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ANALYSIS AND RECOMMENDATIONS OF TRAINING NEEDS
OF UNIVERSITY FACULTY

TRAINING FOR PRIVATE SECTOR DEVELOPMENT

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BACKGROUND

USAID/Costa Rica is developing a \$5 million grant-funded, five-year project to improve the quality of human resources available to the private sector. The project goal is to stimulate growth in the production and marketing of non-traditional goods and services through the strengthening of human resources by a variety of selected training activities. Training will be offered to managers in private industry, personnel of the private banks and the Central Bank, and to certain university faculties. The training alternatives will include: academic, technical, on-the-job internships, both long term and short term, within Costa Rica and in the United States.

The proposed project will constitute a valuable vehicle for transferring knowledge and technology applicable to the country's productive processes. The proposed short-term training activities, consisting of observation visits, on-the-job training, internship programs, and specialized seminars and courses, will enable producers and managers to effect needed change in a relatively rapid manner. Furthermore, the strengthening of key university departments will provide the means for human resource development and technology transfer in years to come.

The proposed project rests on AID's "four pillars" in that it has elements of private sector participation, technology transfer and institution building. Better trained managers, executives, and central bank employees could also contribute towards strengthening the long-term policy and economic environment.

The proposed project is also fully consistent with AID's Participant Training Policy Determination which encourages participant training for three purposes: (1) staff development for AID-assisted projects; (2) strengthening of key developmental institutions; and (3) establishment of local training capacities.

Goal and Purpose

The overall project goal is to stimulate growth in the production and marketing of non-traditional goods and services, resulting in increased levels of employment and foreign exchange earnings for Costa Rica. The specific purpose of this portion of the project is to strengthen the capacity of selected university programs to respond to the educational needs of the private sector. This will then lead to the development of the professional competencies of private sector managerial and technical employees.

The overall project purpose is to strengthen the human resources which are needed for Costa Rican private sector development through a program of selected training activities. The project purpose in the university programs section will have three specific objectives:

1. To improve the ability of the universities to develop and deliver these needed private sector training programs. This will be achieved through the training, retraining, and upgrading of the faculty members best suited to provide these programs or services to the private sector.

2. Through a variety of long-term and short-term educational programs, faculty will be provided needed state-of-the-art technological training. In addition, "hands-on" work experience will augment the more traditional academic training. These activities will result in the improved availability and expertise for private sector training, as well as improved university academic programs.

3. This program will support and enhance cooperation between the universities and the private sector. The private sector has positive contributions to make in the development of these programs and services. A partnership between the private sector and the universities along with cooperative program planning must be developed.

ANALYSIS OF TRAINING NEEDS

The academic administrations of four Costa Rican institutions of higher education were consulted in order to ascertain their views as to which of their academic programs best support the needs of the private sector relative to the goals of this project. These universities are:

Universidad de Costa Rica
Universidad Nacional
Instituto Tecnológico de Costa Rica
Universidad Autónoma de Centro América

In addition to the four institutions initially considered, INCAE and INA were added for possible consideration. From this initial consultation, 14 programs were identified for possible training support.

An overview of these institutions follows:

The public institutions of higher education in Costa Rica are the University of Costa Rica; that started in operation in 1941, the National University that began operation in 1973 and the Institute of Technology of Costa Rica that started operations in 1974.

The University of Costa Rica is a complex university offering all of the major programs in the liberal arts and professions. The university is the premier university within Costa Rica.

In addition to the main campus in San Jose, the university operates academic programs in San Ramon, Puntarenas, Guanacaste, Tacaes and Limon.

With its extensive academic programs, research program experience, extensive extension delivery capability, and a system of excellent extended academic centers, the university has great potential to be of assistance in the private sector development of the country; the goal of this project.

The university currently enrolls approximately 28,600 students. A problem of holding power may be taking place within certain programs of the university. The drop-out rate reached 22% in some programs this last year.

The Institute of Technology of Costa Rica began operating in 1973 with the expressed purpose of providing higher education for the technical professions. This institution was developed to specifically broaden job opportunities for the trained technologist by demonstrating to them their essential role in national development.

ITCR moved early to develop a Division of Investigation and Technological Extension. This division provides technical assistance to all phases of the private sector economy.

In addition to the modern well equipped campus in Cartago, educational programs are offered in San Jose and San Carlos.

Over 2,500 students are presently enrolled in the 4 year degree programs of the institute. The holding power in these programs appears to be excellent.

The Universidad Nacional began operating in Heredia in 1973. Approximately 10,300 students are enrolled in the academic programs of the university. In addition to programs in the liberal arts and business several professional programs are also offered. Agriculture, veterinary medicine, and the marine sciences are programs that are directed at serving national developmental needs. The School of Veterinary Medicine is receiving international attention for its forward looking programming.

In addition to the main campus at Heredia, educational program are offered at Otar Dengo, Perez Zeledon, and Liberia.

In addition to the three public universities, two private universities were considered for inclusion within the scope of this training project; INCAE (Instituto Centroamericano de Administracion de Empresas) and the University Autonoma of Centro America (UACA).

UACA began operating in 1977 in San Jose. This institution is non-profit and under the control of its fifteen member founders that serve as the Board of Trustees.

The structure of UACA is based on the Cambridge system of Autonomous Colleges within an overall university structure. Each college tends to control its own curricula and operates as a discrete business unit.

Graduation is achieved through the passing of a final university oral and written examination given by a panel of five examiners. Each panel includes at least two persons from outside the university.

Sixteen colleges are presently in operation. Over 6,400 are enrolled in 34 different programs. The programs are all work related. The university has been experiencing a continuing growth in enrollment.

INCAE is an outstanding graduate and post graduate institution providing research and education in business administration. The new Alajuela Campus complements the Montefresco Campus in Nicaragua. Approximately 2/3 of INCAE's Operations are now in Costa Rica. The Institute has moved from a single post graduate program to four residential programs: the Masters Program, a one year post graduate program in functional administration, a one year graduate program in banking, and a one year program in Financial Management. Their students come from 10 Latin American and Caribbean countries.

The Institute serves over 400 full-time students with a faculty of 55 full-time teachers.

The Institute has an extraordinary record of service to the private sector. Their research efforts are making significant contributions to a variety of private sector concerns. In addition, the institute has taken leadership to develop and administer a variety of specialized short courses, seminars, and conferences. INCAE has an excellent record of cooperation in the developing and co-sponsorship of these activities.

The next step in the interview process was concerned with interviewing members of the various university faculties to determine their perceived training needs in order to upgrade their ability to support the private sector in terms of the goals of this project. Some programs that had been initially suggested for consideration by the administrations were shown to not merit further review. Lack of interest in private sector training, the availability of qualified fulltime faculty, and the applicability of the program to private sector needs were the principal reasons for not considering several of these programs further.

The key members of the Costa Rican private sector leadership, as well as multi-national managers and investors, were interviewed to ascertain their perceived needs for strengthening managerial and technical manpower resources. Those needs are reflected in program proposals that will be recommended for early implementation.

The private sector leadership was also asked if the universities were fulfilling their training needs and, if not, what changes should be made to facilitate improved service. The private sector response was that the universities can and should provide more of this needed training. This training, however, is different and will require an alteration in existing teaching methods and program delivery. This, too, will be addressed in a later recommendation for implementation.

Throughout the interviews with the universities and the private sector, interesting contrasts and perceptions emerged. Several common concerns were identified as well as several points of marked disagreement. By-and-large, respect for the needs and capabilities of the universities and the private sector is recognized by both parties. The main point of difference is, however, cooperative program planning. The private sector very clearly stated their desire to be involved in program planning with the universities. The university administrators expressed little interest in cooperative planning. This must be resolved since cooperative planning is at the heart of successful program development. The potential for significant, now, cooperative program development is, however, clearly identifiable.

The private sector identified several training activities that will require faculty participation to develop and implement. Through in-country, short-term training, there could be an immediate impact on both production and add viable credibility to the overall project.

- Mid-level managerial employees need short-term, in-country administrative training. Such training should be directed at improving financial and managerial skills, in particular, modern administrative theory and practice, and applications of the computer to operations and planning.
- Managerial training must also be developed to facilitate and expand industrial production. This lack of "know-how" can be overcome through short-term training. Inventory control, materials handling and production scheduling are problems that the private sector feel can be responded to through training.
- A variety of manufacturing and production technology short courses needs to be developed to help overcome the problems of declining production. In addition to inefficient methods that lead to higher material cost, a lack of quality standards and consequently poor quality control must be considered in the development of this training.
- In the expansion of Costa Rica's capability as an exporting nation, many technical problems have emerged. Knowledge of dealing with the importers from other countries, international banking procedures, tariffs and the transportation of exports are several problem areas that must be addressed through short-term training. While many of these problems are presently being responded to, additional training must be developed.
- A variety of courses must be developed to serve the private banking educational needs. Within the Costa Rican Banking Association, mid-level managers must improve their knowledge of domestic and foreign banking. Also, the computerization of the banking enterprise and the development of internal auditing procedures can be responded to through short-term training. Participation in these programs could be a screening opportunity to determine which persons are best suited and qualified to engage in further short or long-term training in the U.S.

- While there appears to be a well-educated labor force being provided through the technical training institutions, that labor force is however only responding to the needs of the existing technology. As new production methods emerge and the nature of the products being produced changes, existing technical education will also need to change. Short-term training to facilitate technology transfer must be initiated through the universities to update other professors and teachers who need access to these new techniques and knowledge. This activity is vital to private sector development.
- Many problems of equipment maintenance relates to improved industrial production. Effective training in maintenance and service could result in improved performance of personnel and production systems. It has been suggested that a three-day practical training program could provide information which is applicable to all manufacturers's electrical equipment, specifically tailored for persons assigned to maintain electrical equipment at industrial plants, utilities, institutions and commercial and government facilities. This training would emphasize maintenance of power distribution equipment, protective relaying, AC and DC rotating equipment and solid state devices. The Seminar would provide engineers and maintenance personnel with an opportunity to meet their counterparts from other facilities to discuss common problems and solutions. Experienced field engineers would serve as instructors and a specially developed reference textbook should be provided for each participant.

RECOMMENDATIONS

It is recommended that short-term, private sector training programs be implemented through the use of selected university faculties. It is further recommended that an advisory committee be formed of private sector employers, and university faculty to plan each of these educational activities.

Short-term private sector training may require faculty development. This instructional assistance can be provided through a series of in-country seminars or conferences utilizing technical assistance for program development and teaching.

Technical Assistance

In addition to short-term training, the private sector desires technical assistance from the universities to solve management and manufacturing problems.

It is recommended that technical assistance be established as a function of each participating university. ITCR already has this capability in place.

This assistance would provide consultants to private sector employers in several areas:

- a. Management assistance — Assist employers to identify management problems and develop effective solutions.
- b. Personnel — Assist employers to identify their labor and training needs.
- c. Marketing -- Assist employers to identify new markets, identify sources of marketing and product development and pursue new opportunities for sale and diversification.
- d. Manufacturing-- Assist employers to identify manufacturing problems and find profitable solutions.

The objectives of this program would include:

- a. To again, better link the universities with the private sector.
- b. Provide direct technical assistance to the private sector.
- c. Better link the realities of the private sector with the training of technical manpower, thus keeping training current with need.

FACULTY DEVELOPMENT

Faculty development will take place through a program of long term and short term training.

The long term training will take place in the United States and will be mostly at the masters level; however, there will be some training at the Ph.D. level in areas of critical importance to the private sector.

Both long term and short term training will be integrated with a component of practical "hands on" experience. It is this component that clearly differentiates this project from other faculty development training projects.

Short term training in technology:

The University of Costa Rica and the Institute of Technology, faculty both are in critical need of short-term coursework for updating in new technology. Such courses would serve the purpose of technology transfer of "State-of-the-Art" information to the engineering and technical community of Costa Rica.

Two options are available: local inservice training at the specific institutions by bringing experts to Costa Rica, or by sending faculty for specific training in the United States. There are advantages to both approaches and for different topics one may be more desirable than the other.

Specific advantages of bringing expertise to Costa Rica for faculty in-service programs are that more faculty and possibly some of the advanced students along with selected personnel from industry could share in the

information transfer. Although the cost would be lower due to travel expenses for one compared to several going to the U.S., a limitation develops regarding equipment available and visitations to actual operational settings in industry. Courses such as industrial application of the microprocessor, computer aided design, and laser applications can best be delivered in the United States. However, other courses such as process control, statistical quality control, along with others, not as equipment intensive, could be delivered locally.

Another approach is to send faculty members to the U.S. to develop areas of expertise with the intent to have that person develop an inservice program upon returning. This has proven to be an effective approach, but may require a larger stay in the United States with a more extensive training program to insure an effective technology transfer.

Long Term Training:

All long term training will be directed at improving the participating universities' service to the private sector, through their participation and the participation of the individual faculty members. Through this Training, valuable technological information will be acquired for later diffusion to the Costa Rican private sector and professional associates.

The first program that is recommended for consideration is Electrical-Electronics Engineering at U.C.R. It is this reviewer's position that this is the single most important program that resources should be concentrated on for faculty development. With the resources that are being recommended, this program can become a program of prominence and can become a significant force in the development of industry in Costa Rica.

School of Electrical Engineering

These observations are based upon examination of the curriculum, site visit of the physical plant along with discussions with the faculty.

Strengths:

1. Electrical Engineering (EE) Program reflects a strong Math and Science component.
2. These Programs attracts a very good student that is obviously in the upper spectrum of College freshmen (Approx. 100/yr).
3. The 18 full-time teaching faculty in the EE program have a strong undergraduate (Math-Science) background and have a real commitment to building a quality undergraduate EE program at the University.
4. University of Costa Rica is perceived nationally as the premier University and maintains a role of prominence in the university community of Costa Rica and other Latin American nations.

Areas of Concern. Needing Attention:

These problems are not in priority order but need to be approached in a coordinated effort.

1. The development of the Electrical-Electronics into a strong undergraduate and graduate program within the University of Costa Rica is of national importance for economic development. This is because automation and control systems are a growing part of every industry, and future growth and development is dependent upon the effective utilization of electrical technology.

An important component of this technology change for the university as well as the developing Costa Rica industries should be some form of joint council made up of EE departmental faculty, Central University Administration, with key leaders of the Electrical Power and Electronics Manufacturing industries. Working on problems of mutual concern would be the primary agenda for regularly held meetings that could lead to better understanding of university problems and improve the quality and transfer of Electronics Technology.

This council could affect the rate of economic growth and should be given high priority. Since there is a traditional amount of "scepticism" on the part of both universities and industries to develop such standing dialogue, it is recommended that an outside or neutral party be employed to bring this into existence and make it a model for other technologies in Costa Rica.

2. The lack of modern equipment and supplies in the laboratories is a serious problem for this school. This is particularly true in the areas of instrumentation and measurement, computers, industrial control process, and communications. An immediate recommendation to resolve this problem would be to commit a minimum of \$200,000.00 per year for four years. This 4-year equipment funding should require a revolving five year plan to bring laboratory equipment and supplies in concert with a developing academic program.

3. The Physical Plant does not have adequate space, electrical, and lighting capabilities necessary. There is a proposal to provide 1200 to 1500 m² to resolve this problem as well as classroom and office space shortages. This is conservative and should be placed in a situation that allows for future expansion.

4. Faculty Staffing and Faculty Development: Two problems are in operation that need attention and leadership. Of the 30+ faculty teaching in the EE school, only 18 (just over one-half) are full-time at the University. Although a certain percentage of this is desirable, this figure is too high for an important program that needs undergraduate and graduate developmental work.

Secondly, a comprehensive faculty development program needs to be established to provide advanced degree work for faculty as well as "short-course" work for Technology Transfer on state-of-art information. There is an immediate need for training in Process Control and Systems using Microprocessors and Microcomputers. The whole areas of digital circuits and subsystems needs to be fully developed with expertise and modern equipment for immediate transfer to Costa Rica manufacturing sector.

It is recommended that a total of seven (7) long term training grants be established for the School of Electrical Engineering. Three of these would be at the Ph.D. level and four would be at the (M.S.) level. Three of these participants would specialize in Digital Control, two in electronics, and two in electrical power. This training program would facilitate the development of a M.S. with emphasis in electrical power.

School of Industrial Engineering

The School of Industrial Engineering requested three long term (M.S.) scholarships. If these grants were to awarded two of the three requested would come from faculty that would need to be hired.

This school is in need of a critical academic review with wide faculty participation. The private sector should also become involved in dialogue with the School to bring the school into the reality of the private sector.

This school also needs microcomputers. Future curricular change will be largely dependent upon long and short term training as well as the acquiring of computer capability. Recent curricular developments in industrial and manufacturing technology are all tied to expanded computer use.

It is recommended that one scholarship at the M.S. level be reserved for Industrial Engineering. While the short term training needs were discussed with the Dean these plans are at this time not sufficiently developed to base a positive recommendation.

Food Technology

This important academic program is presently undergoing extensive internal and external review. The faculty, students, and alumni are all being asked questions about the effectiveness of the program. In addition the private sector employers are being asked to participate in this review. The administration and faculty are to commended for taking this important step.

This review will result in eventual curricular change with the expectation that the programs future graduates will be better able to serve private sector needs.

The program is presently seeking the services of a food technology curricular expert to help them in the analysis of the survey data and apply that information to their curricular planning.

It is recommended that two scholarship grants be made at the M.S. level. One would be in food chemistry and the other would be in food engineering. The Administration has made a commitment to add two full-time positions to the Food Technology staff in order to make these training arrangements possible.

In addition one short term training grant of three months should be made for training in food fermentation. This would complete the total faculty development plan for the food technology program.

Economic, etc..

School of Economics and Statistics

It is recommended that the long term training portion of this project allocate four scholarships to this important program. Two of these scholarships would be at the masters level and two at the doctoral level.

Critical private sector needs exist for trained professionals in policy development related to human resources. Several general areas of study at the graduate level could be utilized both within the school as well as by business and industry. This suggested orientation of specialization is an important linkage between the University and the Private Sector.

In addition it is recommended that three professors from the Economic Science Research Institute be provided short-term training in the Dept. of Labor in Washington, D. C. These individuals would participate in the regular seminars of the Department. Each seminar lasts from 6 to 8 weeks. The specific topics that need to be covered are as follows:

- 1) Industrial labor statistics development.
- 2) Projection of human resource needs.
- 3) Construction and interpretation of the statistical indices.

It is believed that much of the other faculty training needed in administration, statistics, and international Commerce can be supplied by several of the new Costa Rican institutions that are working in these fields. For example INCAE, Universidad Nacional, and the International Commerce Center all provide excellent academic training sufficient to cover many of these needs. Perhaps local currency could be utilized to support scholarships for this type of faculty development.

Instituto Tecnológico de Costa Rica

Instituto Tecnológico de Costa Rica presently holds the key role for technical assistance and training for industry. The practical training available along with excellent facilities and staff are an important asset to Costa Rica. This institution will continue to play an important role in the development of human resources for the country.

An important aspect of this technical institution is the role it can play in making its educational resources available to provide a linkage for technicians from INA into formal higher educational programs. This is particularly important in Electronics Manufacturing, Wood Products Manufacturing, and Industrial Maintenance Technologies. These transition programs are described in this paper in the section dealing with INA and its educational program needs.

The Institute has definite staff development needs in the areas of Electronics, Occupational Health and Safety, and Industrial Technologies related to Manufacturing engineering. Specific needs are as follows:

Long term needs include two persons in wood technology and two persons in industrial production, all at the masters level.

The Institute feels that several areas could benefit by either teacher exchange or the hiring of visiting professors that could develop and present classes in new technological developments.

It is especially important to work with the Institute in facilitating short term training opportunities in the electronics program. Digital systems, communication systems, and electronic power control curricular and staff development can be enhanced by short term training experts secured from U.S. universities or the U.S. private sector to develop and teach these courses.

Short term training must also be developed in the area of occupational health. This unit has been involved in activities carried out by the National Insurance Co. related to the occupational health and security of workers. But due to the scarcity of staff a program hasn't been developed. A visiting professor should be brought in to facilitate this curricular development and staff training.

Universidad Nacional

Four proposals were submitted for consideration. Three of these proposals were to support research. The other proposal would improve the quality of dairy and beef cattle production through the development of artificial insemination and embryo transfer services. Since none of these proposals are within the scope of this project, none are being recommended for consideration.

National Apprenticeship Institute (INA)

INA, has developed a most effective modular training system for making the transition from the unskilled to skilled worker. This modular training system backed up by occupational analysis has specified training for many of the skilled occupations in Costa Rica.

In the overall training/education system for Technical Education, there is need to develop a link between the Training Certification Programs of INA and

the formal educational system of the Technological Institute. This need is caused by the fact that most mid-management and supervisory personnel are "operators" certified by INA, trained in industry, and promoted into specific managerial-type positions. These workers are quite knowledgeable and experienced in specific areas of technology yet need education to improve their productivity and effectiveness in mid-management positions.

The transition from INA certification to the formal educational system has many advantages for Costa Rica. First of all it recognizes the technical training and education learned through experience, various types of formal education, and apprenticeship. This has long been recognized by the industrial community in that only part of an employee education can be achieved in the traditional educational setting and continues to reward performance and achievement.

Secondly, it provides social mobility through hard work and performance with an incentive system for those citizens that did not utilize the formal educational system of the universities, yet have skills and knowledge needed by industry and the nation. This is particularly important at this point of industrial development because the rate of growth and productivity in industry is really dependent upon effective supervision and mid-management planning and development.

There are three industries in Costa Rica that should be selected immediately for up-grading of mid-management and supervisory skills through developing links for transition with INA. These industries are Electrical/Electronics Manufacturing, Wood Products Manufacturing, and Industrial maintenance. The first two, Electronics and Wood Products Manufacturing have a high potential for expansion in Costa Rica and could lead to direct economic growth and job creation. It will be critical for these industries to have mid-management experience with background in trades and technologies, yet have a formal education targeted to specific mid-management responsibilities.

These mid-management personnel will need formal coursework in Quality Control, Process Management, Statistics, Computer Programming, Principals of Management, Supervision, Personnel Management, Long-range and short-range planning, and leadership development. These topics, along with verbal ability and communicational skills, should be the basic building blocks of an undergraduate degree for this "transition link" between INA training and a degree program in higher education.

The third industry is industrial maintenance. There is need for management and supervision of equipment maintenance that continues to increase in volume and complexity in Costa Rica. Again the best source for mid-management personnel is in a transitional degree program for technicians from INA into special managerial degree program.

The most logical institution in Costa Rica to work with INA on such a transition program is the Instituto Tecnológico de Costa Rica. It is already

philosophically committed to direct assistance to industry and would be the most receptive to such a concept.

This transition degree program will require the solution of some basic problems in assessing relevant work experience, INA training, and other non-traditional educational experiences into some form of educational equivalency. This will be necessary to provide the needed flexibility yet maintain a quality program. This would require a consultant with expertise in such activities as well as some one knowledgeable in mid-management needs and training.

There is also a need on the part of INA to obtain staff development assistance. Primary concern is with competency assessment and technical updating in specific technologies. Expertise and staff development programs should be made available to this agency through consulting services. It is recommended that this short term training be included as part of the university development program.

Instituto Centroamericano de Administracion de Empresas (INCAE)

The critical problem facing INCAE results from the expansion of their faculty from 33 in 1981 to 55 at the present time. New faculty need faculty development experience to make it the same strong faculty that it was when it was much smaller. This group of younger faculty is doing research and teaching without the academic preparation of the older faculty members.

INCAE needs its younger faculty to have training in English and then proceed on to training at the Ph.D. level.

It is recommended that two scholarships at the Ph.D. level be made available to assist them in their overall faculty development needs.

Universidad Autonoma de Centraomerica (UACA)

The electrical engineering program at UACA was reviewed for possible consideration. Since the faculty of this program are all part time teachers, there is a way that this program can participate in this project.

However, USAID should open up a continuing dialogue with the Administrators of UACA to survey how this institution can eventually become a viable producer of technical professional graduates. However, until they begin to provide adequate facilities and at least some full-time faculty members there is very little that can be done to assist them in program development. Yet the idea behind this institution is sound and it is this observer's view that private higher education should be given a chance to succeed in Costa Rica.

Change and Implementation

This section will deal with the potential of this project to bring about change within the institutions as well as specific curricular change within the targeted programs.

Through the providing of short term and long term training, faculty members will:

- be provided new information that they do not now have;
- acquire skills that they do not presently possess; and
- develop attitudes and new ways of looking at themselves and the world and its problems.

The ultimate value of this program will be in the nature, the quality, and the magnitude of change that results in each participant, and the long-term, positive impact that each participant makes on the academic program. No one would in any way denigrate the past contributions of the Costa Rican universities to research and teaching. But it is now the opportunity for the faculty to participate with and become partners with the private sector that clearly establishes this rare opportunity for significant new development.

The rapid rate of technological change and its continuing effect on the nature of work, places an absolute requirement that teachers and institutions continue to change if they expect to be a significant force in the society that they serve.

The greatest opportunity for the advent of curricular change especially in how classes are taught will start at the time a university decides that it would like to participate in this project. Through participating, they will soon learn that change will be an expected and positive aspect of their participation.

Certain requisites will be required to facilitate their understanding and responsibility of this change. Requirements will include:

1. An academic plan for the unit seeking training funds.
2. A human resource development plan that demonstrates how the proposed training will be utilized in the improvement of the academic program.
3. A Demonstrated Commitment to working with the private sector, including the development of a Cooperative planning mechanism with identified private sector participation.

In addition, each faculty member seeking training will be required to develop a training implementation plan that would clearly state the areas of development where change will be expected to take place.

The Training Implementation Plan will state:

1. How the specific training will impact the academic program. Special reference with respect to private sector training should be also considered.
2. How the participant is or will be involved in private sector training.
3. How the required practical "hand on" experience can be utilized by the Costa Rican private sector.
4. Each participant will also be required to submit a plan of how they will diffuse the knowledge and techniques that they have acquired when they return to Costa Rica (seminars, lectures, etc.).

Since short term training would be intensive with maximum "hand on" experience, there will be great potential for the utilization of this training component in immediate curricular modifications.

SUMMARY

Long term training: It is recommended that a total of 20 persons undertake long term graduate training in the United States. This would require a total of 62 person years. Six of these training grants would be at the doctoral level and other fourteen would be at the masters level. Six of the twenty are in the general area of business and aimed at responding to specific private sector training needs.

The balance (non business) degrees are all technology oriented. Again each of these directly relate to a private sector training need.

Each long term training plan will include a required "hands on" work experience. This has been estimated to be of 2 months duration for each masters degree participant and 4 months for each doctoral degree participant.

The faculties of three institutions would be invited to participate in this program; U.C.R. I.T.C.R., and INCAE. Fourteen of the twenty scholarships would go to U.C.R., four would go to I.T.C.R. and two to INCAE.

Short term training: A large portion of the allocation for short term training will be part of the overall long term training objective. This short term "hands on" experience would utilize 52 person months.

Additional short term training being recommended would require 146 person months. The recap sheet breaks this out by function and institution.

In addition the following in country faculty development activities should be supported as part of this overall project:

Visiting Professors for the Following
Areas of Needed Institutional Development

	(1) Digital Controls	6 mo.
	(2) Electronic Communications Systems	6 mo.
	(3) Electronic power control	6 mo.
I.T.C.R.	(4) Occupational health & Safety	12 mo.
	(5) Manufacturing processes	9 mo.
	(6) Welding applications	6 mo.
	(7) Metalurgy	6 mo.
	(8) Electronics	6 mo.
	(9) Electrical power	6 mo.
U.C.R.	(10) Food Technology	9 mo.
	(11) Computer	6 mo.
	(12) Statistics	6 mo.
INA	(13) Training Module Development (INA-ITCR)	2 mo.

Each visiting professor would be hopefully coming to U.C.R. or I.T.C.R. while on leave from a U.S. university, or private industry. This budget should anticipate a round trip fare from U.S. which would require U.S. currency. In addition, a monthly living allowance that would be supported through local currency would be required. Travel costs are estimated at approx. 9100 for this program.

The other major incountry faculty development project would be in recent developments in electronics.

This would consist of a series of "state of the art" seminars. This program would be directed at the Electrical Engineering faculties of U.C.R. and I.T.C.R.

In addition, advanced students and members of the society of Electrical Engineers would be invited to participate.

Each seminar would be programmed over a weekend with a total of 10 hours of instruction during the two days.

It is recommended that 20 such seminars be planned for implementation during the next 4 years of this project.

Each Seminar would be taught by a team of experts appropriate to the topic being studied.

The total cost of each seminar is estimated to be approx. 3500. This would cover the honoraria and travel of the two visiting specialists. Approximately 75,000 should be reserved within the total budget to cover this program.

In closing this observer would like to list several factors that are essential to the success of this new University Private Sector collaborative effort:

- 1) There must be a commitment by both the faculty and administration of the University to the concept of orienting some of the resources of the university to the solving of the problems of the private sector.
- 2) There must be a commitment from the private sector to explore and utilize the strengths of the university yet honor its traditions and objectives as an educational institution.
- 3) The university must be more flexible in order to be more responsive to the needs of the private sector yet not compromise the mission of the university.
- 4) This new partnership must move intellectual resources in both directions. Each can contribute to the other.
- 5) Sustained financial funding must be developed to support this overall training effort that has to be viewed as being critical to the future of Costa Rica.

Criticize the material found in the PID concerning the analysis of the role of the Universities and the proposals, in quantity, quality and nature, for faculty improvement.

1. Well written report.
2. Host country commitment of 2.5M is positive--self help idea.
3. Premise appear to be sound:

In order to develop and exploit new markets, the project needs to address three areas: private enterprises, banking and institutions of higher learning.

4. Although it is not directly expressed, the project embodies the identification and nurturing of the competitive spirit in all phases. Rather than being explicitly expressed in the project document, competition may be built into the execution of this project. For example, in the training sector, first level training (in-country) will weed out the less able, and the more capable students move on.

In the area of banking, first effort might be made in the smaller but more flexible private sector. The available financial resources might be used to encourage competitive new approaches for use of investment capital. The project should select and encourage those persons and institutions which show the greatest potential for solving problems despite bureaucratic constraints.

In the manufacturing areas, those businesses and industries which show a desire and capability to develop new competitive products and a willingness to improve the quality of existing products should be encouraged with help.

In the academic area, the same applies. Selection of the best subject matter fields in which to concentrate should be followed by development of staff who show the greatest desire and ability to perform.

The overall emphasis running through the entire project is correctly placed on human resources development. The success of the project, however, requires more than sound conceptualization, it depends on sound execution. Moreover, the success of this project will be greatly enhanced if the criteria for selection of the human resources to be developed include competitive aggressiveness on the part of the high-energy, task oriented candidates.

5. The rationale for including banking and higher education as a support to productive enterprises is sound. However, one area which may not be possible to deal with, particularly by a grant from the USG, but is absolutely critical to rapid and sound growth, is that of public policy. Although it is mentioned in several places, this project does not directly address this support system as it does in the case of banking and education. Within the existing framework of the project as now written, an effort could be made to include funds for ad hoc meetings with appropriate government officials and persons from the private sector (manufacturing, banking, import-export entrepreneurs, etc.).

It probably would not be useful to enlarge the project to include the public policy makers as a third support group, for resistance would no doubt result. However, if the policy makers and bureaucratic enforcers were invited to sit down with businessmen to talk about specific problems they have with very specific existing policies, perhaps the discussion would expand and ultimately lead to reform. Perhaps this thought is naive, and reflects a lack of familiarity with political realities, but somehow, public policy makers and enforcers as a group cannot be overlooked as a third area of support function equal in importance to education and banking.

6. In the spirit of a clearer understanding for all concerned, the project proposal may be expanded a bit to clarify the meaning of some phrases. For example, what is the meaning of non-traditional goods and services? Does it mean the development of new products, i.e. non-traditional in Costa Rica, or does it have some specialized meaning?

The proposal may become clearer if statistical data can be presented graphically.

7. The project proposal appropriately points up key groups such as ABC, CIAPA and INCAE which could be of help to the project. An important element here is to address how each can be used. Interpersonal relationships and proper attention to cultural, political and social sensitivities will be necessary to maximize the used of key groups.

In the case of CIAPA, careful attention must be given to staffing and function description.

8. As the project unfolds, special attention needs to be given the matter of evaluation. An attitude of flexibility is desirable so changes can be made as the project develops as is indicated by evaluation. This should not, however, replace well thought out indices of success which the project should encompass.
9. More needs to be done on the relationship of the granting agency to the implementing agency. At this point in time the Mission is in a strong position to develop the guidelines. Extra work now will possibly preclude serious misunderstanding later.

10. The USAID/Costa Rica Country Development Strategy Statement is apparently being supported by the Mission's major strategic objectives, (a) economic stabilization and recovery; (b) strengthening of the financial system; (c) promoting exports and investments; (d) improving economic policy making and public administration; (e) improving coordination between the public and private sectors.

This project could indeed help meet these objectives, however it will require understanding and skill of implementation.

Appendix No. 2

In the course of completing the work under this contract, the following persons were interviewed:

		<u>Number</u>
Perceival Kelso, Dean	UCR	2
Rodolfo Herrera, Dean	UCR	1
David Davis, General Manager	Motorola	2
Fernando Duran, Rector	UCR	1
Israel Calvo, Coordinador	UCR	3
Jose Rodriguez, Board Member	ICE	1
Danilo Jimenez, President	INA	2
Alfredo Vargas, Dean	UCR	2
Alfredo Vargas, Dean	UACA	1
Jose Saglut, V. Rector	ITCR	2
Vera Salgado, Dean	CITA	2
Jorge Badilla, Dean	UCR	3
Rosendo Pujol, Profesor	UCR	1
Janina Del Vecchio, V. Rectora	UCR	1
Carlos Lepiz, V. Rector	UNA	1
Iar Shult, Director Human Resources	CONICIT	2
Alberto Di Mare, V. Chancellor	UACA	1
Roberto Villalobos, Rector	ITCR	1
Alfio Piva, Profesor	UNA	1
Win Castro, President	Investor	2
Fernando Arias, Director CITA	UCR	2
Carlos Solera, Manager	ACOGE	1
Rodrigo Sánchez, Manager	Chamber of Industries	2
Wally Wang, V. President	New Fu Sam Industrial Works	2
Eduardo Sibaja, Assist. Manager	CONICIT	1
Hernán Acero, Sectoral Specialist	IDB	2
Héctor Lopez, Specialist	IICANT	1
Constantino Urcuyo, Director	UCR	3
Samuel Hidalgo, V. President	ACOGE	2
Oldemar Lopez, V. Rector	ITCR	2
Gerardo Mirabelli, V. Rector	ITCR	2
C. Ramírez, V. Rector	UNED	1
Marc Linderberg, Rector	INCAE	2
K. Hoadley, Program Director	INCAE	1
Ronald Dornmont, V. Rector	UNA	2

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