

NACTA members indicated a wide range of flexibility on the length of foreign service. For those who indicated a preference, a majority favored a period of service less than six months with many of these members only available for a shorter period. Several members indicated that the period of service would depend on how much notice they were given.

In conclusion, a significant number of NACTA members have a wide range of experience and interest in International Agriculture. This indicates that the decision to reactivate the International Affairs Committee was

an appropriate decision and that this Committee has a major responsibility to the total NACTA organization.

Most of those members who indicated foreign experience also indicated interest in additional service. This implies that their service was personally rewarding and should provide incentive for those of us who have not taken advantage of the opportunity for foreign service. Hopefully, the International Affairs Committee, the International Agriculture section of the NACTA Journal, and NACTA membership in general can provide various opportunities for those who desire to serve in International Agriculture.

A Case for Continuing Institution Building

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Agriculture — the Problem Sector

Despite attention to the importance of the agricultural sector, agriculture in much of the world is unable to meet local needs for food and fiber. High population growth rates compound the problems in developing countries.

The capability of U.S. agriculture to help meet expanding world demands is questioned. Energy shortages and limited land and water resources will constrain production, increasing U.S. internal demands will decrease crop surpluses, and other exporting countries face similar problems. Therefore, most agricultural production needs in the developing countries will have to be met through increasing their own productive capacity.

What is Institution Building?

Institution building is an attempt to establish a viable institution in a developing country. Many kinds of "institutions" are needed in a modern society.

Agricultural institutions include universities, research agencies, extension services, and infrastructure organizations dealing with credit, marketing, land tenure, transportation, and storage. In this paper the discussion is limited to agricultural institutions of the "land grant college" type including teaching, research, and extension activities. The lack of effective educational systems to meet the needs of agriculture already is perceived as a crippling handicap in many countries. (Hammond and Todd, 1975.)

The College of Agriculture of the University of Arizona (UA) was a partner with the Agency for International Development (AID) and the Center for Agrarian Sciences of the Federal University of Ceara (UFC) in Northeast Brazil in a typical institution building program. The important features of that project and many similar projects include:

1. Sending professionals to work with counterparts in the developing country institution, which may be well established or newly created.
2. Professional education and/or upgrading for the personnel who will staff the institution, either in the U.S., the developing country itself, or a third country.
3. Providing teaching and research equipment, supplies, and books and technical journals for a library.
4. Improving teaching, research, and service activities through close day to day collaboration of expatriate and host-country personnel.
5. Improving facilities for conducting local research and demonstration projects.

Success of institution building is measured by several criteria. Among them are increased faculty capability to teach and conduct research and extension programs; increased numbers of students in revised and expanded undergraduate curricula and new graduate programs; improved library facilities with more books and journal subscriptions; improved research facilities (not just buildings), involvement in relevant research projects and development of local and other research funding; and increased number of effective extension (outreach) programs.

Institution Building as a Factor in Agricultural Development

To accomplish increased agricultural production will require an expansion in agriculturally-educated support personnel as well as in training programs for farmers and ranchers. Qualified extension agents, educators, researchers, and staffs for government agencies are all needed. Commercial enterprises such as banks, seed companies, and fertilizer manufacturers and distributors also require agricultural graduates. Few developing countries are able to meet these personnel needs.

As an example, the Brazilian National Research Council in 1970 projected 1974 needs for people with advanced degrees in agriculture as 3,000 M.S. graduates, and 400 Ph.D. graduates. Requirements for 1979 were projected as 5,000 M.S. graduates and 700 Ph.D. graduates. Six institutions in Brazil offer graduate programs

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in agriculture. To date they have produced fewer than 2,000 graduates with advanced degrees.

One third of the difference in labor productivity in agriculture between developed and developing countries was shown to result from differences in general and technical educational levels. Investment in the public sector in the U.S. and Japan was necessary to provide the technology which increased productivity per land unit in the 1920-1960 period. (Hayami and Ruttan, 1971.)

A Necessary Condition

Development of institutions for teaching and research in agriculture is not a sufficient condition to insure short-term improvement in agricultural production and the quality of rural life in the developing countries, but it is a **necessary** condition for any sustained improvement in the future. Ultimately, individual farmers or ranchers must accept the need for and bring about change, but expatriate individuals or technical assistance agencies cannot influence directly very many producers because of their numbers and the cultural differences involved. Therefore, it seems logical to assist the teachers and researchers in local agricultural schools who will develop the agricultural technology, provide information for government decision makers, and educate the people who will work directly with the producers.

Shortage of Agricultural Institutions

Many developing countries are short of agricultural institutions. A survey in six countries of West Africa disclosed only one agricultural institution at the university level, producing fewer than 100 graduates per year. There were four "institutes," 18 "schools," and 12 "centers" providing technician or sub-technician level training for a few hundred students. This region has an area about two-thirds that of the U.S., and a population of about 23 million with more than 85 percent employed in agriculture (Matlock and Cockrum, 1974). By comparison more than 13,000 students graduated from U.S. universities in 1974 with bachelors degrees in agriculture.

Other countries, e.g., India, have developed reasonably strong agricultural institutions partly as a result of past institution building assistance. For a variety of reasons assistance was stopped although some projects were considered incomplete. Many of the developing countries have indicated a continuing interest in institution building projects.

Meeting Local Needs

Requirements of agriculture are unique in different regions of the world. Physical resources are unequal and social systems are extremely varied.

The sophisticated technology of modern agriculture is not directly transferrable to the developing countries. Therefore, educating their personnel in the developed countries is only a beginning. A nucleus group can be educated there, but continuing a policy of education in the developed countries does not provide the most appropriate background and may build up false expectations on the part of the person educated. It's perfectly

natural, but seldom desirable, for returning personnel to continue the research which was a part of their graduate program. Usually such research involves sophisticated technology and expensive instrumentation and has little relationship to local problems.

A local institution with orientation toward local problems will produce graduates who are not tempted by technologies beyond the capabilities of the government or the agricultural producers. Locally educated personnel may have a more immediate, greater, and longer lasting impact on local problems.

There has been difficulty in getting returned personnel to work on their country's real problems. They tend to isolate themselves in "ivory tower" research. Dissatisfaction of returning scientists has contributed to the "brain drain."

These issues are related to the process of "capacity transfer" which creates the ability to find innovative solutions to local problems. Hayami and Ruttan (1971) state that this phase of technology transfer is heavily dependent on extended personal contact and association of agricultural scientists.

Institution Building Out of Favor

Despite all of the above arguments, institution building has fallen out of favor with AID and other international donor agencies. This unfavorable view is also shared by some U.S. universities which have been involved in institution building. Some critics say that "phase" of technical assistance is completed.

Among the complaints leveled against institution building programs are that they are expensive, time consuming, and have not resulted, in most cases, in the quantum jump in agricultural development in the recipient country that some people expected, albeit mistakenly.

A look at the UA Brazil project furnishes some representative data. (Matlock and Smith, 1976). The total U.S. cost of this project was approximately \$3.5 million; the Brazilian contribution was equivalent to about \$1 million; almost 800 man-months of professional assistance were provided; and the project lasted just over 10 years. No attempt was made to correlate regional agricultural development with the project, but even its most ardent advocates will admit that there was little significant development as a direct consequence during the life of the project.

Department heads in U.S. universities often do not support additional institution building activities because "costs" of making faculty available have exceeded the tangible benefits to the departments. The methods of financing institution building projects has not permitted long range planning or encouraged long term commitment by the departments.

There was always conflict between the donor agencies and the contractors over the question, "When is the institution built?" Universities were accused of constantly expanding the bounds of the project. Donors were inclined to set arbitrary, but fixed, time limits. On the UA

Brazil project, faculty from both institutions were in general agreement that the project should have continued for about 5 more years, or at least until the faculty education program was complete.

Institution building often represented a serious drain on host country human and economic resources. There was a danger of the institution being too sophisticated or too far ahead of infrastructure development. This was of concern in Northeast Brazil when the number of graduates strained the capability of the local economy to employ them. Fortunately, the problem was only temporary.

Some of the criticism leveled against institution building programs probably is justified; many mistakes were made. However, there remains the question of whether the decision to abandon institution building as a concept was either right or timely.

What Was Learned

In few cases were the specific reasons for success or failure in institution building documented. Nor were the reasons for abrupt termination always readily apparent.

AID commissioned a study by the Committee on Institutional Cooperation (CIC) in the late 1960's in an attempt to fill this void (Anon., 1968). Many institution building projects were analyzed, and significant findings were reported.

Major needs for success identified in the study included: a stronger commitment from universities, more flexible project agreements, more research on the institution building process, a better understanding of land grant institutions, wider participation in project planning and review, a change in negative attitudes of some faculty and department heads, improved orientation for team members, improved participant training programs, improved public understanding of technical assistance, and strengthened institution building capabilities of U.S. universities.

Constraints to successful institution building projects were described in the CIC-AID study as inadequate knowledge of technical assistance and lack of confidence in its permanency, inadequate knowledge of institution building and low ranking of such projects, complexities of operation and underestimation of difficulties and time needed, failure to use existing knowledge, lack of experience in developing countries and inadequate knowledge of their agriculture, lack of competency, and low prestige of agriculture.

At least five of the above constraints relate to a lack of knowledge which only experience can fill. Certainly University of Arizona experience was minimal at the initiation of activities in Brazil but increased rapidly during the project. The same comment could be made for most universities as they embarked on institution building projects. Nevertheless, the CIC-AID study rated two-fifths of the projects as good to outstanding. This seems a commendable record considering that it occurred when U.S. universities and AID were learning about the insti-

tution building process. Unfortunately, the study was not completed until the decisions to stop institution building had been made by the donors, and the momentum in that direction was irreversible.

Success of Institution Building in Brazil

At the end of the UA Brazil project all parties involved judged it to be a success. Most of the Brazilian faculty had completed advanced degrees, curricula had been revised and expanded, research and library facilities were greatly increased and being well utilized, locally-generated research funding was available, and other agricultural institutions were looking to the Center for Agrarian Sciences for leadership and assistance (Matlock and Smith, 1976).

A graduate degree program in agricultural economics was initiated and had awarded four M.S. degrees. Another graduate program had been started and others were planned. Admittedly the outreach program and capabilities of the Center to serve producers were not highly developed.

Will the accomplishments of the UA Brazil project endure? Has enough time passed since the formal agreement ended to be sure that the institution will continue as a major factor in agricultural development of Northeast Brazil? At this time (1977) all signs are favorable for continued success. Whether all of the changes are truly institutionalized is difficult to evaluate. But UA and UFC faculty agree that the institution has been substantially changed from what it was and that the quality of education received by its students is better than when the project began.

At the present time the Federal University of Ceara and six other Brazilian universities are the basis for an expanded program of graduate education in agriculture. The government of Brazil is committed to this program of educating research scientists to the M.S. and Ph.D. levels. As part of the program, four universities which were assisted through institution building projects are now providing technical assistance to other agricultural schools. None of this would have been possible without the strong base provided by the previous institution building activity.

Taking Advantage of Experience

Most of the objections raised to institution building programs can be overcome, minimized, or at least understood from experience of the early projects. Ways to capitalize on this experience can be developed such as through creating a better, widespread understanding of the institution building process and its value with donors, contractors, and the general public.

Institution building projects are not expensive when considered in terms of potential payoffs and in comparison with other types of technical assistance projects. For example, numerous development projects are being initiated which have annual budgets several times greater than most institution building contracts. Such projects may produce dramatic and tangible results, but their effect will be felt only in a relatively small area. They will

contribute little to technical capacity development which permits the host country to repeat the process elsewhere.

The cost comparison would be even more favorable if the "crash program" nature of many past efforts were changed. Many projects were inefficient in their early years because personnel levels were greater than the host institution could absorb or the donor institution effectively furnish. The UA Brazil project was initiated with eight professionals, grew to 14 by the third year, and then gradually dwindled to three. This staffing pattern was the reverse of UFC capability to utilize their UA counterparts.

Long-Term

The long-term nature of institution building must be fully recognized. Most projects would have been more effective if the same amount of money and man-years had been invested over a longer duration. Only a few long-term advisors are needed in initial stages of planning, identifying participants for education programs, and equipping laboratories. The numbers can increase when participants are educated and ready to resume normal duties. Increased use of short-term consultants can gradually replace long-term staff in the latter stages. This procedure would not only reduce annual budgets but insure more effective use of well-qualified and interested advisors.

Moreover, development of an educational institution cannot be expected in the short run to result in direct or dramatic impact on regional agricultural production. The real benefits are in the gradual but sustained increase in expertise and education of teachers, technicians, and ultimately the producers. The final impact of institutional development may not be truly felt for 20-50 years.

Even in the long term, development of agricultural education institutions may not have the desired effect if other types of institutions are weak. A successful agricultural sector depends on support from the other parts of the economy. Infrastructure needs are not all effectively met by the agricultural education institution, and undue emphasis on the Ph.D. researcher as the most desirable product of such institutions can result in a serious lack of technicians, business managers, accountants, and other essential personnel who also can be educated there.

Finally, ways can be found to insure real commitment of administrators and faculty in the assisting universities. Financing agencies should recognize that they are hiring an institution and not just individuals. To obtain real institutional commitment administrators need to build overseas projects into their on-going programs on a continuing basis without sacrificing domestic needs. The Title XII section of the Foreign Assistance Act may provide more effective ways to integrate international and domestic programs. U.S. universities also can insure that departments and individuals participating in overseas contracts are more adequately compensated financially and in the reward structure of the university.

Advantages of Resuming Institution Building

Emphasis on faculty education, planning, and physical facilities is necessary in initiating an institution building project. When these aspects are largely completed, additional assistance is necessary to institutionalize and integrate the changes which were introduced. Unfortunately assistance stopped in many cases at a time when the potential payoff was greatest.

Some institutions with a cadre of educated people and adequate facilities have not "matured" completely in terms of programs established. They could benefit by follow-up opportunities for collaborative research or other joint efforts. The stimulation afforded by contact with scientists from the developed countries will regain the momentum generated during the project and insure a focus on priority problems.

Some countries today are willing to pay part of the costs of institution building programs, thus the investment by international donor agencies will be minimal. Nonetheless, such agencies can be of major assistance in obtaining the kinds of programs suited to country needs and wants.

Another factor is the accelerating cost of educating professionals from the developing countries in the U.S. Hurrying the day when local institutions can meet local needs will save scarce funds for other purposes.

Who Are The Builders?

Many U.S. universities are interested in and capable of involvement in agricultural institution building projects. The collective experience of U.S. universities and donor agencies has resulted in the development of knowledge on the principles and practices of institution building which has been widely published and discussed. Perhaps more important is the nucleus of people at U.S. universities and AID with individual experience in the process.

Unfortunately, this core of experienced people is a surprisingly ephemeral thing. Death, retirement, and personnel changes can whittle away the knowledge and commitment of a university in a few years unless the experience is renewed. The importance of individual experience underscores the need for a continual involvement of U.S. institutions and the necessity for utilizing a large proportion of their permanent staff in such undertakings.

Institution building is the activity that U.S. universities are best qualified to do and which brings the greatest benefit back to the U.S. partner. Since such projects are educational in nature, there is a deep and philosophical commitment to them on the part of university faculty. The relationships of U.S. and host country personnel which are established result in a degree of mutual respect, understanding, and involvement which is probably not achieved in any other type of technical assistance program. This personal touch not only contributes to the permanence of the effects on the recipient institution but enriches the donor institutions as well.

Conclusions

1. A serious problem still exists in the agricultural sector of the developing countries. Rural development continues to lag behind the urban sector.

2. Many effective institutions which will produce personnel educated in agriculture are needed to overcome this problem. All levels of people are needed from the extension specialist working directly with the producers to the research specialist to the government policy and decision makers. The requirements for qualified personnel in other institutions involved in infrastructure activities are equally critical.

3. Developed country training won't suffice. Some personnel can be educated to sophisticated levels in foreign institutions, but major needs of developing countries must be met from their own programs.

4. Few high quality agricultural institutions exist in the developing countries. Many institutions have been assisted, but most of them have not reached the "critical mass" level. Their local outreach programs have been minimal. Some of the assisted institutions now form the basis for continuing development. Additional assistance will speed their maturation.

5. The reasons for much of the disillusionment with institution building have been identified and now could be overcome. Among the needed actions to accomplish this are (a) fostering understanding of necessary costs, time required, and reasonable expectations of direct impacts with donors, contractors, and the general public; (b) providing incentives for involvement; and (c) use of improved program planning and management techniques.

6. The U.S. technical assistance community has learned much about the institution building process. Donor agencies need to reassess their position on institution building and its role in overall development strategies. Effective management of such undertakings in the future can reduce mistakes made in the past.

7. Technical assistance programs will continue. There is no move to eliminate all foreign assistance, and agricultural emphasis is assured. A reasonable share can be devoted to institution building, including follow up activities on earlier projects.

8. U.S. universities are capable and interested in further institution building activities. A cadre of experienced faculty members was built up in the 1950's and 1960's. Many are anxious for additional opportunities on the international scene. Ways to increase support of department administrators must be found so that such activities become an integral part of department planning and programs.

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BOOK REVIEWS

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Gerald W. Thomas, Samuel E. Curl, and William F. Bennett, Sr. **Food and Fiber for a Changing World**. Danville, Illinois: The Interstate Printers and Publishers, Inc. 1976. 225 pp. Clothbound, \$7.95.

The subtitle of this book is "Third-Century Challenge to American Agriculture." This challenge relates to producing enough food and fiber for a burgeoning population. The book presents an overview of the world food and fiber situation.

While only 4.5 percent of the United States' people are employed on farms or ranches, agriculture is still America's number one industry, generating over 25 percent of our GNP. In the authors' view, the efficiency of food and fiber production in the United States is a unique example of unprecedented progress and should serve as a guide to developing countries throughout the world.

Chapter 1 outlines the world food and fiber problem, which is complicated by the energy crisis and inflation. The authors conclude that food production must be doubled by the year 2000 to feed 6.5 billion people. Trends in agricultural production and world problems of unequal food distribution and adequate protein are discussed. Animal agriculture in relation to efficiency, and alternative sources of food are mentioned. These alternatives include aquaculture, microorganism culture, insects and wildlife, and direct food synthesis from base elements.

The land, water, energy, and chemical resources for meeting this great challenge are evaluated. The authors express optimism about increasing food and fiber production by expanding land use, particularly in the Tropics. Over twice the area presently cultivated can be put into food or fiber production. An alarming picture is presented of our dwindling water resources. Readers are