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Training Agricultural Economists to Serve the Needs of a Changing World

Universities in the United States of America have built substantial teaching and research capabilities in international agricultural development since World War II. During the 1960s faculty members had many opportunities for overseas assignments in technical assistance projects and they were strongly encouraged to participate. It was also a period when increasing numbers of foreign students enrolled in US master's and PhD training programmes.

Demand for US graduate training by LDC students has continued at a high level through the 1970s. Studies by Stevenson[2] show a total of 9,600 graduate students entering MS and PhD programmes in some fifty US Departments of Agricultural Economics between 1969 and 1978. Thirty per cent (2,900) came from LDCs. In the period since 1974 about two-thirds came for MS training and one-third for PhDs. Over one-third came from Asia and one-fourth from Latin America. Twenty per cent came from Africa and an equal percentage from the Middle East. Numbers from Asia and Latin America have declined in the last ten years, while the flow of students from Africa and the Middle East has increased. Average yearly enrollment of new LDC students in US universities has increased about 20 per cent in the past four years, compared to the previous five.

The figures cited above reflect the continuing growth in demand for agricultural economists in the developing countries. Agricultural economics is a very new profession in the majority of LDCs and few countries have been able to initiate and/or consolidate their own graduate training programmes. There have been major increases in demand for MS level training from Africa and the Middle East where local training capabilities are very limited. With few exceptions, all LDCs need more PhD trained professionals to staff their teaching and research programmes.

At the same time that LDC demand for US training has continued to

* The authors acknowledge the contributions of the International Committee of the American Agricultural Economics Association to the study reported in this paper.[1]

increase, support for US university-based international work has substantially declined. Young US agricultural economists receive little encouragement to work in the development area and there are fewer opportunities for overseas contact and experience. This has left the US academic community with some sense of frustration as to how to maintain competencies in the economics of agricultural development and still serve the needs of LDC students who constitute over 30 per cent of graduate enrollments.

The training of foreign students has been an area of long-standing concern to the American Agricultural Economics Association (AAEA). In 1974, three regional seminars on international training were held prior to the AAEA annual meeting, where the conclusions and recommendations for improvement were presented. One of the recommendations was to make a follow-up study of former graduate students from LDCs to determine their current employment and training needs, and to obtain an evaluation of their US graduate training.[3]

In 1978, the International Committee of the AAEA obtained funds from the US Agency for International Development (AID) to conduct a major study with LDC alumni of US graduate programmes in agricultural economics on needs and strategies for improving US training in international agricultural development. This paper is based on the findings of the AAEA-sponsored study.

The basic source of information and data comes from 653 LDC agricultural economists, representing 79 countries, who studied in US universities over the past 15 years. These 653 respondents completed an eight-page questionnaire which was initially sent to nearly 2,200 LDC alumni of 52 US Departments of Economics and Agricultural Economics. In addition to the mail survey, in-depth studies were conducted in ten countries.[4] Major employers of agricultural economists, including graduate teaching and research centres, ministries of agriculture and national planning agencies, were personally interviewed to get their views on the usefulness of agricultural economists and their training needs. Leading professionals in each country were also asked to evaluate the strengths and weaknesses of US versus home country training and the country's needs in developing a more viable agricultural economics profession.

Principal objectives of the AAEA study were to (a) determine what has happened to LDC alumni of US universities in terms of residence and employment, (b) obtain an evaluation from LDC alumni of their US course work, thesis research, language training and programme guidance, (c) appraise agricultural economics training and research capabilities in the developing countries, including their current and future needs for training, and (d) assess possible ways the US profession can help strengthen these capacities in the LDCs. The purpose of this paper is to summarize results of the AAEA study and offer some conclusions relative to the objectives listed above.

EMPLOYMENT AND RESIDENCE OF ALUMNI OF US UNIVERSITIES

LDC agricultural economists trained in US universities are generally working in jobs for which they were trained. Over 40 per cent held university positions; another 40 per cent work in government, including ministries of agriculture, national planning and other state agencies; about 10 per cent work for private businesses and as professional consultants and advisors; and 10 per cent work for international agencies and foundations. Actual positions currently held coincide reasonably well with what the alumni indicated their goals were when studying in US graduate schools. The major divergence is the relatively high proportion working in administration positions in LDC governments and universities (30 per cent) compared to less than 4 per cent who indicated administration as their first employment goal.

Eighty per cent of LDC alumni of US graduate schools are still living and working in their countries of origin. On a regional basis Asia has lost the most US trained professionals (31 per cent) compared to a maximum of 15 per cent in any other region. On an overall basis 92 per cent of those with MS degrees only are still working in their home countries compared to 75 per cent of the PhDs. International development agencies and US universities have been the principal employers of PhDs who have emigrated from their countries of origin.

EVALUATION OF US TRAINING

The essential components of US graduate training in agricultural economics include completion of a set of formal academic courses, plus research experience through writing a thesis or research paper. Most graduate programmes have minimum course requirements in economic theory, quantitative methods, and in the basic subject matter areas of agricultural economics. The thesis research is designed to utilize economic theory and methods in a problem-solving activity. Masters and PhD degrees have similar objectives with the PhD having greater depth and breadth, and major emphasis on the research component.

In the AAEA study, LDC professionals were asked to evaluate their US course work and thesis research experience. What would they change if they were to repeat the process? What were the strengths and weaknesses of their US training and how could it be improved? What effect did this training have on their professional career development? Answers to these questions are important for US universities who continue to enroll large numbers of LDC students, and for the agencies and governments who provide support for their education.

Fourteen areas in which agricultural economists normally take formal courses were listed in the survey questionnaire. Each LDC respondent was asked to indicate the number of courses taken in each area and to

rank them as: extremely useful, very useful, moderately useful, slightly useful, a waste of time, or cannot tell. Space was also provided to write in courses not included on the list.

Courses in economic theory and quantitative methods were considered most valuable by the alumni surveyed. The top three areas in order of importance were micro economics, statistics and econometrics, and production economics. From 78 to 85 per cent of respondents ranked these courses as either extremely or very useful. Next in importance were macro economics, economics of agricultural development, mathematics, agricultural marketing, and linear programming, with 66 per cent or more of the respondents ranking these courses in the two top categories of usefulness.

Courses considered least useful were agricultural policy, trade and trade policy, land and resource economics, agribusiness, history of economic thought, and comparative economic systems. Many of these courses tend to be highly oriented to US and developed country institutions and situations. It is hypothesized that these rankings would improve if the courses were more relevant to LDC conditions.

Some consistent differences exist in the ranking of courses between respondents with PhDs and those with the MS only. PhDs consistently rank theory and methods courses higher and institutional courses lower than respondents with MS degrees. Those with higher levels of training evidently put greater value on analytical skills and tools needed for research. The PhDs also give more importance to history of economic thought and comparative economic systems, but even so, these courses still had low rankings.

When asked what courses they wish they had emphasized more when in graduate school, over 30 per cent of the responses were in the area of quantitative methods. Nearly one-fourth of the responses included traditional agricultural economics courses, with emphasis on marketing and agribusiness. There was little interest in giving greater emphasis to micro or macro economic theory, indicating most felt they had gotten enough theory when in graduate school. Again, PhDs were more interested in quantitative methods than were those with MS degrees.

There were essentially two areas of work where respondents would have liked more courses. One area was agricultural sector planning and policy analysis, including project development and evaluation (over 18 per cent of responses). These are topics which are not widely offered in US graduate programmes. Another area often discussed, but where LDC students usually do not get training, is in management and public administration. Ten per cent of the responses were in this area.

Nearly two-thirds of the survey respondents wrote master's theses. Ninety per cent of this group felt it had been more useful, or just as useful, as course work in their training programmes. Experience in the application of theory and quantitative techniques in problem analysis was considered extremely valuable.

Over half of the survey respondents with PhDs recommended doing

theses using an LDC problem and data, but to do most of the analysis and writing at the degree-granting US university. The major advantage is to become knowledgeable and contribute to the solution of a home country problem, yet close to the thesis committee and other US university infrastructure to facilitate degree completion. Only 15 per cent recommended doing all the PhD thesis research in the home country. The major problems are lack of thesis guidance and supporting services. Also, many become so involved in job responsibilities at home that no time is left for the thesis. Actual procedures used for thesis completion by the PhDs in the sample were approximately one-third each in the two approaches indicated above. The remaining one-third did their theses in the US on a US problem.

Major strengths, weaknesses and ways to improve US training were explored in the country studies. The strengths coincide with the findings of the mail survey. Most important is the comprehensive training in theory and quantitative methods which provides students with a strong conceptual and analytical orientation. Flexibility in programme and the depth and range of courses were also emphasized. It was felt that the course work structure gave a wider exposure to subject matter and prepared graduates to work in many areas. Good student–professor relations and infrastructure for research and learning were further positive aspects of US training.

Weaknesses of US graduate training in agricultural economics are found mainly in the lack of faculty perception of and application to LDC problems. Many would like to see more attention given to the political, social, and institutional factors in development. There is a need to "bridge the gap" between theory and application, to be aware of the shortcomings of neoclassical theory as well as its strengths in analysis. Another gap may be the lack of attention to Marxist-Socialist ideology. Students trained in the US are usually not well prepared to discuss intelligently the issues of alternative economic systems. Economic theory and quantitative methods taught in the US are considered very useful in countries such as Tanzania, but they stress that only mature students should come to the US in order to put their training in proper perspective.

Both employers and professional agricultural economists suggested that US training could be greatly improved if more professors had real knowledge and experience of LDCs, especially for student advising. It was also felt that courses should be broadened to include application to LDC problems and conditions. Many would like to see more attention given to economic development strategies and also to the more practical aspects of project planning and appraisal, marketing, and management studies. All seem to agree that LDC students need a broad range of training, including more application of theory and methods to their problems. Some changes can and should be made, but often there are time and funding constraints that limit students in taking advantage of what is available.

Employers of agricultural economists in the LDCs are somewhat more

critical of US training than professional agricultural economists. However, the same strengths and weaknesses are emphasized. US training is recognized for its rigour and strong analytical tools. It contributes substantially to the overall development of the student by giving a broader perspective of problems with emphasis on the scientific approach in analysis. This is considered especially important for training PhDs. At the same time, there is concern about the lack of focus and application to LDC problems. Some would like to see US training broadened to include more interdisciplinary work. When adequate MS training is available locally, most employers prefer it to US training. There is concern about those going to the US becoming disorientated to their local situations, especially when they are away for more than two years.

It is clear that much can be done to improve the relevance and application of US training to LDC problems and needs. Better student guidance, more international content in existing courses, and some new offerings in areas where LDC alumni indicate special concerns are some of the needed improvements. There was, however, little indication that the basic structure and content of training should be changed. Over 75 per cent of the respondents to the mail survey indicated US training had been extremely useful for their career development.

THE DEVELOPMENT OF AGRICULTURAL ECONOMICS IN THE LDCs

Although US universities have a strong commitment to the training of professionals from the LDCs, there is an underlying long term goal of assisting these countries in the development of their own graduate training capabilities. But this is a process that takes decades and the experience of the past thirty years indicate that it is often an elusive goal to achieve.

The level of professional development and the capacity to train agricultural economists varies widely among geographic regions, and among countries within these regions. Asia seems to have much greater professional agricultural economics capability than the other two regions. MS level training programmes are relatively well developed in several countries, including Japan, India, the Philippines, Thailand, Malaysia, Taiwan and Korea. Some of these countries also have PhD programmes. Within Latin America, Brazil currently has the most viable graduate training programmes in agricultural economics, while programmes previously established in Argentina, Chile, Colombia, and Peru no longer exist, or have been seriously weakened by political shifts within these countries. On the African continent, Nigeria has the strongest agricultural training capabilities, although Egypt, Kenya and Tanzania are also offering graduate degrees. Most African countries have very limited capacity for professional agricultural economics training.

The AAEA surveys in ten countries confirmed a widely held belief that

the demand for agricultural economists continues to exceed LDC training capabilities. Employers indicate a growing need for BS and MS level agricultural economists to fill staff positions in government ministries, credit institutions and parastatal marketing agencies. PhD trained economists are increasingly sought for positions in planning units, research institutions, and as faculty members in local universities. In LDCs that have moved up toward the middle income range there emerges a rapidly growing demand in the agribusiness sector for agricultural economists with BS and MS level training.

In countries where MS level training exists, employers generally expressed a preference for locally trained individuals over those trained in the US or other developed countries. They supported this preference with the observation that locally trained professionals are more familiar with local social and economic problems. However, professionally trained agricultural economists identified what they considered to be major weaknesses of existing master's programmes. These included: (1) lack of qualified faculty, (2) narrowness of course offerings, (3) lack of depth in many courses, and (4) inadequate teaching materials and computing equipment. It was felt that the faculty resource constraint is often worsened by the relatively low university salaries, making it necessary for professors to seek other part-time employment, or teach as a supplemental source of income while employed elsewhere on a full-time basis. In either case, graduate students have relatively little contact with their professors and very limited research supervision.

WAYS THE US CAN HELP STRENGTHEN LDC PROFESSIONS

In countries with limited professional capacity, the study indicates a continuing need for both MS and PhD level training in the US. In countries which have made substantial progress in establishing local training capabilities, there is a desire for US training at the PhD level in conjunction with several collaborative arrangements that would strengthen their own local institutions.

Joint degree offerings between a LDC and US university was posed as a means of combining the strengths of US university course offerings in basic subject matter with additional course work and applied research experience within the student's own country. However, due to the complexities of university degree-granting procedures, LDC professionals were sceptical about the administration of a joint degree programme. Several preferred more flexible arrangements that would enable students to obtain their degree from their own local university with an opportunity to spend one to two years in a developed country university taking course work and participating in other professional development activities. Upon completion of this portion of the graduate programme, the candidate would return to his local university to complete the research requirement for the degree.

Shared thesis advising, involving professors from US and LDC universities, is an option that had considerable appeal, both as a means of carrying out a "joint degree" programme and as a means of strengthening the training of students actually completing degrees with developed country universities. Several advantages of this arrangement were noted. For the student it provides an opportunity to complete a degree programme that has greater immediate relevance to the problems of his country. He is separated for a shorter period of time from his home environment. For the LDC university there is a potential advantage in having a qualified US professor collaborating with the student and other faculty members in the development of a research activity which not only produces a thesis, but also contributes to institution-building. For the US universities it provides an opportunity to develop a longer term institutional linkage that enhances the professional capacity of their faculties and, thereby strengthens their own graduate training programmes. Some possible disadvantages of "shared thesis advising" are the additional time for completion of degrees and added costs. There was also a concern that the degree candidate might become heavily pressured to teach and assume other professional responsibilities which would prevent completion of the thesis.

Joint research projects involving professionals from developed or less developed countries were seen as a means of extending shared thesis advising into a broader programme of research. Collaborative research teams could be formed to carry out contract research projects of importance to LDC governments and international development agencies. This would provide opportunities for further development of the research skills of young LDC professionals, while contributing to the need for research inputs into local development programmes. Collaborative research was also seen as a means to maintain viable long term professional networks that could bring together the efforts of experienced LDC and US researchers on important LDC problems. The difficulties of funding and administering these arrangements were recognized.

Several of the LDC professionals who have obtained PhDs abroad expressed a desire for sabbatical-type opportunities to upgrade their professional skills. Many feel relatively isolated from the mainstream of the agricultural economics profession. Some expressed the view that sabbatical programmes need to be carefully planned and rigourously administered. Others pointed out the high opportunity costs in countries with very limited numbers of trained agricultural economists.

In countries with the least professional capacity, there was a keen interest in having developed country professors for both short term and longer term assignments with the local universities. In the more advanced of the LDCs, there was an expressed interest in faculty exchange arrangements with US universities that would provide mutually beneficial professional development activities.

Employers and professional economists in the LDCs recognized that all training needs of agricultural economists cannot be met through

formal degree programmes. Some gaps are bound to exist in any recent graduate's education, due to time restrictions or curriculum limitations at the degree-granting institution. Even more important is the need periodically to update past training and learn new analytical techniques and/or concepts needed for better job performance. There is a tendency for LDC professionals to become isolated from the mainstream of professional development. Interaction with peers in their own countries also is often more limited and difficult.

Approximately 35 per cent of the mail survey respondents had participated in special, non-degree training programmes since receiving their US degrees. Additional areas for short courses most desired by LDC professionals included quantitative methods, agricultural sector planning and policy analysis. Management and administration were also mentioned frequently. US universities have not been active in this type of training, but it offers promising possibilities both for delivery in LDCs and on US campuses.

CONCLUSIONS AND RECOMMENDATIONS

The demand for agricultural economists in the developing countries considerably exceeds their capabilities to train MS and PhD professionals. For the past two decades a large part of this training has been provided by the US and other developed country universities. Our assessment is that these needs for US training and collaboration in LDC institution-building will continue at least through the 1980s. Even those countries with the strongest capabilities in agricultural economics want to expand their relationships with US professionals and universities. LDC enrollment in US master's programmes has continued to be high, but should decline somewhat in the next decade. Demand for PhD training will remain strong as will the need to form better linkages between the more developed and developing professions.

The major recommendations that are suggested by the study are as follows:

US Graduate Programmes

US graduate training in agricultural economics is highly regarded by LDC professionals and their employers. The basic structure of formal course-work and writing a thesis should be maintained.

Economic theory, quantitative methods, production economics and economic development should continue to constitute the subject matter core of graduate programmes.

Courses with a high institutional content, especially those related to US conditions are least useful to LDC students. There is a special need to introduce LDC problems and examples into courses such as marketing, policy, agribusiness and resource economics.

Additional courses should be given in agricultural planning and policy analysis, project design and evaluation, and primary data collection and analysis. These courses should be specifically designed for LDC students and for those from the US who want to work in developing countries.

The thesis option should be used for training LDC students at the master's level whenever possible. PhD students need to develop theses on problems from their own countries. Where possible, arrangements should be made to provide for data collection and initial analysis in the home country, with final writing and thesis defence in the US university.

Every US Department of Agricultural Economics that wants to maintain a significant LDC student group, should have several faculty members with a major commitment and continuing experience in international agricultural development. These professors would teach some of the key courses for LDC students, advise them on their academic programmes, and serve as advisors in thesis research.

Within the limits of time and resources, LDC students should be trained broadly because of the many roles they must fill at home. Courses in public administration and management should be part of the programme.

Strengthening LDC training and research programmes

LDC professionals have a very positive attitude towards more collaboration with US agricultural economists. Joint degree arrangements, shared thesis advising and training more PhDs in the US are most commonly recommended. There is also a continuing need to increase LDC faculty competence through post-doctoral programmes, short courses, and seminar activities. Specific recommendations are as follows:

There is a pressing need to continue training PhDs outside the developing countries. Even a country like India, with its own doctoral programmes, wants to keep some US-trained PhDs flowing into their professional group. Most LDCs have no doctoral training capabilities and the rest have extremely limited capabilities for PhD training. PhDs are greatly needed to staff academic programmes and to guide and conduct research.

Joint degrees and shared thesis advising should become a growing dimension of the collaborative relationships between LDC and US universities. US course work can provide needed background in theory, quantitative analysis and research methodology. LDC course work can give a greater understanding of local development problems and institutions. The combination of course work can then be drawn upon in planning and conducting thesis research. In some instances, thesis advising may be shared by professors from both LDC and US universities.

Joint research projects can extend the collaborative arrangements

linking the LDC and US universities, but usually require considerable initiative to arrange and finance. International funding agencies are showing greater interest in collaborative research programmes.

Post-doctoral sabbaticals in the US should be considered for LDC professionals who have at least five years of active experience in their home universities or research institutes since completing their doctoral studies. These awards should be reserved for outstanding young professionals with a serious commitment to continued teaching and research in their own countries. In countries like India, Brazil, Egypt and Nigeria, where the profession is reasonably well developed, there is a great need for more mature leadership to help define national policy issues, set research priorities and give guidance to graduate training.

Short courses, seminars and workshops should be given greater emphasis in a comprehensive strategy for professional development. These can be planned and carried out with LDC institutions collaborating with US university faculty and international development agencies.

Professional associations are an important complement to developing strong professions of agricultural economics in the countries surveyed. They can do much to promote greater communication and interaction among professionals and help alleviate problems of isolation. National meetings, workshops, seminars, and publication of a journal are some principal means used to facilitate peer review and professional development. Formation of LDC associations should be encouraged by the IAAE and other associations like AAEA.

NOTES

[1] This paper is a preliminary report on the AAEA study. A more complete report will be available in late 1979.

[2] Stevenson, Russell "Graduate Students from Less Developed Countries: The Continuing Demand for US Training", *AJAE*, Vol. 61, No. 1, February 1979, pp. 104–6; also, "US Graduate Students from Less Developed Countries", *AJAE*, Vol. 56, No. 4, November 1974, pp. 816–8.

[3] "International Training in Agricultural Economic Development," L.P. Schertz, A.R. Stevenson, and A.M. Weisblat, editors, published for the International Committee of the AAEA, Agricultural Development Council, 1976.

[4] These countries include India, Indonesia, Nepal, Kenya, Nigeria, Tanzania, Egypt, Brazil, Colombia, and Guatemala. The country surveys provide a useful supplement to the mail survey, but should be regarded as a series of case studies, rather than a representative sample of country situations.

DISCUSSION OPENING – G. STEFFEN

First I would like to express our thanks to Dr Fienup and Dr Riley for their contribution about training agricultural economists in a changing world. I am sure that we can take this as a basis for a useful discussion.

An important result is the fact that 80 per cent of the LDCs' agricultural economists are working in universities and governments. These jobs must be very attractive.

A high proportion of the alumni changed their goals, especially to administrative positions. Could we know more about the reasons why administrative work is so attractive in comparison to other activities?

It seems to me a success for my American colleagues that about 80 per cent of the former students ranked economic theory and quantitative methods as most valuable. In my experience these subjects are not easy to teach. I am not sure that European students will evaluate our lessons about theory in the same manner.

Concerning the PhD thesis, more than 50 per cent of the survey respondents thought it was better to write the thesis at a US university. I wish to ask whether this method will give good results compared to the alternative of writing the thesis at the home university. It might be difficult to get the necessary data or to see the real problem which should be solved.

Interesting recommendations have been made to improve the development of agricultural economics in the LDCs. One proposal which seems to me very effective is to involve professors from the US in teaching and research activities. Do you believe that the present capacities of your own universities are big enough to do two jobs – teaching and research work in your own universities *and* abroad? Or will extra funds be needed to pay for additional staff? I see some difficulties in European countries with an increasing number of students, if the state is not ready to pay more money for additional staff who will work in LDCs.

My final comment is that it would be useful to do similar research work to evaluate the activities of other countries which are involved in the same work. For this purpose it is necessary to develop some criteria to judge the work in different countries so that we can compare the results.

GENERAL DISCUSSION – RAPPORTEUR: C. PEMBERTON

In the general discussion the view was expressed that there was need for a similar study every five to ten years. This would show up differences which will occur when US graduates teach their own students. Second and third generation responses are needed. The major role of US training appeared to be to provide individuals for governmental institutions and universities in the LDCs. But was the training of workers to deal with problems of the countryside adequately covered?

One speaker with long experience of bringing students from developing countries to the US for training felt that at the beginning he had confidence that the students would get training relevant to problems of their own farms and marketing systems but as the orientation of US training moved towards theory and mathematical procedures, he now had less confidence that US training could equip LDC students to deal

with practical problems. Academics in Asia are very scholarly in their attitudes and tend to insulate themselves from real problems. Such an orientation allows these students to obtain high grades in the US universities, but they do not have to come to grips with practical problems. For these reasons he felt that there may be a bias in the sample of scholastic-oriented persons and was not confident that there had been success in training for solving farming problems.

Valid suggestions were given in the paper on follow-up training for US graduates in the LDCs, but some comments on how these recommendations may be implemented would be welcomed.

In reply to the last point, Dr Riley agreed that publication of the results of the AAEA study was not sufficient in itself. Workshops would be held with US universities and international organizations to discuss the results, and some discussion of the results took place at the last AAEA meeting in Washington. The long term strategy must be to have all training for LDC agricultural economists in the LDCs. A start had been made with MSc programmes in different countries. For a longer period it is likely that PhD training will take place in the US but the results of the study indicate better ways of carrying this out.

In answer to the question expressing concern over the relevance of training of LDC students in the US Dr Fienup felt that there was a declining role for US institutions to train LDC students, especially at the MSc level. MSc level training was best kept pertinent to local conditions by having this training done in the LDCs and the results of the country studies supported this view. Similarly US universities cannot train LDC agricultural economists effectively for work in the countryside of LDCs. This should be done in the LDCs. He agreed that second generation training would be more relevant to local conditions.

Regarding the opener's remarks about US professors holding jobs at home and in the LDCs, this would have to be studied further. Many young professors in the US desert their interest in development studies because of lack of tenured positions and research funding. Manpower will be needed to provide such training in the LDCs.

Participants in the discussion included Rufus O. Adegboye, Vance W. Edmondson, Ardron B. Lewis, Donald S. Ferguson.