The three centers are to work in close cooperation with the Science and Technology Development Board (STDB) and are to evolve into centers of excellence for applied R&D and to act as a bridge between the public and private sectors. The centers will develop technologies that will later have commercial applications. The government plans to charge the STDB with the function of funding R&D projects and the three centers with the operation of research facilities.

When fully staffed, the three centers will each have about 100 Ph.D. researchers along with more junior researchers and support staff. The centers will be autonomous but will follow the policy guidelines of the MOSTE. The centers are located at the Ministry and will receive their funding from the Ministry, STDB, and contract research from industry. The centers will be computer linked with universities and foreign research centers and will act as a focal point for linkages with these institutions.

3.2 POSITIVE FEATURES OF THE PROGRAM

- 3.2.1 Sending an additional 789 Thai scholars for education overseas will increase Thailand's exposure to foreign technology. The need for greater exposure was

highlighted by the World Bank in its 1989 country report on Thailand.

- 3.2.2 As the majority of the students will go to the U.S., the program will have benefits for the Thai-U.S. relationship.
- a. The program will reinforce older linkages and create new linkages between U.S. universities and Thailand.
 - b. Thai researchers in disciplines key to Thailand's economic development will be oriented towards U.S. technology during their training.
- 3.2.3 The programs envision "bonding" the scholarship recipients to the Ministry, thus in the short to medium term, the program will assist the Ministry in its shortage of professional manpower.
- 3.2.4 The program will increase the number of professionals working in three fields of critical importance to Thailand's industrial development.

3.3 NEGATIVE FEATURES

- 3.3.1 The concept of having three R&D centers, each staffed by 100 Ph.d.'s, is probably ambitious and is not an efficient use of Thailand's scarce HRD resources.
- 3.3.2 The scholarship recipients are targeted to public agencies; however, private industry would argue that it needs these people more than does the government service.
- 3.3.3 In any event, most of the scholarship recipients will leave government service after completing the required period of government service stipulated in their scholarship award. Thus, the long term impact for the Ministry in terms of building up a cadre of R&D professionals will be less than envisioned.
- 3.3.4 The Ministry is not considering the compensation package that will be required to keep the scholarship recipients after their period of "bonding" is completed. The gap between the government and the private sector compensation is large and growing.
- 3.3.5 While the program emphasizes applied R&D, the dominance of Phd.'s in the centers will tend to skew the research towards the theoretical. Most university research already has a theoretical rather than applied bias.

- 3.3.6 MOSTE envisions a role for the private sector; however, this role is not clearly defined.
- 3.3.7 MOSTE has yet to clarify who owns the intellectual property rights resulting from government financed research projects.

3.4 RECOMMENDATIONS ON HOW TO IMPROVE THE PROGRAM

- 3.4.1 Rather than bond the researchers to government agencies, it would be better to bring the researchers back to work in a government agency for a fixed period of time, perhaps two years, and then encourage them to join the private sector. During this time, the recipients could work on applied research in conjunction with the private sector. The hands-on research experience would enhance the marketability of the recipients to the private sector, since they would carry the fruits of their applied research to their private sector employers, thereby facilitating the connection between government research and its utilization by the private sector.
- 3.4.2 While each center may not require 100 career civil servants with Ph.D.'s, the centers will need to have a core of career researchers to provide continuity in the research programs. The centers will need to have the flexibility to provide the career researchers with compensation packages close to what the researchers could get in the private sector.
- 3.4.3 In order to keep the research oriented to applied R&D, it may be useful to encourage private businesses to second their mid-level and senior researchers to the centers for two year periods. Retired industrial researchers could also be brought into the centers on either a full time or part time basis.
- 3.4.4 The government should require partial funding from the private sector in order to qualify for STDB funding. This leveraging will expand the impact of limited government resources and will ensure that the research projects have commercial viability.
- 3.4.5 The STDB and MOSTE need to clarify who owns the intellectual property rights on jointly funded research. While some compensation to the source of funding may be appropriate, the bulk of the financial benefits derived from the research should be granted to the private sector partners in the research projects.

3.5 POSSIBLE ROLES FOR USAID

While the MOSTE program is not a priority program for USAID, there are several possibilities for collaboration:

1. Assistance in identifying high quality university programs in the U.S. by specialty to which the potential recipients should apply. As there are a large number of directories in the U.S. that already do this, it may be more efficient to make sure that the MOSTE has copies of the latest directories and is placed on the mailing lists of the relevant publishers.
2. Create a database of Thais who have studied in the U.S. along with the name of their institution, the field that they studied, and their willingness to talk to Thais who are interested in studying at the same institution. The Thai-American Technical Cooperation Association (TATCA) has lists of about 1,300 names and addresses of Thais who have studied in the U.S. that are classified by province. The lists do not contain the institution in which the person studied nor the academic discipline of the person. The lists are also not on computer. USAID could fund the creation of such a database. The database could be kept in conjunction with the Northeastern University project, the Thailand-U.S. Educational Foundation, or TATCA. The TATCA lists provide a starting point for putting such a data bank in place.
3. Assistance in placing the students in the U.S. universities, including ESL classes and assistance in settling into the university. Given the large numbers of foreign students studying in the U.S. and the services available to them at large universities (housing placement services, ESL, tutorial programs, and counseling services), it may no longer be necessary for scholarship programs to duplicate these services.
4. Create a system for introducing recipients to local businesses, both U.S. and Thai, that are active in the recipients' fields of interest. Interested companies could be divided according to the three priority fields (i.e. genetic engineering and biotechnology, metallurgy and material technology, and electronics and computer technology). Each of the three groups could conduct a seminar that would include profiles of the companies and their current and planned areas of research. Meetings could be arranged before the recipients leave for the U.S. Such a program could be expanded to include other students going to study in the U.S.

4. PROGRAMS FOR APEC INITIATIVE

4.1 BACKGROUND

The U.S. - APEC Human Resources Development Initiative seeks to increase priority skills for economic development for the ASEAN countries in the areas of science, engineering, computer science, business and management. The initiative will focus on activities in which U.S. technology has a comparative advantage. The projects are to be jointly funded by USAID and the private sector. The program will have three components:

- expansion of "cooperative education" and other private sector internships/contact programs for USG and nongovernment-sponsored students from the APEC region who are studying in the United States. The initiative will provide a mechanism for reaching 100,000 of the Asian students in the U.S. through newsletters and other outreach activities, 20,000 Asian students through Initiative sponsored activities on campuses and 5,000 students in private sector internships, specialized training courses, and cooperative education programs.
- support for "educational partnerships" between U.S. and ASEAN institutions in areas such as science, engineering, business and management; the initiative foresees the creation of 10 to 15 partnerships.
- expansion of USG-sponsored private sector related short- and long-term training in the United States from the ASEAN countries. The initiative will assist in the training of 2,500 private sector employees in their home countries, and of these employees, about 500 will attend short-term technical courses in the United States.

The programs are intended to strengthen ASEAN colleges, universities, think tanks and management institutes through "partnership" relations with U.S. institutions. These partnerships will be between countries, educational institutions, and among the public sector, private sector and universities. Priority will be given to strengthening existing institutions rather than creating new ones.

The USAID funding for the Initiative is expected to be leveraged with resources from participating universities and the private sector. The degree of leveraging is a criterion in the selection of projects to be considered for funding. The following types of participation are anticipated from the university and private sector partners:

Universities

- tuition-free waivers
- equipment
- educational material donations
- staff time

Private sector

- funds that match or exceed USAID funding.

The HRD program that we are proposing falls very much into line with the intention of the APEC initiative. Many of the project ideas that are discussed in this report would qualify under the APEC initiative. For information on these projects, the reader should refer to the project descriptions in Part E. The following sections highlight the reasons why the following project ideas were put forward in response to the APEC Initiative.

4.2 COOPERATIVE EDUCATION

4.2.1 Outreach program for Thai students in the United States

The Program links the private sector, in particular the U.S. private sector in Thailand, with U.S. universities and their Thai students. It also facilitates the return of Thai graduates from the U.S. and likewise helps private sector in Thailand overcome the shortage of highly skilled manpower.

The Human Resources Committee of AmCham recently established a University Relations Sub-Committee. The members of the sub-committee cited attracting Thai students in the U.S. back to Thailand as their number one priority as a means of alleviating the shortage of skilled personnel.

4.3 UNIVERSITY PARTNERSHIPS

All of the proposed university partnerships are within existing universities.

4.3.1 Petroleum and Petrochemical College

The Petroleum and Petrochemical College seeks assistance in strengthening its polymer and petrochemical programs. These are engineering fields that are crucial for Thailand's development. The proposed linkage will be long term as the College wants access to changing technologies in the U.S. in order to establish and maintain the College as a center of excellence. The College will charge close to market rates of tuition in order to finance its operations. The College

plans to secure the support of private companies in Thailand in this sector, represents the largest amount of U.S. investment in Thailand and represents an area in which the U.S. has state-of-the-art technology.

The College also hopes to build regional relationships and aspires to be a center of engineering excellence for Southeast Asia.

4.3.2 U.S.-Thai-Philippine Initiative

The program would strengthen nascent engineering programs, the success of which are necessary for Thailand's industrial development. The program establishes a long term partnership among U.S. and Asian universities and between universities in two ASEAN countries.

4.3.3 Information Technology Program

Computer science and information technology are essential for the development of a wide range of industrial sectors in Thailand. This program would establish a long term partnership with U.S. universities. The computer sector comprises private companies in Thailand in a sector still largely dominated by U.S. firms (e.g. IBM, Digital, Hewlett Packard, Seagate, NCR, National Semi Conductor). This dominance is based on U.S. technology which leads the world.

4.3.4 Northeastern and Rangsit Technical Cooperation Program

This cooperative program teaches management skills to engineers as well as computer fields and represents a cornerstone of a long term partnership between Northeastern University and Rangsit University.

4.4 SHORT TERM TRAINING

Thai Chapters of American associations involved in engineering and manufacturing

The American engineering and manufacturing associations disseminate the latest information on changes in engineering technology and provide short term training to private sector employees in Thailand. The programs are targeted to the factory managers and supervisors. Establishing Thai chapters of these American societies will build long term linkages between the private sectors and educational institutions in the U.S. and Thailand. The chapters incorporate significant leveraging. The universities or other institutions will house the chapters and will provide staff to teach the courses. Private companies will provide expertise and pay tuition.

D. STRATEGY AND CRITERIA

1. CENTRAL GOAL

The central goal of the proposed USAID human resources development strategy is:

To build long term, sustainable Thai-U.S. linkages between the private sectors, research and training institutions, and universities.

After three years of double-digit growth, Thailand is now an Advanced Developing Country and is well on the road to becoming a Newly Industrialized Country. The Thai economy at the end of 1990 was 50% larger in real terms than it was at the beginning of 1987.

While the credit for Thailand's success should go to the strength of the Thai private sector, the country's openness to foreign investors, and the stability of the country's economic and political systems, the United States has also played a significant role. Even more important than the official development assistance are the private sector investments in the Thai economy and access to the U.S. market, which has consistently been the largest single destination of Thai exports since 1984.

As Thailand continues to develop, its problems change and its opportunities expand. The United States wishes to assist in the development of solutions to the new problems and to take advantage of the opportunities of the booming Thai economy.

The human resources development field in Thailand requires solutions to problems caused by a mismatch between a labor force that was educated for an agrarian society and an economy in which the industrial and service sectors dwarf the agricultural sector. Reorienting the educational system and the work force to the needs of the Thai economy in the 1990's will require collaboration among the Thai public and private sectors, the universities and vocational schools. Linkages with their counterparts in the U.S. as well as the U.S. private sector in Thailand will strengthen their programs. These institutional linkages can continue beyond USAID's presence in Thailand and can act as testimonies to the long term collaboration between Thailand and the United States.

2. OBJECTIVES

USAID can facilitate these linkages through pursuing the following objectives:

2.1 Assist Thailand in overcoming its short and medium term needs for technicians, engineers, and managers.

The shortage of technicians, engineers, and managers has two dimensions. The shortage poses problems for companies that operate in Thailand or are considering operating in Thailand and for Thai public policy.

About two thirds of companies that employ engineers complain of problems recruiting engineers. Almost half of these companies complain that the problem is very acute. Currently, Thailand produces about 3,200 engineers per year and requires closer to 8,000 new engineers. Thailand's capacity to produce additional engineers is hampered by a shortage of engineering professors.

Over half of the companies that employ technicians¹ indicate that they have problems finding them; however, fewer companies describe the problem as "acute." While there are over 300 private vocational schools and several systems of public vocational schools (e.g. Rajamangala Institutes of Technology the Department of Vocational Education), the quality of education of these programs is lower than that required by industry. Few companies describe having major problems recruiting vocational level staff and about a third indicate that they have some problems recruiting them.

Surprisingly, the situation with managerial and administrative staff is similar to that of vocational staff. About a third of companies reported recruiting staff in these areas.

With the exception of engineers, it is surprising that companies do not report more problems with recruiting staff. The reason may be that the companies that have come to Thailand as well as local entrepreneurs made their decisions to launch activities in Thailand after making an assessment of the investment climate including the human resource base. Hence, the portfolio of companies in Thailand are weighted towards those that are large users of unskilled and semi-

-
1. In Thailand, technicians are generally those with two years of education after secondary school. Vocational education is received in vocational high schools.

skilled labor and require relatively few highly skilled staff. The crucial problem is not of the companies but of Thai society. The problem has several aspects that can be phrased as questions. Will the bulk of the Thai population be content over the long term with low wage, low skill jobs? If the labor force is not upgraded, how long will it be before Thailand's booming economy stalls?

The Thai population will not be satisfied with low paying jobs over the long term, certainly not for their children; although, the patience and tolerance of the Thais will allow them to continue on this path for quite some time. In this project's survey of 157 companies in Thailand, more companies complained about turnover among unskilled workers than skilled workers. This supports the contention that Thailand's supply of surplus, low wage labor is disappearing.

Up until now much of the rapid growth in the Thai economy has been based on taking largely surplus agricultural laborers and employing them in manufacturing, construction, and services. While many of these jobs have paid close to the minimum wage, the wage itself came close to representing the increase in productivity. With the disappearance of the surplus of agricultural labor in the early to mid 1990's, this phenomenon will cease to exist. While there will be people leaving agriculture for other sectors (this phenomenon will continue through at least the middle of the next century), the people bid away from agriculture in the future will have been productive in the agricultural sector. Their transfer to the other sectors will have a lower immediate marginal benefit because it will be at the sacrifice of their agricultural productivity. Their transfer to the other sectors will provide less fuel for economic growth. The added fuel must come from increased productivity of those in the agricultural and non-agricultural sectors.

In the drive to upgrade the skills of Thai workers, it is important to note that the interests of Thai society and the business community will not always converge. Many businesses in Thailand rely on inexpensive, non-skilled labor for their success. Some of these companies use imported equipment from industrialized countries and claim that the gap between the efficiency of their operations and similar operations in industrialized countries is not very large. While their labor force has primary school education, they do not believe that further education of their laborers would significantly enhance their productivity. There are many manufacturing jobs that do not require either high levels of education or skill levels. On the other hand, higher levels of education may increase the expectations of the work force. These companies are content with the status quo. The Thai government cannot afford to be satisfied with the current situation, development of the

human resource base is essential for Thailand's continued development. USAID should assist the Thai government and Thai companies that wish to increase the value added by their work force in these efforts.

- 2.2 Assist Thailand in the medium and long term in its transition from a country whose competitive advantage is based on low wages to one in which the competitive advantage is based on the value added by its human resources.

Thailand's competitive advantage is currently based upon low income labor. However, this advantage is being eroded by overall economic success. As the GDP expands, workers are demanding increases in the minimum wage and in the overall wage structure. Their argument is carrying more weight because the pool of surplus agricultural labor is rapidly disappearing.

The World Bank in its Country Economic Memorandum in February 1989 noted that earnings in the Thai construction industry were higher in February than they were in August in most regions and for commerce were higher in February than they were in August for the Central and South regions. This suggests that the seasonal demand in these industries is more important than the surplus of agricultural labor during the dry season for the rural labor market. The World Bank also suggested that the government figures on the portion of the labor force engaged in agriculture were overstated. While the government estimated that 67% of the labor force was engaged in agriculture in 1986, the World Bank surmised that the actual figure may have been as low as 45 or 50%. This hypothesis is supported by the wide disparity in the GDP share per employment share in the agricultural sector versus the industrial sector. While in Indonesia the differential was a factor of four and in the Philippines a factor of five, in Thailand the factor was 13. The World Bank indicated that this big a differential was unlikely in the two largest sectors of the Thai economy. Should the assumption that 50% of the labor force works in agriculture be correct, the number of people working in the agricultural sector will begin to shrink in absolute numbers in 1992 or 1993. The labor surplus, even the cyclical surplus during the dry season, is largely a phenomenon of the past.

During the 1980's, Thailand's per capita income grew faster than in the major Asian countries that have larger pools of surplus labor, as shown in the following table:

Table 5-17: GNP per Capita for Thailand and Major Low Income Asian Nations in Current U.S. Dollars

	1980	1984	1988
Thailand	670	840	1,000
China	300	330	340
India	240	280	340
Indonesia	470	550	440

Source: Economic and Social Commission for Asia and the Pacific (ESCAP).

In the 1990's Thailand will find it increasingly difficult to compete with these countries on the basis of low wages: Thai wages will be higher, and the gap will continue to widen. The only avenue that is open to Thailand is to increase the value added of its work force to be able to continue increasing wages. However, young people in Thailand receive less education than in the other ASEAN countries.

Percentage of Age Group Enrolled in Secondary Education in 1986

	%
Indonesia	41
Malaysia	54
Philippines	68
Singapore	71
Thailand	29

Source: The World Bank

Based upon the percentage of young people who attend secondary school, Thailand appears to be the least able to increase significantly the value added by its labor force.

In spite of these limitations, the Thai work force is eminently trainable. Expatriate managers are generally pleased with the work force, particularly, in fields that require manual dexterity such as textiles, plastic goods, and assembly lines. Companies have problems promoting from this group, and this may be a factor in the propensity to use engineers in jobs that are done by technicians in industrialized countries. While the relatively weak labor skills may not be a problem for many labor intensive factories, the low skill level is a major concern for public policy and for higher technology firms. If the skill level is not increased, increases in value added per worker will be modest and the engine of growth will be stalled.

2.3 Where possible, promote more equitable access to training and education.

The lack of access to quality education and training for poor residents of Bangkok and provincial populations is the root of the high and increasing disparities in incomes. Of the 44 universities and colleges in Thailand, only four are located outside of Bangkok. The best high schools are in Bangkok, and some of the better schools are private. Parents pay significant sums in tea money to gain admittance for their children in the better schools, both public and private. In addition, Bangkok has many private schools that assist students in preparing for the university entrance exam. All of these factors bias the provision of educational services towards the more affluent residents of Bangkok. The result of this bias can be seen in the profile of Thais who study in the U.S. According to the Counselor Section at the U.S. Embassy in Bangkok, of the 3,206 Thai students who went to the U.S. on student visas issued in 1989, 78.6% were residents of Bangkok, and 9.1% were residents of the Central region.

USAID/Thailand can contribute to increasing educational opportunities for the rural population and the poor through targeting assistance to institutions in rural areas and to the establishment of scholarships and work study programs.

2.4 Support programs that include continuing education.

Thailand currently sends the lowest percentage of its students to secondary school of any country in ASEAN. It will take at least five years and perhaps a decade or more to catch up. It will need to continue educating its work force after workers' formal education is completed in order to close the gap between the skill levels of Thai workers and those of the other ASEAN countries.

2.5 Promote institutional and commercial linkages between Thailand and the U.S.

The U.S. commercial presence in Thailand is in relative decline. A 1990 Siamerica/IMRS survey for the American Chamber of Commerce in Thailand determined that U.S. accumulated direct investment in Thailand from 1965 through 1986 was consistently higher than that of Japan. In 1987, the Japanese caught up with the U.S. Japanese investment in Thailand was over U.S.\$600 million in 1988 and over U.S.\$800 million in 1989. U.S. investment was about a quarter of

these levels in 1988 and 1989. The Bank of Thailand reports that the U.S. provided about 14.4% of Thai imports in 1980; by 1990 imports from the U.S. had fallen to 11.2%. In contrast, the Japanese provided 21.2% of Thai imports in 1980 and 30.0% in 1990.¹ The U.S. has grown in importance as a market for Thai exports. The U.S. has overtaken Japan's position as the largest single destination of Thai exports. In 1980, Japan was the destination of 15.1% of Thailand's exports and the U.S. was the destination of 12.6%. By 1990, the U.S. took 22.7% of Thailand's exports compared to 17.1% destined for Japan.

It is not in Thailand's interest to see a continued erosion of the U.S. position. Because Thailand's recent economic success has been predicated on its openness to the world economy, the country is interested in promoting diversification of nationalities among foreign investors. Such diversification of ownership allows Thailand to benefit from the technological advances all over the world and promotes backward and forward linkages in industries that are linkages among companies and not integration within a single company or industrial group. A reinvigorated American business sector is in Thailand's interests.

It is also in the interests of the U.S. An economy that is growing at ten percent per annum in real terms provides U.S. businesses with an enormous variety of business opportunities. Upgrading skills is inextricably linked to technology and technology to machines and equipment. Promoting skills development in Thailand can be a mechanism for exposing U.S. technology and expertise for the mutual benefit of both Thailand and the U.S.

3. CRITERIA FOR PROJECT SELECTION

3.1 Programs should serve as models for replication in Thailand.

There are currently 44 universities and colleges and over 300 private vocational schools in Thailand. Given limited USAID resources, it is not possible to work with more than a few of these institutions. Through establishing models that can be replicated in other institutions, USAID can act as a catalyst for change in a wider number of institutions.

-
1. The 1990 import and export figures are for January through October of that year.

3.2 Programs should emphasize areas in which the U.S. has and is perceived by Thais as having a competitive advantage.

While Thais generally regard the U.S. universities to be preeminent, the Japanese and Germans are more often cited for excellent vocational training programs. USAID involvement in vocational schools should be based upon the strength of U.S. technology in a given field, e.g. computers, petrochemicals, construction crafts. The existence of large U.S. foreign investment and strong U.S. products in Thailand are indices of competitive advantage. By concentrating on these areas, USAID will maximize the chances that U.S.-Thai commercial transactions will result from the interventions and that these interventions will be institutionalized.

3.3 Programs should have significant leveraging from the private sector, particularly the U.S. private sector in Thailand.

By insisting upon private sector involvement in USAID interventions and the private sector's co-financing of these ventures, USAID can assure that the intervention passes the "market test" and addresses a real need. By emphasizing the involvement of the U.S. private sector, USAID can increase the likelihood that the linkage with the U.S. will be maintained after the end of USAID funding. As one of the objectives of some of the programs will be to increase Thailand's access and to facilitate Thailand's utilization of new U.S. technologies now and in the future, the involvement of the U.S. companies is important as they are the source of much of the new technologies. Leveraging is also necessary given limited USAID resources.

3.4 Programs should strengthen existing institutions rather than create new ones.

With the large numbers of universities and vocational schools that already exist in Thailand in both the public and private sectors, there is little need to create new ones. The administrative burden on the project holders and on USAID is lighter for strengthening institutions than for creating new ones. Strengthening institutions requires fewer resources and shorter implementation periods.

While preference should be made for working with existing institutions, an exception could be made if there are powerful reasons for doing so. One example could be to finance a consortium of similar businesses that wished to launch a joint training program for their in-house needs.

3.5 Programs should impose minimal management burden on USAID.

By the mid-1990's, the USAID Mission will be reduced to a Representative Office, possibly within the Embassy. USAID foresees that this office will be staffed by no more than three American officers and a complement of Thai staff.

3.6 Programs should concentrate on the following sectors:

petrochemicals and plastics
manufacturing
information technology
services (financial services and tourism)

3.7 Where possible, programs should be confined to private sector institutions.

Many bilateral and multilateral donor programs have prohibitions on implementing programs outside of governmental institutions. This appears to be the case with the Japanese institutions. This prohibition opens a door of opportunity for USAID as there are a wide number of private institutions in Thailand many of which have not worked with foreign donors. Private institutions that pursue a public good are very much a part of the fabric of the U.S. Strengthening such institutions in Thailand through linkages with the U.S. is particularly appropriate.

Furthermore, unlike the public sector institutions, the private institutions are remarkably flexible administratively and operationally. This flexibility is important given USAID's limited time horizon. The research team suspects that some of them will surpass the public institutions in particular fields. Some business leaders indicate that the Marketing program at Assumption University is probably the best in Thailand. The engineering faculty at Rangsit University is dynamic and ambitious: it wants to challenge Chulalongkorn University's preeminence in engineering before the end of the decade. Rangsit may well succeed.

Indirectly, stronger competition from private institutions will help the public institutions. At some of the more prestigious public universities, the lack of competition has created complacency and has allowed the university bureaucracy to grow unchecked. Professors are spending increasing amounts of time in administrative committees, leaving less time for teaching and research. Increased competition from private universities will force the

university administrators to reallocate resources to teaching and research to preserve the status of the university.

Lastly, the Human Resources Committee of the American Chamber of Commerce in Thailand has asked that future USAID activities in the HRD field be targeted to the extent possible on private institutions.

E. PILOT PROJECT DEVELOPMENT

The following sections contain brief descriptions of a number of project ideas. These ideas will require further discussion with USAID before submission of the final report. On the following page is a possible time line for the implementation of these projects.

1. PROJECTS THAT WILL BE PROPOSED TO USAID

1.1 THE PETROLEUM AND PETROCHEMICAL COLLEGE (PETC)

The project description is enclosed as Appendix XV. This section will summarize the current status of the project.

The Board of PETC met on February 27, 1991. They authorized proceeding with negotiations with the Big 8 for the petrochemical program with the University of Oklahoma as the lead institution. Hopefully, the Consortium of Texas Universities will agree to collaborate with the Big 8. For the polymer program, the lead institution will be Case Western Reserve University, possibly in collaboration with the University of Akron. While the Big 8 explored the option of submitting a proposal to USAID/Washington to fund part of the start up costs under a centrally-funded USAID program to build collaboration between U.S. and foreign universities, this option is not feasible because Thailand is currently ineligible. This program is under the auspices of the Science and Technology Division, Research and University Relations Department and will provide 15 programs with annual grants varying from U.S.\$100,000 to U.S.\$300,000 for a five year period.

The Big 8 was chosen because they have solid programs in petrochemicals, have programs relevant to the PETC, are oriented towards masters and doctoral programs, have good interaction with the business community and are highly interested in working with Chulalongkorn University. The research is oriented towards applications of technology and not theory. The engineering faculties are oriented towards awarding masters degrees and preparing engineers to work in the private sector and generating new doctoral researchers. Owen Cylke, who has been in frequent contact with the PETC, USAID, and IMRS, is working very hard to build a program between the Big 8 and Chulalongkorn University. The University of Oklahoma was chosen as the lead institution because of its excellent Energy Research Center.

PROPOSED USAID'S FIVE-YEAR HRD PROGRAM IN THAILAND

PROJECT	Year 1	Year 2	Year 3	Year 4	Year 5
1. <i>Petroleum and Petrochemical College</i>					
2. <i>Thai-American Educational Foundation Project</i>					
3. <i>Rayong Technical College</i>					
4. <i>Seminar on University Brain Drain</i>	*				
5. <i>Northeastern University – Summer Internship</i>					
6. <i>Training Unit for Private Vocational Schools</i>					
7. <i>Northeastern & Rangsit Technical Cooperation Program</i>					
8. <i>APICS Project</i>					
9. <i>NMTBA Project</i>					
10. <i>Seminars with PTIT</i>					
11. <i>Information Technology Program</i>					
12. <i>TAT Project</i>					

Case Western Reserve has a strong macromolecular science department, which includes polymers. Case Western has collaborated on similar programs in Algeria and Spain. This experience would be transferable to Thailand. The major drawback is that Case Western views its collaboration as assistance over the medium term. Hopefully, Case Western will work in collaboration with the University of Akron, which also has a good program in polymer science. The university operates a team-teaching system that would permit releasing professors for five week periods during the school year. Case Western and the University of Akron collaborate on the Edison Polymer Innovation Corporation, it should be possible to get the universities to work together. The University of Missouri at Rolla has a good polymer program and is also willing to participate.

1.2 A THAI CHAPTER OF THE AMERICAN ASSOCIATIONS INVOLVED IN ENGINEERING AND MANUFACTURING

The Manufacturing Committee of the American Chamber of Commerce has cited quality control and statistical process control as areas that need to be reinforced in order to increase the volume and value added of Thailand's manufactured exports.

There are several American associations devoted to engineering and production technology. Among them are:

- The American Production and Inventory Control Society, Inc. (APICS)
- The Society of Manufacturing Engineers (SME)
- The Institute of Industrial Engineers
- The Institute of Mechanical Engineers

The SME has a strong continuing education program in conjunction with the Georgia Institute of Technology that leads to certification. It also has a strong program in statistical process control and total quality control.

1.2.1 APICS

The American Production and Inventory Control Society, Inc. provides certification in the following disciplines:

- Inventory Management
- Production Activity Control
- Just-in-Time Manufacturing
- Capacity Management
- Master Planning
- Material Requirements Planning

APICS has 65,000 members and administers about 30,000 exams per year. APICS has designed extensive multi-media training materials (books, videos, interactive computer software) to assist in teaching courses for preparing candidates to take the exams in each of the above fields. Candidates who pass five of the six exams are granted a Certification in Production and Inventory Management.

The Board of Regents of the University of New York offers college credit to students who pass the exams. It is possible to obtain nine credit hours for passing all six tests or three credit hours for two tests. There are more than 800 colleges and universities across the U.S. that also participate.

A group of engineers involved in manufacturing have organized a meeting with Rangsit University and potential members, which will be held at the Grimm-Carrier offices on March 28, 1991. Rangsit University has an Industrial Engineering Department and will offer courses to prepare candidates to take the tests, has asked to host a local chapter of APICS, and will sponsor the exams, which are administered by the Educational Testing Service.

Grimm-Carrier is willing to share its APICS pedagogical materials with Rangsit. The value of these materials is about U.S.\$7,000. This set is not complete, and the university may wish to have its own pedagogical materials.

An APICS unit at Rangsit should be financially profitable to the university in the medium term. Companies need expertise in production and inventory control and would be willing to pay tuition that would cover the costs of the training. It should also be possible for participants to receive university credit for the courses. The university may offer these courses to their regular students. The training would build bridges between the university and the private sector and would provide a model of a U.S. certification process in Thailand.

USAID is asked to provide funds to finance the acquisition of the materials from APICS, U.S.\$10,000 to U.S.\$15,000.

1.3 NMTBA PROJECT

This project is described in Appendix XVI.

2. PROJECT IDEAS THAT REQUIRE FURTHER DEVELOPMENT

2.1 RAYONG TECHNICAL COLLEGE

Caltex and HMC Polymers have indicated that the shortage of technicians is a greater threat to the petroleum and petrochemical industries in Thailand than the shortage of engineers. They also indicated that they could be of assistance to technical schools that would attempt to address this problem. In addition, there is a critical need for technicians to support the construction phase of the Eastern Seaboard Development Program. Rather than create a new institution to address this need, it is more efficient to upgrade the quality of teaching and infrastructure at an existing technical school. The Petroleum Institute of Thailand (PTIT) feels that the Rayong Technical College is the school that can fulfill this mission.

The Rayong Technical College is a public college. Both Khunying Thongthip, the Director of the PTIT, and Dr. Sippanond Ketudat, the former President of the NPC and current Minister of Industry, feel that this college is among the better institutions of its kind in Thailand and has much better faculty and infrastructure than the private institution in Rayong. PTIT in collaboration with KMIT is in the process of developing a program to upgrade staff and laboratory equipment.

It appears that a coordinator is needed to mobilize support from the private sector, KMIT, and bilateral sources. Khunying Thongthip feels that the ideal coordinator would be an engineer, possibly a professor from KMIT on sabbatical or one that is active but retiring from teaching. Khunying Thongthip also felt that it would be possible to present a package of assistance for the school to the Ministry of Education and use it to obtain concessions from the Ministry in relation to design of curriculum and establishment of staff salaries at the College.

The types of assistance to the College should include team-teaching, in which the College staff jointly teach classes with either professors of engineering from KMIT or Thai engineers and technicians from the companies on the Eastern Seaboard. This experience would upgrade the quality of the College's staff and orient the courses towards the needs of the private sector. The fields to be emphasized initially will include welding and process control.

The Rayong Technical College could draw on not only financial support from the NPC companies but also collaboration from technicians and experts at those companies to participate in the education programs. The active involvement of the professional staff of the NPC

companies would ensure that the quality of education was high and that it was well adapted to the current needs of the NPC companies. While the immediate beneficiaries to the program would be the NPC companies, the students would not be bound and many of the disciplines taught would have applicability to other industries and companies in other regions of Thailand.

A continuing education program for current staff would improve the upward mobility of technicians and skilled, and unskilled workers at the NPC companies. This would alleviate the shortage of skilled and professional labor at even the engineer level as some posts that are occupied by engineers could and would be met by better skilled technicians.

2.2 SEMINAR ON UNIVERSITY BRAIN DRAIN AND SALARIES OF PROFESSORS IN PUBLIC UNIVERSITIES

IMRS has discussed with the Thailand-U.S. Educational Foundation the possibility of sponsoring a seminar on the brain drain from the universities and technical schools to the private sector. The seminar would include the Civil Service Commission that sets government salary scales. The Commission would have to authorize special salary scales for technical teaching staff. The seminar would gather together about 20 participants from the Commission, the private sector, the Ministry of University Affairs, and the Ministry of Education. The participants would discuss the causes of the brain drain, its current and future impact on the Thai economy, and the way in which the drain can be stopped. The end result of the seminar would be increased motivation on the part of the Thai bureaucracy to focus on this problem.

2.3 INFORMATION TECHNOLOGY CENTER

The Information Technology Center at Chulalongkorn University will grant undergraduate and graduate degrees in computer science and information technology. In support of this program, the university is investing in a campus wide computer network and a new building to house the Center. The committee charged with the development of the project is considering the optimal mix of English and Thai as the medium of instruction, higher rates of tuition to provide funds for equipment and upgrading and retaining faculty. The committee is interested in collaboration with U.S. universities for curriculum development, exchange of faculties, and innovative technologies for distance education. The last may include one or two way satellite linkages for teaching classes. There is significant interest among U.S. computer companies in contributing to this

program. As the University hopes that the Center will be able to act as a bridge between other Thai and foreign universities in information technology, a provincial university will be linked to the Center.

2.4 NORTHEASTERN UNIVERSITY - SUMMER INTERNSHIPS FOR THAI STUDENTS

The office that will liaise with Northeastern University for its internship program could arrange meetings between Thai students going to study in the U.S. and relevant Thai and U.S. businesses in Thailand before the students leave for the U.S. These meetings could include visits to industrial plants and research laboratories. These meetings can make the students more aware of the state of their future discipline in Thailand, the areas of research that are of interest to the companies, and develop possible linkages that can perhaps develop into summer internships and post-graduation employment with Thai and U.S. companies. The internships could then be done through the Northeastern University program.

Making the students aware of the opportunities that exist in Thailand in their discipline before they go to the U.S. will assist them in tailoring their education towards the needs of Thai industry and reassure them that opportunities do exist in Thailand. Establishing contacts between the students before they leave for the U.S. and the Thai private sector may facilitate the students reentry into Thailand after completing their studies.

There are other universities and consortia with similar programs. The University of New Mexico has contacted the American Chamber of Commerce about establishing a program to send Thai students to the U.S. to work with American companies during their summer break and American students to Thailand to work with companies in Thailand during their summer break. MUCIA has a program in Indonesia for bringing Indonesian students to the U.S. to work during their summer vacations. Bringing American students to Thailand to work during their summer vacations has the benefit of exposing young Americans to doing business in Asia and makes the New Mexico program particularly attractive. Thailand currently participates in the AIESEC (Association Internationale des Etudiants de Science Economique et Commerciale) program for exchanging young graduates among countries for one year scholarships; there is a precedent for such a program in Thailand.

2.5 SEMINARS WITH PTIT

The Director of the Petroleum Institute of Thailand, Khunying Thongthip, recently visited the U.S. to identify U.S. technologies of potential interest to Thai companies. She cited the following four areas as showing promise:

1. Gas technology
2. Energy efficiency
3. Environmental technology
4. Information services

Among the institutions that could provide seminars is the Argonne National Laboratory in Illinois. She said that, in general, the U.S. institutions were focused on activities in the U.S. and ignored the rest of the world. While they were willing to come to Thailand to present workshops, their costs would have to be met.

The Institute pays its overhead expenses out of its members' contributions. In general overhead expenses amount to about 20% of the cost of the seminar. The annual contributions are based upon the member companies' volume of business. The Petroleum Authority of Thailand pays one million baht per year. Unocal pays B 600,000 per year. The Institute does not wish to go back to its members for financing particular workshops as their annual contributions are already sizable. The Institute charges significant tuition (up to B 12,000 per day) for its seminars and workshops. The fees charged depend upon the commercial applicability of the topic, the target audience, the number of participants, and the fees charged by the presenters. Grants to cover workshops, including those covered in the past by USAID, are about 35% of the costs. The balance is paid by tuition.

USAID could underwrite the costs of bringing U.S. experts in the four above-mentioned fields to present workshops or seminars and to meet with Thai companies that are active in the fields related to the topic of the seminar, university academics, members of the American Chamber of Commerce, USAID, and the Commercial Section of the U.S. Embassy.

The direct costs, without overheads, of a three week seminar are in the neighborhood of one million baht, half of which could come from tuition. While it would be preferable to obtain some cost-sharing from the U.S. institutions, it may be necessary to underwrite their costs for the initial seminars. Combining the seminars with visits to private companies and other institutions will expose them to the commercial possibilities in Thailand and, hopefully, encourage them to return to Thailand on their own. If USAID were to underwrite half of the direct costs of a series of four seminars on the above-mentioned high priority sectors, the total cost to USAID would be about U.S.\$80,000.

2.6 TRAINING UNIT FOR PRIVATE VOCATIONAL SCHOOLS ASSOCIATION

There are roughly 300 private vocational schools in the association. These schools include business colleges as well as technical schools. Most of the teachers that work in these schools are trained in the teachers colleges; those trained in the universities tend to enter the private sector. Many of these teachers need further education in order to be better able to prepare their students to enter the work force. In general, the problem with vocational education in Thailand is one of low quality rather than insufficient quantity.

There is interest in creating a training unit attached to the Association that would provide in-service training to member schools. USAID financing would be for start-up costs and training of the trainers, with assistance from American consultants. Once the unit was in place and staffed by Thai trainers, the schools would pay fees to the Association for the training. These fees would be sufficiently high to cover the costs of training.

2.7 TAT PROJECT

The Tourism Authority of Thailand (TAT) wishes to privatize its hotel and tourism training facility at Bang Saen. The TAT would contribute its training facility and 16 rai of beach front property in Bang Saen in exchange for a minority interest in the venture, which would include an enhanced training program and a two or three star hotel. The hotel would be used as a training facility. The TAT recognizes that the site is not prime for a hotel that would cater to foreign tourists. The first phase of this program requires an investment of 387 million baht. The TAT hopes that this funding would come from private investors. However, should funds be required from the TAT, the request would have to be included in the TAT's annual budget submitted to the parliament.

2.8 NORTHEASTERN AND RANGSIT TECHNICAL COOPERATION PROGRAM

Rangsit University is proposing to establish a Masters in Management Engineering and Masters in Computer and Information Technology in collaboration with Northeastern University. The collaboration would also involve information exchange and formation of faculty and administrators. The universities report that they will commit some of their own resources to the program but solicit additional resources from external sources.

2.9 U.S.-THAI-PHILIPPINE INITIATIVE

U.S.-based professors in technical subjects are interested in short term consultancies in Thailand but are generally unwilling to spend long periods in Thailand for fear of failing to keep pace with technological changes in the U.S. The Philippines still has a problem with educated unemployment. Thailand has a short and medium term need for high quality technical teachers and engineering teachers.

It may be possible to combine short term involvement from U.S. professors and longer-term commitments from Philippine professors to address Thailand's need for technical teaching faculty. Initial discussions with the Foreign Relations Division of the Ministry of University Affairs were encouraging. Provided that the foreign universities and seconded faculty were of high caliber, the Ministry would welcome this type of program, which would increase the number of engineering faculty available to the universities and boost the numbers of engineering students that could be educated in Thai universities.

Assumption University, which inaugurated its engineering programs in 1990, is interested in the idea. Assumption is a logical site for this program because its programs are taught in English, its engineering program is new and could benefit from additional professors, and its engineering fields, electrical and electronics, are areas in which some of the better Philippine engineering schools are strong.

Logical U.S. partners include the University of Detroit and the Milwaukee School of Engineering. There are several Philippine institutions that have strong engineering programs and could be approached. These include:

- De la Salle University
- Ateneo de Manila University
- The Mapua Institute of Technology
- University of Santo Thomas
- University of the Philippines at Diliman
- University of the Philippines at Los Banos

The first four universities are private institutions, the last two are public. Assumption University already has a cooperation agreement with De la Salle University, and De la Salle has sent professors to Thailand to conduct short term courses in psychology and education management. While Assumption does not have a cooperative agreement with Ateneo de Manila University, both universities are members of the Association of Christian Universities. This common linkage should facilitate the establishment of a partnership.

2.10 A FUND TO PROVIDE U.S. PROFESSORS OF TECHNOLOGY TO PRIVATE AND PROVINCIAL UNIVERSITIES

Private and provincial universities in Thailand have hosted few American professors on exchange programs in spite of their need being greater than the public universities in Bangkok. Several American professors have approached the Thailand-U.S. Educational Foundation to enquire about doing their sabbatical in Thailand. The Thailand-U.S. Educational Foundation can link American professors in fields pertaining to technology and business (e.g. engineering, computer science, management and administration) to the private and provincial universities in Thailand. As the professors on sabbatical receive half of their salary, they do not require full funding during the sabbatical. Most universities in Thailand contribute between U.S.\$5,000 and U.S.\$10,000 in housing and stipend to the U.S. Thailand-U.S. Educational Foundation recipients who teach at their universities for one academic year. The program would be restricted to professors in fields pertaining to technology and business. A fund administered by the Foundation could provide an additional U.S.\$12,000 to U.S.\$15,000 for each of five professors per year, three for private universities and two for provincial universities. The yearly outlay of the fund would be between U.S.\$60,000 and U.S.\$75,000.

USAID could provide the funds for the initial year. The funding level would decline over a five year period and the balance would be raised through private donations from the private sector. In the second year, the Foundation would have to raise 20% of the needs of the fund (U.S.\$12,000 to U.S.\$15,000) in order to receive the 80% from USAID (U.S.\$48,000 to U.S.\$60,000). Each year thereafter, 20% of the funds needs would shift from USAID to the private sector; thus, in the sixth year, all of the funds needs would come from the private sector.

The program would require minimal administrative oversight from USAID as the Foundation has adequate administrative procedures in place. The program would also spread costs among Thai and U.S. universities and the private sector.