

Thoughts for the future

In light of accumulated experience, modifications in administrative procedures are being tested and more may be anticipated. Research projects for the doctoral thesis requirement, to be defended in a U.S. university, have been successfully conducted by a number of scholars in their own countries. When possible, this procedure will be strongly encouraged. Concurrently, travel will be encouraged and supported for the major advisor to the scholar's institution abroad to consult, advise and guide his research. The test cases have demonstrated that thesis research in absentia for the doctoral degree requirements can accomplish several desirable goals. It can focus research on an important problem in the scholar's own nation. It can reestablish contacts and working relations in his home institution at an earlier date. In lengthy PhD programs, this is highly desirable. It fairly well assures that the student will not become dependent upon sophisticated apparatus which may be unavailable in his own institution. This need not, however, deprive him of the knowledge of new techniques if special problem research is worked into his course of studies abroad.

This again strongly suggests that the selection program and goals of the student's institution be carefully matched to assure that training is provided which is realistic in terms of the student's career opportunities.

Recall my earlier comments that graduate degree work is now being offered in Mexico for agricultural sciences. The same is true in Costa Rica, Colombia, Peru, and Brazil. The need for highly specialized training can much more readily be met to supplement such

graduate programs than to provide all graduate and special training abroad.

Recent experience also strongly suggests that conferences of Foundation scholars studying in the United States held at least once a year could be very helpful and educational for students. A carefully structured program would be essential and might include distinguished outside speakers, experienced U.S. educators and possibly, earlier scholars.

Such a conference could serve a special purpose in broadening the disciplinary understanding and curiosity of scholars in a time when many problems are becoming increasingly complex because of new considerations, including economic forces, and legal and health concerns.

In my continuous visits to U.S. universities, I have been impressed with the growing sense of need for truly interdisciplinary approaches to complex environmental issues and problems. There is, concurrently, a strong interest by outstanding students for broader training which will better prepare individuals for dealing with such complexities. In some cases, programs have been devised which maximize freedom of course selection in several fields: plant sciences, biochemistry, engineering, economics, landscape architecture and design, and public health. Such programs provide for some depth of training in at least two major fields. In other cases, dual field specialization is effective. In still others, scholars are shifting to new areas after clear specialization through the Master's level, or in other instances, undertaking post-doctoral work in a distinct but related area of research. It is perhaps too early to evaluate the real benefit to the scholars and society of such innovations, but there can be little doubt of the enhanced capabilities and interest on the part of these highly motivated, bright young people.

EDUCATION FOR FOREIGN STUDENTS: A U.S. UNIVERSITY PERSPECTIVE

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I approach the subject of "Education for Foreign Students" with considerable misgivings, partially because this topic has been under discussion by groups like this for the past 15 years. The very process of re-examining programs that are appropriate for foreign students implies that we have had some second thoughts about what the professional goals of these students are or should be. Alternatively, perhaps this re-examination results from a feeling that our original views on student goals were accurate but that we adopted poor strategies in achieving such goals. In either case we leave ourselves open to the charge of being presumptuous in imputing a set of goals to other people on the basis of our prejudices. If the experience of the past 15 years of technical assistance has taught us anything, it is that we simply cannot successfully impose our own judgement on what other people should do with their own lives and resources. Therefore, it is my hope that some of my colleagues on this panel will be able to shed more light on what the foreign students themselves really feel about the quality of the graduate programs they have encountered in the United States apart from the superficial frustrations they experienced. Let me leave this side of the question to them with only one caveat, namely: the opportunity to study in the United States is by far the most highly prized form of technical assistance in the eyes of the developing nations, and this opportunity will likely have a more lasting effect than anything else we have done.

The remarks in this paper are offered with two assumptions in mind. First, I assume that the foreign students with which we are most concerned are those from the underdeveloped nations, and secondly, that we are primarily concerned with students at the graduate level. My comments are offered under two major rubrics. The first is a look at foreign student needs, and the second is an examination of U.S. university programs.

As I began to think about this topic, it occurred to me that over the last 15 years I have developed a number of biases which may or may not be shared by others engaged in training foreign students in the field of agriculture. Therefore, as part of my preparation I circulated a questionnaire to three groups of respondents in the Land Grant institutions of the U.S.: deans of graduate schools, directors of international programs, and heads of departments of horticulture science. I received a total of 78 replies, reasonably well distributed among these three categories. The following remarks will perhaps still

contain many of my own biases but at least they will be tempered by the views expressed in the responses to this questionnaire.

The results of the questionnaire itself are summarized in an addendum to this paper.

FOREIGN STUDENT NEEDS

I would like to comment on three aspects of foreign student needs; namely, 1) what they are, 2) how they differ from U.S. student needs, and 3) how they have changed in the last fifteen years.

When foreign student needs are stated in general terms, they may sound exactly like the needs of our domestic students. They need a technological base that is reasonably adequate for three to five years after they finish their schooling. This suggests that the science and technology which they acquire in their particular disciplines should be sufficiently broad, basic and up-to-date that they can get good mileage from them for a reasonable period of time without undue reliance on further training. It also suggests that upon return to his home country, the foreign student should be prepared to become productive immediately in his discipline and that he should be capable of adapting his acquired knowledge to his own environmental circumstances. This level of competence is implied in the expectations of sponsoring agencies and home institutions when they indicate the institutional strength to be gained from training a staff member.

The foreign student needs a scientific base that is strong enough to permit him to continue to reinforce, refresh and up-date his technological base through self-study and association with scientific colleagues. He must be able to read scientific literature and to appropriate new scientific information for his own technical area. If his scientific base is not strong enough to permit him to continue this up-dating, he will soon exhaust the technological base which he acquired in graduate school, and then he will be little better than his colleagues who did not have the advantage of additional training abroad.

The foreign student also needs a strong production orientation in his graduate program, that will focus his energies on important practical problems and on skills needed to solve such problems. It is not likely that he will encounter, upon his return home, an environment which can give him this orientation. There will be little in the way of in-service training programs or mature colleagues on whom he can depend for such guidance.

The challenge of the U.S. university, then, is to offer programs which have the appropriate balance among these categories of needs and in which the student can acquire a total level of competence that

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justifies granting him a respectable graduate degree. Achieving this balance is not easy and there are many different views as to the appropriate weight to be given each of the above three elements.

How do they differ from U.S. student needs?

Upon return home the foreign student typically finds himself with a broader area of responsibility than a domestic student faces upon graduation. Therefore, the foreign student usually needs to cover a broader range of subject matter in his graduate program. This often includes additional courses in economics and public administration, topics that are often frowned upon by our own professors of genetics or plant physiology. By the same token he may lose the opportunity to become as deeply grounded in any single area.

The foreign student needs a stronger production orientation than is required by most of our domestic graduate students. The great need in the developing nations is to increase agricultural production primarily through modern technology. Most of the developing countries are not yet in a position where they can afford to divert much of their scientific resources to basic research. Therefore, their scientific leadership needs to have a strong commitment to research and development on the practical needs of the country and to the passing of this information to the producers. This is perhaps the point at which U.S. university programs have been weakest in satisfying the needs of foreign students.

The foreign student will generally have poorer resources for renewal and up-dating of his scientific and technological knowledge when he gets home and he will depend heavily upon continuing contacts with the outside world. This means that he should have a stronger personal channel of communication with scientists in this country so that he can exchange ideas and information through continuing correspondence. This implies a need for more personal contacts at scientific meetings and visits to other laboratories than are normally provided to our domestic students.

Finally, there is a much greater need among foreign students for work experience in the field and laboratory. This experience is almost totally lacking among foreign students prior to coming to the U.S. Most of them come from cities. Urban secondary schools are better and produce more successful competitors for the relatively scarce openings in their own university programs. Many have never known the excitement, pleasure and motivation that comes from personal accomplishment in practical matters. Working with researchers in the field allows the student to observe the work ethic, hear discussion of practical matters, and absorb attitudes and points of view that are rarely expressed in formal course work. We have deprived our foreign students of this experience although they need it even more than our domestic students. My personal feeling is that our affluence of the past 15 years has clouded our vision, and we have failed to involve all students in work programs.

Have they changed in the last 15 years?

The difference in the needs of domestic and foreign students noted above have changed considerably recently. There are now many universities in the less developed countries that provide excellent undergraduate and a few graduate programs in various fields of agriculture. Some of the most renowned in Asia include the Philippine College of Agriculture and the Agricultural Universities of the Punjab and Uttar Pradesh in India. In Latin America there are such outstanding institutions as the College of Agriculture at Chapingo, Mexico, the Agricultural University at La Molina in Peru, and the Agricultural University of Vicosa in Brazil. In addition, there are many other institutions that are well on their way to satisfying national needs in the education of undergraduates in agriculture.

A worldwide study in 1967-68 of agricultural institutions that were being assisted by AID documented the substantial progress being made. In the five years since that study, even greater progress has been demonstrated. This is one reason why over 90% of the foreign students who come to the U.S. to study agriculture today are at the graduate level. It is also one reason why the great deficiencies which we observed in foreign students 15 years ago have been corrected in more recent applicants. There is a stronger base on which to build than we had in the early days. Let me emphasize and underscore this latter point because some of our professors still treat foreign students on the basis of their earlier unhappy experiences.

With this improvement, there is a slight narrowing of responsibilities which current foreign students will face upon return home. There is a slightly lower probability that returning foreign students will quickly find themselves in administrative roles. This means that they can remain longer in subject matter areas.

Much technology has been adopted in the majority of the developing countries in the past 15 years. This means that students

are expected to be more knowledgeable about improvements in technology than they were earlier.

There is now a growing demand for people with advanced degrees in extension programs. A few years ago, there was so little technology available for extension that these services were not particularly demanding in the technical competence of their personnel. That is now changing rapidly with the development of new cultivars and practices in the major food crops of most of the developing countries.

One final difference that has emerged over the last 15 years is the need for technical people to understand the economics of agricultural production. The experience of the last 5 years with modern technology, including the miracle rice and wheat cultivars, has indicated the urgency for a better understanding of the economics of production for home consumption and for export. Most developing countries are now confronted with the problem of costs of production that are still above world prices, coupled with scarce foreign exchange reserves and high levels of unemployment. These problems are not peculiar to these countries, but they are more serious for national development. Therefore, they must be understood and tackled jointly by scientists in all areas of agricultural production.

U.S. UNIVERSITY PROGRAMS

I would now like to direct our attention to three questions regarding U.S. University programs available to foreign students: Are the university programs adequate? Are they sufficiently flexible? Do we offer the appropriate economics courses?

"Relevance" is a word which our students added to the university administration's vocabulary several years ago, and it has been used until it has virtually lost its bite. However, relevance is still at the very heart of the question with respect to programs for foreign students. Our universities offer enough courses at an appropriate level of sophistication or abstraction, and there has been little criticism of the more basic courses that foreign students take. The major issue is whether they can put together an adequate program for their own needs back home.

As noted earlier, a strong production orientation is needed for many of the technological courses taken by foreign students. Production courses assist the student in seeing how basic science and technology has been put to economically productive use under specific economic, cultural, and biological circumstances. The diversity of economic and cultural constraints on production technology, as it is introduced into other cultures, needs greater stress for the foreign student. Fifteen years ago we were sure that there was enough technology available in the world to solve most of the production problems of the less developed countries. We quickly found out, however, that the applied research necessary to adapt existing technology to the environmental conditions of these countries was deficient. It also required a high degree of skill to perform such research in other environments. This same problem plagues our production oriented courses. Students become aware of modern technology as we know it in the U.S.: with strong support by institutional infrastructure and mechanized. Our courses seldom take cognizance of the dependency of our technology on these two items. Therefore little of this gets into our classroom presentations. As soon as the student returns home, however, he is confronted with the difficulties of introducing such technologies into his own environment. Perhaps the crucial problem confronting U.S. universities is whether alteration in presentation is possible. If it is, can we afford to make the changes for a few students? There is some recent evidence that these courses improve even for our own students if we attempt to make them more universal in their application. This is particularly true as we become more involved in producing for world trade.

The adequacy of the programs of U.S. universities is perhaps strongly influenced by the role of the academic advisor in designing a program to suit the student's real needs. This is one of the weakest points in our entire foreign student program. Few of our advisors can visualize the circumstances in the foreign student's own country. Their only recourse is to design a program based on what they know and to grudgingly yield to suggestions by the student or his sponsor. The advisor's role has been strengthened in a number of institutions by giving this responsibility to staff members who have served overseas in technical assistance projects. Such a procedure has often been a great help, but I strongly suspect that a great deal of the criticism that we continue to hear arises primarily from the inadequacy of the advisor's understanding of the problems which the foreign student will face upon return home.

The greatest single deficiency, as identified by the respondents to our questionnaire, was in the area of work experience. There is a broad recognition of the need for foreign students to work closely

with faculty members on research and other activities during their academic careers. The need to develop a work ethic, the need to develop a genuine understanding of the importance of scientific integrity, the need to develop a feel for priorities in research and other programs are items that were listed very frequently by all three categories of respondents. Their comments suggested that these attributes are developed primarily through work experience with faculty members. Most respondents indicated that their institutions had difficulty in making arrangements for such experience and admitted that this constitutes a serious deficiency in their program.

Are programs flexible?

The total set of courses offered by any land grant university represents an enormous potential for students from any part of the world. The question is whether foreign students are allowed free choice in making up their academic meal from such a cafeteria offering. Are there departmental restrictions, graduate school restrictions or other regulations which impose serious constraints on the student's ability to make the best possible program? Results from the questionnaire suggest that these restrictions are being modified, but they still present substantial barriers.

Transfer of credits between institutions in the host country and the U.S. university is another area of inflexibility that causes problems with foreign students. Many would like to take as much as possible of their graduate work at home and then come to the U.S. to complete the requirements for a degree. Alternatively, they would like to take much of the course work here and transfer these credits back home. To date they have encountered considerable inflexibility in going in either direction. Many universities now insist that there is no specific course requirement for the Ph.D. and therefore the student may be permitted to take much of his work at his home institution. This practice, however, is not sufficiently widespread to prevent its being a problem in many areas.

Graduate schools in the U.S. have characteristically been quite inflexible in their regulations regarding residence, thesis research and examinations. A few institutions are now permitting students to take their course work and their qualifying examinations on campus and then return home to conduct their thesis research. Some will now permit the student to write his thesis at home and only return for the examination. Others indicated in the questionnaire that they would even arrange for the examination in the student's home country if appropriate financing could be arranged. There is heartening evidence that graduate schools have become much more flexible in the last few years in these matters. Hopefully, over the next decade we will see the faculties of the major international agricultural research institutes playing an increasing role in thesis research supervision and examinations.

A few years ago the Agricultural Development Council held a series of seminars on graduate studies for foreign students particularly in the field of agricultural economics. The discussions indicated that

while a special graduate school was perhaps not necessary, there was considerable evidence that the economics taught in this country leaves much to be desired when applied to production technology in underdeveloped areas. Most of the developing countries are confronted with serious unemployment or underemployment in agriculture. They generally have strong national policies against the introduction of technology which would further aggravate the unemployment situation. The economics taught in this country has great difficulty in coping with such problems. Can you imagine, for example, a chapter in our textbooks on the economics of scale which focused attention on "generation of employment" as the dependent variable to be maximized rather than "returns per dollar invested?"

Many of the developing countries are engaged in serious agrarian reform activities. This necessarily pushes them strongly in the direction of socialist enterprises of various kinds. Most of the economics taught in the U.S. is based on free enterprise and free market situations and it is of little help under conditions of strong government control.

All of the developing nations are confronted with serious problems of balance of trade and foreign exchange. Most modern technologies in agriculture require capital investments and inputs that must be imported. The economies of these situations is poorly understood at the present time, and only recently have research projects begun to study the consequences of various alternative strategies which the developing nations might consider in resolving these problems. Again, this is an aspect in the fundamental training of almost every foreign student which has been grossly neglected by our U.S. university graduate programs.

Need for improvement

In summarizing the U.S. university perspective on the education of foreign students, I see a few areas where we can and should make some improvements, a few areas where changes would be helpful but too expensive to consider, and one area where we have little hopes for improvement in the immediate future.

The areas in which we can and should make improvements include the following:

1. Broaden the ecological, economic and cultural base in our technology courses.
2. Increase work experience opportunities on a rigidly scheduled, volunteer basis.
3. Improve advisory service.
4. Permit greater flexibility for including socio-economic courses in technology curricula.

Areas in which change would be helpful but too costly include:

1. Tailor-made courses for foreign students.
2. Greater personal attention to individual student needs.

The area in which we have little hope for improvement in the immediate future is an adequate economic base for developing countries. It is small comfort to add that I am not aware that any other nation fosters a better set of economic principles.

HORTICULTURAL EDUCATION FOR FOREIGN STUDENTS: A FACULTY ADVISOR'S VIEWPOINT

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In preparing for this discussion, I have assumed that our primary concern is for graduate level students from developing nations and that most of their undergraduate education has been obtained within their own national institutions.

It has been said that perhaps the weakest point in our entire university program as far as the foreign student is concerned is the role which the academic advisor plays in the student's program. As a faculty advisor, I would like to challenge that statement. I must, however, reluctantly agree with it.

While it is true that the advisory system is one of the weakest points, it is also the point which probably could most easily be strengthened. It would require somewhat more judicious selection of academic advisors for foreign students and an extra effort on the part of the advisor in reaching a better understanding of the student's real needs.

I'd like to explore why the advisory system is weaker than it should be and, to suggest some possible approaches we could employ to improve the foreign student's educational experience. I would also like to discuss ideas for improvements in areas which are outside the

direct control of the academic advisor.

Comparison of students

The best manner in which to approach and understand the subject of the foreign student is to compare him to the student with which we are all quite familiar. I suspect that most of us have obtained either our undergraduate or graduate training, and perhaps both, from a land-grant institution. Most of the students with whom we come in contact have travelled the same route. Our formal education has been a carefully orchestrated balance between a set of basic science courses and technology courses coupled with some exposure to active research programs. These research programs are kept in close contact with a highly mechanized agriculture through the Extension Service. There is an interchange in both directions. The U.S. student is exposed to this organization regularly. In fact, he is quite likely to have become familiar with the system while still a teen-ager because he is most often from an agricultural background, either having been brought up on the farm or closely associated with it through his family's farm-related business.