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An Assessment of
Efforts to Expand
AGRICULTURAL EDUCATION AND RESEARCH CAPABILITIES
in Less Developed Countries¹

by George H. Axinn²

1. Paper Presented to the Annual Meeting of the Association of U. S. University Directors of International Agricultural Programs, Washington, D. C., 17 June 1971
2. President and Executive Director, Midwest Universities Consortium for International Activities, Inc., and Professor of Agricultural Economics, Michigan State University.

It is indeed presumptuous to attempt an assessment of efforts to expand agricultural education and research capabilities in the less developed countries of the entire world. For one thing, I am completely unacquainted with most of the world -- and for those places I have visited, I have not made any systematic assessment of efforts to expand agricultural education and research.

However, I have been visiting some, particularly in Africa and Asia in the last few years, and even occasionally in Latin America. I have reviewed quite a few reports of studies of such institutions. And, friends and colleagues have shared their impressions with me. That which follows does not claim to be a systematic assessment at all. I shall offer general impressions and try to make an overall assessment without any claims at having systematically collected data on representative sample of those institutions about which I'm speaking.

The only systematic thing I can offer is a frame of reference for looking at the whole question, which I will draw largely from the institution building research with which most of you are familiar. The conceptual framework originated by Dr. Milton Esman¹ when he was at Pittsburg, associated with the Inter-university Research Program in Institution Building.

The concepts were used, in part, by the CIC/AID study of AID/University cooperation in technical assistance in building institutions to serve agriculture. That study was administered

by Dr. Ira Baldwin, then at the University of Wisconsin, and the report is well known to most of you.

In summarizing the study, Ira Baldwin and his colleagues wrote, "given the level of knowledge which existed in 1950, U. S. citizens have every reason to be proud of the accomplishments of AID and their Land Grant Universities. The record of the last 18 years reveals many frustrations and irritations and some near failures. However, there were enough solidly successful operations to indicate that the objective of transplanting the "Land Grant idea" as a stimulus for agricultural development is both worthwhile and feasible, and that our universities can effectively assist the developing countries."²

Without dwelling on the institution building model, which is being used more and more in training and research programs throughout the world, I will make my assessment in terms of the institution building categories: leadership, doctrine, organizational structure, resources, and program, and linkages.

I will first deal with the so-called institutional variables of leadership, doctrine, organizational structure, resources, and program, and then later get into some of the linkage variables which I think perhaps will be most important to us as we look to the future

One of the principal concerns among Americans in the last 20 years, as they tried to be helpful in efforts to expand agricultural education and research capabilities in the less developed countries, has been a concern for doctrine. Some of them called it the "Land Grant philosophy" and others confused it with the organizational structure commonly found

among the Land Grant institutions of the USA. But essentially, the underlying rationale was the doctrine of the Land Grant institutions. And the attempt was to share this doctrine with newly emerging universities and research institutions throughout the developing world.

One could summarize the doctrine by saying that it promotes higher education for as large a proportion of, and as wide a spectrum of the population of a country as possible -- rather than limiting it to a small elite. Secondly, the doctrine is one of relevance -- insisting that higher education focus itself on the needs and the interests of the people of a nation, and apply the methodology of higher education to the problems of the work-a-day world -- the ways in which men and women earn their sustenance.

Integral to this philosophy is the notion that it is appropriate to do research on practical problems. The data which results from such research is practical and applicable to the day-to-day problems which people face. Fundamental to this doctrine is also the notion that there ought to be some direct benefits to the public at large; not merely benefit for those who are enrolled as degree seeking students at the institution.

In general, I believe that the doctrine of agricultural education and research throughout the less developed countries

is an outstanding example of achievement. That is, many of the agricultural institutions in the developing world have evolved an appropriate and satisfactory doctrine, as best I can assess it. This is not to say that there are not still some "ivory tower-type" institutions where the staff is more concerned with its own wrestling with academic minutia than it is with the reality of the world. But I would say that in agriculture particularly -- the main trend is in the opposite direction.

Here are some examples:

Haile Sell ssie I University, in Addis Ababa in Ethiopia, published a special report in September of 1969, in which they said, "we must continually make clear the university's commitment to the values of sacrifice, service, work and greater social justice. This is a commitment of individuals, of teachers and students alike. We must avoid the danger of fostering the wrong kind of essentially selfish, individualist, "elite" attitudes which may have begun to characterize some other universities in the developing world. It is simply wrong, in my view, (and here I'm quoting directly from President Aklilu Habte) for staff and students to be pre-occupied with white-collar, status-oriented, high-salary jobs. Development means hard work -- labor, on the farms, in health stations, in construction, in factories, and in schools; higher education must more strongly emphasize the dignity of labor, the value of

achievement through manual work as well as other work.

"Our educational philosophy must be innovative, not imitative. We must learn -- though it is sometimes hard to teach the lesson to some University teachers - that valid education is not simply a process of amassing course credits according to some pre-ordained curriculum; nor is education always fostered by listening to didactic lectures and acquiring information. The experience which constitutes a "higher education," in Ethiopia at least, should include extensive work in the field, notably in the country's less-developed rural areas, but also in government offices, businesses, hospitals wherever the hard problems are. The experience must aim at developing more self-reliance and initiative, and in particular, capacities to work out problems in disciplined, practical ways."³

Now let's skip to another part of the world -- this one in the Asian Pacific -- I'd like to quote you a little bit of what people at the College of Agriculture of the University of the Philippines have said about themselves as an institution.

"The complex community consists of scientists, teachers, and scholars from more than 20 countries, and facilities all aimed at contributing to the building of an efficient, dynamic agriculture in the Philippines and other South East Asian countries so their expanding millions can live a life of abundance, freedom, and dignity. Thus, the University of

the Philippines College of Agriculture is the center of a cultural milieu neither urban nor rural, whose primary concern is general well-being."⁴

And now another example, back in Africa, the following words appeared in the 1966-1967 calendar of the University of Nigeria under the heading, The Philosophy of the University.

"In the spirit of the essential purposes of all great universities since the dawn of man's struggle toward universal human dignity, the basic objectives of the University of Nigeria are: To seek the truth, to teach the truth, and to preserve the truth.

"....the goals of the University of Nigeria go beyond those of education for its own sake. This seat of higher learning is committed to play a dynamic and vital role in the significant task which faces the country of which it is a part -- that of building a great new nation."

"Thus the community of scholars -- teachers, students, and researchers -- who have gathered themselves on the plains of Nsukka have launched a venture in higher education that is somewhat different for this part of the world. They are attempting to sift out the most appropriate aspects of traditional universities, and by blending them into the Nigerian scene to evolve a program specifically suited to the needs and interests of the people of Nigeria, as they take their rightful place in the world community of nations."⁵

If you were to go half-way around the world to Indonesia, you would find that the present legislation setting up the agricultural faculties in 24 different institutions of that nation has the same essential elements, in its doctrine. The commitment to service is there; the commitment to relevance is there; the commitment to sensitivity to the needs and the interests of the people to be served by the institution is an integral part of it. I'll come back to the Indonesian agricultural universities when we get to linkages later on.

Now let's turn to leadership before going on to organization and structure.

In brief, and as the broadest possible generalization, I'm extremely impressed with the leadership of agricultural education and research in the less developed countries. Actually, from a personnel standpoint, I think the leadership is much stronger than the staff in general. What I'm saying is that the Deans of agricultural faculties, the Vice-Chancellors of universities, and the Rectors of universities are first rate men. In fact, I would say, in general, that they are men of greater eminence than outside nations can send as chiefs-of-party for technical assistance teams. I have the feeling that the top leadership is in good shape on a world-wide basis. Certainly there is a lack of training in administration. It's not uncommon to find deans of agriculture or vice-chancellors

of universities who have come to their positions of respect and stature by virtue of first class contributions in the academic world, or in other aspects of public life -- but with almost zero in the way of administrative experience and certainly zero in the way of training in administration and management.

I think there is a serious lack here. It would be useful on a worldwide basis for the leadership of the agricultural institutions to have a good solid exposure to what is known in such areas as planning, organizing, staffing, and the controlling of large complex organizations.

But with that exception, I would have to give high marks to the top leadership. Any intervention in the developing world from outside -- in the spirit of technical assistance -- should probably be in some other area -- rather than in assistance in the development of top leadership. Again, this is a broad sweeping generalization and there are surely many exceptions, but in some cases at least, I think we have people leading the agricultural institutions of Asia, Africa, and Latin America who can run circles around some of their counterparts in Europe and the United States.

If we turn to organization and structure, I think we come out with a much more mixed bag. Part of this is appropriate, since there are social and cultural differences from place to

place around the developing world. Part of this is inexcusable, based on the intervention first of Europeans and later of Americans, who saw their own particular organizational structure as necessary and appropriate for the developing nations which they presumed to be "helping."

By and large, the Americans evaluate agricultural universities on the basis of the extent to which they have organized research and extension efforts in the same organizational structure which handles the teaching of degree students. The British see the world in a very different way. Up to this time, neither have been able to take a truly functional approach which escapes the peculiarities of their own structural background.

I think that Bill Thompson of the University of Illinois, and his colleagues who worked with him on the assessment of progress of the Punjab Agricultural University to 1970, did an excellent job. This team of two Indians and two Americans did a much more systematic and careful kind of assessment of one institution than I'm trying to do here for all of them. In general, they state that "The Punjab Agricultural University has made excellent progress up to 1970. A careful reading of the Report provides the basis for this general assessment. But the future will judge P.A.U. in terms of her ability to be innovative, to grow, and to expand to the depth and breadth

of service to the rural society. A large number of suggestions either explicit or implied, are made in the Report. In addition, it is hoped that leaders of P.A.U., in whose hands the future of the institution rests, will be able to draw meaningful inferences from the information presented that the assessment team has not been able to perceive."⁶

But then when you get into their recommendations, the first one is to create the post of director of resident instruction, and the second one is to "integrate the three functions at college level." In total, there are 15 such recommendations, and I'm sure they're all excellent and appropriate -- but if you made them in regard to one of the colleges of agriculture in the United States of America, they would be equally appropriate.

Contrast this with what one Englishman, Guy Hunter, of the University of Reading, says in his book entitled Modernizing Peasant Societies, a Comparative Study in Asia and Africa.

Hunter refers to the allocation of responsibility in the new Agricultural Universities "with their strong land grant college flavour," as having caused much confusion and heart burning. Let me quote directly from him:

"In the early stages the University has often taken over a limited part of its area for experiment and training with direct Extension work. Full of energy and ideas, anxious to

prove the thesis that the University can do the job far better than the old government Extension Service, the University moves in with more staff per 1,000 farmers than the government could afford in the general service, better qualified staff, and staff supported by transport and other facilities which, again, would be too costly on a national schedule. Moreover, it is part of the philosophy that the University Extension worker should be the farmer's friend, and only his friend: not for them the unpopular task of law enforcement; not for them even the administrative chores of constant meetings with parallel or superior staff, the statistical records which government needs, the monthly reports and routine inspections. In consequence, they may achieve a few spectacular 'local successes' more in 6 months than the government has done in 6 years', as one American Extension advisor remarked to us.

Naturally, there have been severe tensions, and some hard things said by Directors of Agriculture and by the regular government staff. They have right on their side. Nothing could be more destructive of morale for the regular Extension Service than to have this subsidized competition creaming off the more attractive parts of the job, and particularly now, when at last the new high-yielding crops have given Extension something really worth while to give to the farmer. Nothing could be more disruptive of a co-ordinated

approach of many government services than to have a rogue element, separately administered, carrying out its own policies in the very center of the stage. Moreover, the University is not even answerable for what it does: if there is a catastrophic crop failure, it will be the Minister of Agriculture who answers in the State Parliament, and the Government Director of Agriculture who will be blamed -- not the Vice-Chancellor of the University."⁷

Later he comments that: "If ever there was a thoughtless transfer of inapplicable experience from one civilization to another, this is one."

Thus, on the organization structure side, I would comment that the world has a long way to go. The organization and structure has been the easiest part for a technical assistance "exporter" to try to export. This was the visible thing which could be seen and easily described. Too often Europeans and Americans went abroad understanding only this about their systems -- rather than the essence of function, or the essence of doctrine, and, therefore, they tried to "force" their organizational and structural arrangements upon the Asians, the Africans, and the Latinos. In some cases they had eminent success in this, but my own view is that this success is temporary. As time goes by, the organizational structures will have to change, grow and evolve into uniquely appropriate structures for the particular nation, state and culture where

they are manifest. In a sense, as we begin to understand the functions better, we will realize that every rural social system has functions of production, of marketing, of supply, of governance, of research, and of education and extension. As a living system, all of these functions are linked with each other, and any change in any function or in any linkage affects all of the other functions and all of the other linkages -- therefore, the whole system. Thus, it is absolutely essential for functions such as research and extension to grow as education grows -- just as it is for supply and marketing and governance to be affected as production changes. But to assume that all must be housed in one particular organization, was a falacious over-simplification of reality.

The question of resources also represents a very mixed picture as one looks broadly at the less developed world. In terms of financial resources, many countries have provided higher education a disproportionate amount of the total available public funds. That is, if one considers the entire pyramid of education -- from elementary through secondary including vocational and technical and on up to higher education -- it could be argued that the elementary schools have been slighted in many countries -- as have the secondary -- in order to provide a university. Part of the case for this is that the university is a status symbol as well as a public

utility in furtherance of national development. At any rate, with the exception of some Latin American countries, it would be difficult to argue that financial support has been lacking. In addition, of course, foreign aid, both bi-lateral from the Americans, the British, and the French, as well as others, and multi-lateral through UNICEF, UNDP and other United Nations organizations -- and more recently to a considerable extent from the World Bank -- has also tended to favor higher education. Therefore, I feel that the financial resources have not been the main constriction.

Personnel resources are another matter. Money can be converted into buildings and a beautiful campus can be constructed almost anywhere. There are excellent examples throughout the world of new university campuses where absolutely nothing existed 20 years ago -- or even 10.

Equipment -- lab equipment, classroom equipment, and even books for the library can be purchased with money. There are all kinds of problems in the process of this -- and most of the world's agricultural universities and research stations have extreme shortages in working library materials, as well as adequate laboratory equipment. But the essential problem here is one of management, rather than the fundamental financial resource.

With respect to libraries, those of us interested in

international development have probably been quite delinquent in emphasizing the exchange of advisors and the training of participants, and neglecting the relatively much less expensive exchange of printed materials. Almost every agricultural research library outside of the U.S. and Europe has difficulty getting the various journals that it requires. Most journals have missing numbers for every year -- and it's not uncommon for a librarian at a place like Mymensingh, Jogjakarta, or LaMolina to tell you that he considers himself fortunate if he in fact receives 6 out of the 12 issues of a regular monthly periodical. Keeping these things up to date and complete is a serious problem which has not received appropriate attention. Of course, it results in a lowering of the quality of the research which is carried on throughout the world. I'll not go on on this point, but I think it's a serious one which deserves more attention. One could say that part of the genius of the U.S. system of agricultural experiment stations, from the middle 1800's on was that each one had an editor, published bulletins, and exchanged them with all the other agricultural experiment stations. Thus, an entomologist at any one of the state agricultural experiment stations had access to the publications of entomologists at all of the other agricultural experiment stations -- and one could argue that the advancement of knowledge was geometrically increased because of this phenomenon.

Turning to the key issue within the category of resources for agricultural education and research, one must come to manpower. The manpower situation is critical throughout the less developed world. Some nations have moved more rapidly than others -- but in general, there is a scarcity of high level trained manpower throughout the agricultural professions. Where persons have the academic training, they tend to be out of touch with practical agriculture, and isolated from the farmer.

Of course, the contrasts are great. When I visited the University of Zambia at Lusaka, early in 1971, I found a faculty that was 95% expatriate and only 5% Zambian. Contrast this the University of Nigeria at Nsukka and Enugu, which, by 1967, had a faculty which was 85% Nigerian. And in Argentina, the Agricultural Facultad at Balcarce could claim a staff of 83 last year, none of them foreigners.

Another way to look at this problem is to examine the research on agricultural development which has been published recently. Carl Eicher did a study for the Agricultural Development Council in which he looked at 5 English speaking countries in West Africa.⁸ I reviewed all of his listings for journal articles, and found that for Nigeria, for example, 117 journal articles were published by ex-patriates and 62 by Nigerians.

The picture is more extreme if you look at East Africa.

Peter F. N. McLoughlin did a similar study for the Agricultural Development Council on research on agricultural development in East Africa.⁹ If you look at the books published on Kenya, you'll find 23 done by ex-patriates and only 2 by Kenyans. For journal articles there were 62 by foreigners and only 9 by Africans. For Tanzania the picture is even more extreme. There were 15 books listed by foreigners and none by Tanzanians. And for journal articles, there were 53 authored by foreigners and only one authored by a Tanzanian.

The personnel situation tends to be better in Latin America and in most of Asia than it is in Africa. That is, there are more trained professionals within agriculture, and the faculties tend to have a higher percentage of host country nationals and a smaller percentage of foreigners than one finds in Africa. However, there is still a tendency for people who are on the staff of agricultural universities and research stations to have a classical kind of training which emphasizes the taxonomy, rather than the physiology, of each field, and tends to emphasize sheer knowledge about biological phenomena, rather than applications of that knowledge to agricultural production, supply, and marketing.

Thus, while I was able to say earlier on, that I thought the leadership of agricultural education and research was in generally excellent condition, I think the rest of the staff --

particularly the working people in the academic departments -- tend to be in need of continued advanced training, and in need of a shift in approach, or philosophy, or doctrine. The actual work they do and the way they invest the 24 hours they have each day needs to more nearly match the doctrine of the universities for which they work, rather than a more classical educational background they tend to have inherited.

Another dimension of this is the relative isolation of scholars in the developing world. The faculty at the U.P. Agricultural University in Pant Nagar, in India, is relatively well trained. But Pant Nagar is a long way from New Delhi, and both Pant Nagar and New Delhi are a long way from Reading, Ames, and Ithaca. Individuals at such locations have a much greater need for a periodic "sabbatical leave" in which they could become part of a more cosmopolitan academic community, catch up on their reading, and become up-to-date in their fields, than do people at most of our campuses.

This, incidentally, suggests the potential of sabbatical leave exchange programs which each of us could work out with the agricultural universities and colleges of the world which could be a continuing source of strength, not only to them, but to our own institutions as well.

This brings us to the question of program. Whatever the leadership, doctrine, organizational structure, or resources that you may have, the pragmatic question is: what are you

doing and how are you affecting the environment of which you are a part?

An example from Kasetsart University in Thailand illustrates the transition from doctrine to program.

This university has completely revised its curriculum; it is arranging to have introductory texts printed in Thai; it is in the process of establishing a rigidly selected graduate faculty; and it has taken steps to develop a limited number of well-planned research stations. Furthermore, the university council is continuing to review the university's organizational structure including the number and sizes of its faculties and departments.¹⁰

Thus, we see a quest for relevance in program.

This, to me, is essential in all education, and it's crucial in agricultural education. After all, it is a process of people learning how to do what they need to do in order to live. Education is relevant and appropriate when those who partake of it, in fact, learn how to do that which needs to be done. When they learn how to do that which doesn't need to be done, then the education is irrelevant, and its graduates often find themselves in surplus. In fact, the first such graduate, by definition, having learned to do what does not need to be done, is in surplus.

Even with a doctrine of commitment to relevance and public service, it is most difficult for a university to achieve academic excellence, and at the same time help people

learn what they need to know.

One of the severe problems around the world is language. New knowledge in practically every discipline is being generated at a tremendous rate of speed. But most of it is being published in the English language. Of course there are Russian and Spanish and Chinese and Japanese and other languages. But in general I think it's fair to say that on a world-wide basis the language of higher education is rapidly becoming English.

Nevertheless, the university which seeks to be relevant to its own national needs has some pressure to teach in its own language. I'm not making a judgement as to which is the best language for instruction, but I'm pointing to a dilemma.

A case in point is the new National University of Malaysia, which does its teaching in the Malay language. Almost all the faculty members received their educations in the English language, and their prior teaching experience, at the nearby University of Malaysia or elsewhere, has been in the English language. Thus, while they make a good honest try at converting everything to their local language, and seek to be in tune with local problems, it is a very, very difficult exercise.

Similarly, the universities which offer post graduate study in disciplines which are sorely needed throughout the world, tend to be in North America and in Europe. Thus,

university teachers in Latin America, in Africa, and in Asia, tend to have received their preparation based on examples, case material, and data which may be completely irrelevant to their local situation. The problems this makes for classroom teaching at the undergraduate level at home are almost insurmountable.

The lack of locally relevant text books is just a beginning. In some ways this situation forces the committed and creative dynamic university teacher, throughout the world, to also engage in research in his own discipline which is applied to the problems of people in the environment of his own institution. In this manner he is not only forced to stay up to date in his field, but he also acquires the data, the case material, and the examples which can make his teaching relevant.

Participation in extension education also serves a similar purpose. It forces the professor out of the ivory tower and into the real world where he learns dimensions of his discipline which enrich what he does later on in the classroom.

Bill Thompson and his colleagues in the study referred to earlier at the Punjab Agricultural University, were able to comment on program. They said: "owing to the conspicuous impact of the PAU on the agricultural production in Punjab,

public leaders have a high regard for the university."

They also state that "the increasing numbers of farmers who attend Kisan Mela at the Ludhiana campus, and field days at the regional research stations, the sustained interests in the training courses and camps conducted by the university and the calls that are made by the farmers on the PAU staff are evidences of confidence of farmers that the university can teach them as well as solve their problems."¹¹

In fact Thompson and his colleagues went on to say that "when one visits the farms surrounding the university, the farmers make you feel that their best blessing is the university. This confidence and the university's ability to manage well and deliver the goods leads some farmers to suggest that the university should be entrusted with tasks of providing supplies and credit as well for research and education."

In a recent paper on human resources for the development of African nations, Fred Harbison said "post secondary school enrollments in the sub-Saharan African countries (excluding South Africa) increased from 27,200 in 1960 to 68,080 in 1965, an average annual increase of nearly 25%. This means that the rate of increase in enrollments in higher education has been about 5 times the average annual increase in national income. It is clear, therefore, that the growth of higher education in

Africa has exceeded all expectations, and there is no sign of any significant slacking in enrollment expansion."¹²

Having made an over-generalized assessment of the expanding agricultural education and research capabilities in less developed countries in terms of their internal variables --let us turn for a few minutes to linkages. By linkages I mean the relationships between and among such institutions and between agricultural organizations and the other units in their countries which enable them to survive and persist over time, and through which they function in carrying out their programs.

On an extremely general side, the enabling legislation in most of the countries of the less developed world is quite adequate. Universities and research institutions are generally backed up by the kind of legislation which permits them to fulfill their doctrine. Too often, the functional linkage with the government -- either through a Ministry of Education or through a Ministry of Agriculture, doesn't provide adequate financial resources -- but more and more one finds the administrators of agricultural universities and research stations developing the kind of lobbying skill which enables them to be heard by legislative bodies and in the halls of government of their respective countries. They seem to be gaining in their ability to apply the kind of pressure which brings those financial resources.

A more exciting kind of linkage, to me personally, at least, is the substantive academic linkages among the agricultural education and research institutions of the world. These are growing in several ways, and offer tremendous promise.

In Indonesia, in recent years, the Ministry of Education, whose Directorate of Higher Education is responsible for the funding of universities throughout the country, came up with an idea which is different from the usual inter-university competition. They had just finished the years of turbulence on the internal political and military scene, and were entering a period of reconstruction. For this they said their institutions could no longer afford to compete with each other. Instead, they came up with the idea of "konsorsia." They formed a "konsorsium" of agricultural faculties. They formed another "konsorsium" of science and engineering faculties. And they have three other "konsorsia" in different fields. Each of these is an organization which has in it those colleges, or faculties, which focus on the particular disciplines included in the area.

The Indonesian Konsorsium of Agricultural Faculties consists of two senior faculties (one at the Institute Pertanian in Bogor and the other at Gadjaja Mada University in Jogjakarta). These are the oldest, established institutions, with the most

experienced faculty and staff, the largest numbers of students, the most adequate libraries and laboratories. There are 22 other faculties of agriculture throughout Indonesia and these are being served by the two most senior ones. The whole thing is sort of an operation "boot strap" in which those who are best off help those who are less well off, and they all grow together -- not only in their academic excellence, but in their relevance to the needs and the interests of the people of Indonesia, and in their ability to serve the human condition of that country.

Several Latin American countries have also organized Deans of Agriculture. Similarly, the university scene in today's world features certain international associations of universities. The Asian Council of Agricultural Universities and Colleges of Agricultural Science is in the process of drafting its constitution. The effort is being lead by Dr. C. K. Naik, who is Vice-Chancellor of the University at Bangalore in India. This group was formed after a recent traveling seminar, lead by North Carolina State University, in which university personnel from eleven different Asian countries worked together.

Actually, the agricultural universities and colleges of India are not only playing a leading role in the Asia-wide effort at inter-university cooperation, but have set a fine example within India. Let me quote a little bit from the

proceedings of the first convention and workshop of the 12 agricultural universities in India which took place in February of 1970. In a talk on the purpose and scope of the convention, Dr. S. R. Barooah, who is Vice-Chancellor of the Assam Agricultural University and Secretary and Treasurer of the Association of Indian Agricultural Universities said: "The main objective of this association is to help the development of agriculture in the country and to usher in an agricultural revolution throughout the country. The association in the last meeting at Bangalore decided that the first convention of the association should be held in February at Ludhiana to formulate policies and programs of the universities for their development, and also to assist the state governments, and the government of India in formulating their policies of agricultural development in the country."¹³

Notice that he's working on those functional linkages in terms of getting money from government.

He concluded by saying, "the agricultural universities are really the peoples' universities, and our aim should be to serve the people. We should keep in mind the objective that we must serve the needs and aspirations of the rural people of India."

There have been some attempts to global research projects for the solution of development problems. The United Nations Economic and Social Council has an advisory committee on the

application of science and technology to development. At their 14th session in February of 1971, the secretary general noted, "only one global research project -- research and training in the development of high lysine maize (GLO 1) has been approved and initiated so far. This project is being implemented by the International Maize and Wheat Improvement Center in Mexico with the advisory assistance of FAO. A second project -- Research on social and economic implications of large scale introduction of new varieties of food grains -- is being presented to the 11th session of the Governing Council. The work is to be carried out by the United Nations research institute for social development at Geneva."¹⁴

AID is making major contributions through the awarding of grants to certain U.S. universities to participate in international agricultural research efforts. Examples here would be research on grain-legumes, on soil and water development in arid and sub-humid areas, on sorgums, on certain nutrition projects, on the diffusion of innovations, and on agricultural marketing.

The other side of this picture is the international agricultural research institutions themselves. Sponsored by the Ford Foundation and the Rockefeller Foundation and others, these have made a significant contribution -- particularly in the development of germ plasm and cultural techniques

for food grains. The 1970 annual report of the Ford Foundation comments: "a world network of international agricultural research and training institutes continues to receive Ford Foundation support. The aim is to help the developing nations increase the quality, availability, and reliability of food production. Funded jointly with the Rockefeller Foundation, the U.S. Agency for International Development, the Canadian International Development Agency, the Kellogg Foundation, and others, these institutions conduct research to improve the productivity of wheat, rice, maize, and other staples. They help train agricultural scientists and production specialists, and make available seed and technical assistance. In 1970, Ford Foundation grants to the institutes for capital construction and operating expenses total \$5,593,982."¹⁵

These included the International Maize and Wheat Improvement Center (CIMMYT) located at Chapingo, Mexico; the International Institute of Tropical Agriculture (IITA) whose physical plant is being completed on a 2,300 acre site near Ibadan, Nigeria; the International Center of Tropical Agriculture (CIAT) in Cali, Colombia; and the International Rice Research Institute (IRRI), located at Los Banos in the Philippines.

One of the recent achievements at IRRI is a simple seeder that enables a man to sow one hectare in 5 hours, a rate 20 to 25 times faster than transplanting by hand."

That last observation triggers a question which should be gnawing at all of those concerned with agricultural research in less developed areas. One can generalize that the genius of agricultural research in the United States has been its ability to contrive labor saving devices -- continually reducing the number of man hours required to produce a higher and higher quality and greater quantity of food and fiber. But the real needs of the over-populated less-developed world are very different from this. It's refreshing to note that at the Indian Agricultural Research Institute in New Delhi, for example, they are working on ways of intensifying the labor use per hectare -- growing many different crops in sequence on one piece of land simultaneously, so that the number of man hours required is greater. Food production is also higher. This type of research seems much more in tune with the needs of the developing world than some of the American-type agricultural mechanization and labor extensification.

Another question one must raise in regard to the international institutes is the long-run impact of their role. One could question whether the establishment of an artificial, outside, high-level agricultural research institution in a place like the Philippines, or Colombia, for example, doesn't drain off the best of the local manpower, drain local financial support, and implant an institution which is neither

indigenous in character nor linked to the local resource base. The short-run payoff seems to be worthwhile -- particularly with respect to technology. But in the long-run, would it be better, although more difficult, to invest in the building of indigenous institutions, which have the potential of regenerating their own personnel as well as contributing appropriate knowledge in agricultural production? A long hard look needs to be taken at these issues -- but not by me this morning.

In closing, I would like to turn again to the linkages themselves -- perhaps the linkages in a worldwide network of agricultural education and research.

Much of our effort at technical assistance and institution building in the last two decades was based on the assumption of United States tutelage; on the assumption that the proper role for "developed and senior" U.S. universities and research institutions was to assist in the growth of the "less developed and junior" institutions abroad. Whatever its validity in the 1950's and 1960's, this assumption cannot be considered valid for the 1970's. We are entering an era of full partnership between United States institutions and their brothers abroad. The viable relationship for the next few decades will be one of linkage between equals.

Thus, the need and our attention, might well shift from the building of institutions, at home and abroad, to the

building of linkages between these institutions.

As summarized at a panel of this group, one year ago in Urbana, Illinois, within agriculture, the world-wide network of higher education and research is a desirable goal toward which all of us might well devote considerable attention.

Erv. Long, of AID addressed himself to these questions at the CIC/AID Workship at Purdue in August 1969. There, he said, "the imperative challenge to our ingenuity is not that of how to enable the less developed countries to parallel our scientific, technological and economic growth, but how to enable them to participate fully in it...we can build bridges to them, across which scholars and scholarship cross, and over which they can enter as participants in our progress."¹⁶

David E. Bell recently pointed to four major changes in the less developed countries which have affected the whole technical assistance program.

In his conclusion, Bell says, "in a sense, all the changes identified in this paper point toward the desirability of similar responses: to base technical assistance relationships more than in the past on cooperation between professionals and technicians in advanced and developing countries, to place greater emphasis on research and innovation as the heart of the process of technical advance, and to think of the results of

technical assistance in terms of their possible value to advanced as well as to less developed countries."¹⁷

And thus, I conclude my over-generalized and perhaps somewhat fuzzy assessment of the efforts to expand agricultural education research capabilities in the less developed countries. The picture, as I see it, is really very bright. In many countries agriculture is leading the way in higher education -- and certainly in the utilization of higher education and research in a direct effort to address the pressing problems of the day and prepare for national development in the future. But much more needs to be done -- and I have a feeling that it is less in the institutions themselves -- and more in the linkages among them that the future opportunity lies.

Through these linkages, if we develop them wisely, nurture them carefully, and see that they become appropriately institutionalized, academic personnel can become more efficient and more effective in seeking the truth -- and in improving the human condition in their own situations. Also, to the extent that these linkages are viable and endure, they can provide a worldwide network of higher education and research. These functional working relationships have a capacity to transcend temporary international animosities.

Thru such a worldwide network of higher education and research we can contribute significantly to the human condition.

FOOTNOTES

1. See Milton J. Esman and Hans C. Blaise, Institution Building Research -- The Guilding Concept, Interuniversity Research Program in Institution Building, Pittsburgh, Pennsylvania, mimeo, 1966; and Milton J. Esman, "Institution Building as a Guide to Action," Paper Presented to AID Seminar, Washington, D. C., December, 1969; and George H. Axinn, "The Application of the Institution Building Model," Paper presented at the annual meetings of the Rural Sociological Society, Washington, D. C., August, 1970.
2. Ira L. Baldwin, J. A. Rigney, R. W. Roskelley, W. N. Thompson, Building Institutions to Serve Agriculture, a Summary Report of the CIC-AID Rural Development Research Project, Committee on Institutional Cooperation, Purdue University, Lafayette, Indiana, October, 1968, page 3.
3. Aklilu Habte, A Forward Look, Haile Sellassie I University, Addis Ababa, September, 1969, page II-13.
4. The Philippines College of Agriculture, the University of the Philippines, Report to the Asian Agricultural College and University Seminar, Bangkok, 1970, page 1.
5. Calendar, University of Nigeria, Nsukka, 1966-1967, page 10.
6. O. P. Gautam, J. S. Patel, T. S. Sutton, and W. N. Thompson, An Assessment of Progress to 1970 -- The Punjab Agricultural University Indian Council of Agricultural Research, New Delhi, April 1970, page xi.
7. Guy Hunter, Modernizing Peasant Societies -- A Comparative Study in Asia and Africa, Published for the Institute of Race Relations, London, (Oxford University Press, New York/London, 1969) pages 184-185. Incidentally, it is interesting to note that the Americans who write about the development of universities in the "so-called" less developed world, tend to take the approach that everything started with their own period of intervention. Sir Eric Asby in his book Universities-British, Indian, and African, (Harvard University Press, Cambridge, Massachusetts, 1966) quotes from a report of Ramendra Sunder Trivedi, principal of Ripon College and fellow of the University of Calcutta, in a memorandum submitted to the Calcutta University commission of 1917-1919 as follows: "The University of Calcutta is all together a foreign plant imported into this country, belonging to a type that

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flourished in foreign soil. The importation was an urgent necessity of the time, suddenly created by the abrupt introduction of new conditions of life with a new order of political situation, the founders of the new educational system had not the time to study the ideals and methods that were indigenous: the new system was introduced in entire ignorance and almost in complete defiance of the existing social order regulating the everyday life of an ancient people."

Sir Eric comments on this as follows: "These reflections of a sensitive Indian scholar vividly illuminate the character of the policy Britain adopted initially in exporting universities to India. But as an explanation of how and why she did so, they are less instructive. To suggest that Britain acted on sudden impulse and in entire ignorance of the existing social system is to telescope time and to misjudge her purpose. Her defiance of the Indian scene was not unconscious, as Trivedi implied, but deliberate. The type of university Britain planted in India in 1857 was largely determined by a famous policy decision she had taken in Bengal some 20 years before; and this in turn had a history stretching back to the 18th century and the early days of British rule." (page 47)

8. Carl K. Eicher, Research on Agricultural Development in Five English-Speaking Countries in West Africa, (The Agricultural Development Council, Inc., New York, 1970).
9. Peter F. M. McLoughlin, Research on Agricultural Development in East Africa, (The Agricultural Development Council, Inc., New York, 1967).
10. Kasetsart University, Bangkok, Report to the Asian Agricultural College and University Seminar, Bangkok, 1970, page 2.
11. Gautam, Patel, Sutton, and Thompson, op. cit., pages 136-137.
12. Frederick H. Harbison, A Human Resource Approach to the Development of African Nations, The Overseas Liaison Committee, American Council on Education, Washington, D. C., 1971, pages 8 and 9.
13. S. R. Barooah, "Purpose and Scope of the Convention." in Association of Indian Agricultural Universities, Proceedings of the First Convention and Workshop, Ludhiana, 1970, page 20.

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14. United Nations, Economic and Social Council, Advisory Committee on the Application of Science and Technology to Development, Global Research Projects for the Solution of Development Problems (E/AC.52/L.100, 8 January 1971) page 2.
15. The Ford Foundation Annual Report October 1, 1969 to September 30, 1970 New York, 1971, pages 75 and 76.
16. Erven J. Long, "Philosophical Differences in Approaching Agricultural Technical Assistance," Paper given at the CIC-AID Workshop on Agricultural College and University Development, Purdue University, Lafayette, page 11.
17. David E. Bell, "On the Future of Technical Assistance," (a paper prepared in mid-1969 as a contribution to a volume of essays expected to be published by Houghton Mifflin, under the title Industrial Organization and Economic Development, edited by Jesse Harkham and Gustav Papanek) page 20.