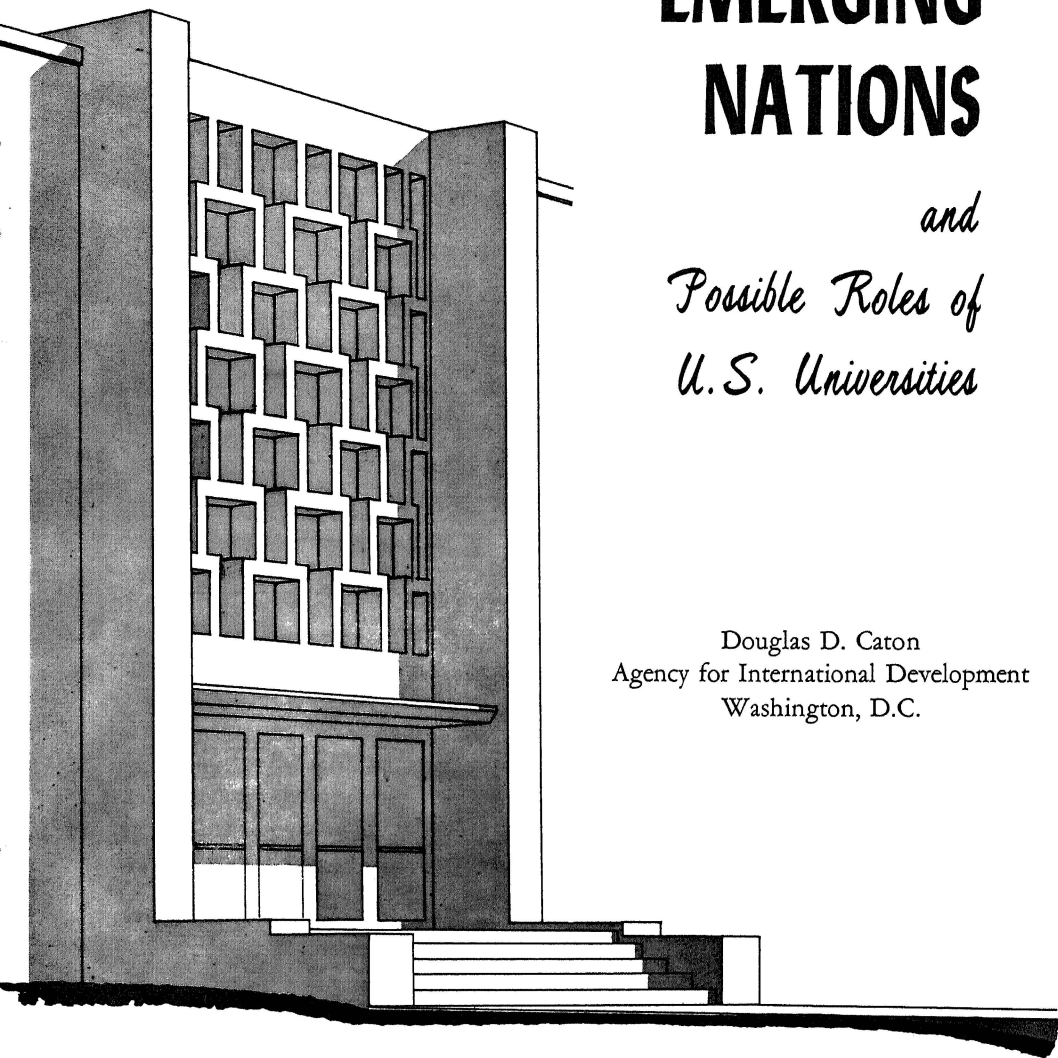


Agricultural Problems of

EMERGING NATIONS

*and
Possible Roles of
U.S. Universities*

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AGRICULTURAL PROBLEMS OF EMERGING NATIONS AND POSSIBLE ROLES OF U.S. UNIVERSITIES

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Dr. A. H. Moseman, the Assistant Administrator for Technical Cooperation and Research of the Agency for International Development, regrets that he cannot be with you today. India, a country which your University and A.I.D. has a mutual working relationship, is faced with some very difficult food problems and Dr. Moseman is there now helping draft plans for further U.S. assistance to that country. Later, in discussing some of the programs needed to meet the impending food problems of the less developed countries, I should like to again refer to India because it is in that country that the food situation appears to be most critical.

Although the current U.S. interest in agricultural development is focused largely on the food problem, we must not overlook other reasons why it is important for the less developed countries to develop their agriculture. In brief, to sustain general economic development, agriculture must maintain output at required levels, become more efficient, produce the products needed not only for food but for foreign exchange earnings, and be a capital and labor supplier and a market for the products of other sectors. General economic stagnation is the price many of the less developed countries are paying for not giving adequate attention to the development of the agricultural sector. In most of these countries, a high proportion of their people are farm people. The people of the agricultural sector have not only an obligation to contribute to the over-all development of their country, but they have a right to share in the benefits of economic growth. At the same time, they can neither contribute to nor share in that growth unless the productivity of their land and their labor is increased.

The Current Food Problem

Getting back to the food problem, I should like to review the current situation and outlook with you.

The USDA has completed, with AID financing, a preliminary study and published a report of the agricultural situation in 26 developing nations. These 26 countries represent some 75 percent of the population of the underdeveloped countries and approximately the same proportion of U.S. foreign assistance efforts. In the 26 countries, the compound rate of growth from 1948 to 1955 averaged almost 4½ percent per year. Thus, it might be assumed that they were doing quite well but in terms of their ability to satisfy the growing food needs of an in-

creasing population, a number of the countries are falling behind. The critical problem is that the crop production increases attained during the early periods have not been sustained during the past decade. And, continuously, more countries are falling behind population and demand growth rates so the over-all food situation appears to be getting worse rather than better.

While I know of no dire predictions from government agencies some non-government sources have warned of serious famine conditions for the underdeveloped world in the not too distant future. For example, Dr. Raymond Ewell of the State University of New York at Buffalo has stated:

“The food/population problem seems likely to reach such enormous proportions by 1975 that it will dwarf and overshadow most of the problems and anxieties which now occupy our attention, such as the threat of nuclear war, communism, . . . Vietnam . . . and the like.” He further warns: “These current problems will fade into the background as the enormity of the world food problem impresses itself on the western world.”

Scope of Current AID Agricultural Development Program

During fiscal year 1965, AID financial commitments for agricultural development in the less developed countries amounted to approximately 105 million dollars. As of the end of last calendar year, there were about 1300 U.S. agricultural technicians working in the less developed countries. Six-hundred of these were under university and other contracts, 180 were provided by other government agencies through agreement with AID, and 520 others were direct hire employees of AID. In addition, over 100 short-term consultants were assigned overseas for periods of three months or less. However, the direct hire component of the technical advisors serving overseas under the U.S. foreign assistance program has been decreasing during the past several years—in fact, some 30% during the last three years. This reflects AID policy of shifting a number of aspects of agricultural technical assistance activities from direct hire to university contracts or other arrangements. Under the university contract program, there are now 26 American universities engaged in agricultural activities in 26 countries. This includes the University of Missouri program in India where you are contributing so importantly to agricultural and institutional development.

Common Problems and Obstacles to Agriculture Development in Less Developed Countries

In spite of apparent differences, common problems or obstacles to development are found in all less developed countries. The more important of these are:

- a. Rapid population growth severely limits the capacity of agriculture to

perform its historical role in accelerating national development, as disproportionate amounts of its production are used to feed the expanding population.

b. Economic institutions affecting rural development often are highly inadequate and inflexible. Farmers lack incentives to increase agricultural production. Instead, they encounter such disincentives as relatively low prices for products sold, relatively high prices for goods purchased, high rents and interest rates, and scarcity of consumer goods.

c. Political institutions designed for traditional maintenance of peace and order are not adequate for accelerating agricultural development. National planning and administration are in many cases over-centralized, which limits initiative. Inadequate numbers of trained administrative and technical personnel, concentrated in national and provincial capitals, not only are inexperienced in working with rural people but also are often unresponsive to felt needs of rural people. Generally, host governments lack the will or the ability to commit adequate funds for rural development. The widespread shortage of roads, transportation, safe water supply, schools, credit agencies, markets, farm supply agencies, agricultural and health technicians, mass communications media, and effective local organizations reflect accumulated rural neglect over many decades.

The production inputs needed by farmers are in short supply or quality, such as economic-size farms, fertile soils, favorable climate, capital or credit, improved seeds, fertilizers, pesticides, suitable farm power and equipment, and modern methods or skills.

d. Rural people largely are illiterate, often slow to respond to change, and subject of technical considerations frequently beyond their ability. Culturally conservative, rural people in the less advanced countries function at a minimum level of survival. They are reluctant to assume risks which threaten their subsistence, security and values. Furthermore, the rural citizens' low status, economically, socially and politically, has aggravated fear and suspicion of government officials and outsiders. Nevertheless, often through the development of local leadership and farmer involvement in planning and developing local programs, and proper local government, the development process has been materially encouraged, and local peoples made responsive to agricultural improvements (in East Pakistan, for example).

e. Host governments and AID in the past have been frequently remiss in differentiating requirements of long and short-run programs in the agricultural development process, and between the requirements needing large capital outlays; e.g., irrigation systems, land settlement schemes and public buildings, and those measures which can furnish production incentives to rural people at relatively low cost; e.g. reduction of rents and interest rates and equitable services.

f. Rural development programs and projects frequently suffer from lack of continuity or sustained interest, changes of leadership, vacillating fiscal support and avoidance of such vital and inseparable issues as land reform, decentralized government, involvement of rural people in planning activities, family planning and adult education.

Technical Assistance—An Essential Component of our Foreign Assistance Program

At this time since the food production growth rate problems of the less developed countries merit highest priority technical assistance attention, special efforts should be made to step up technical assistance supply rates, and to make more effective use of the supply of technical assistance available. Supplies of technical assistance also must be given the backup support of a greatly expanded agricultural research program. The food demand problem is so critical and appears so likely to remain critical, that the one to two percent of skilled agricultural personnel normally available from donor countries for technical assistance assignments is not nearly adequate. In addition, more agricultural research is required because donor country technical knowledge and skills on crops, livestock and production practices has proved not to be directly transferable to the food production growth rate problems of the less developed countries.

Also, since the food demand problem cannot be corrected by a massive reallocation of capital from other economic sectors—which would lead to economic stagnation—increases in food production must be based on technical assistance and research, on more effective programming of these inputs, and on more effective country programs. These food production development activities must be supported by the correct amounts of capital, both internal and external—amounts which are consistent with the relative rates of return to capital between the agricultural and non-agricultural sectors.

In view of the emphasis on the amounts and quality of technical assistance that can be supplied the agriculture of the less developed countries, it is significant that a majority of the crops and livestock being produced in these countries are also extensively produced in the United States and other advanced countries. Therefore, although the fund of scientific knowledge and institutional experience in the advanced countries may not be directly transferable to the needs of the less developed ones, the necessary adjustments and adaptations to make this available knowledge and experience usable by them are within reach. Partly, the necessary adaptations will come through applying the competence of the technical assistance worker to the specific problems of the less developed countries, and partly the adaptations will come through research specifically designed for the purpose.

The U.S. has supplied teaching, research, extension, and food production knowledge and experience from the U.S. Department of Agriculture and other United States Federal agencies, from the Land-Grant College and University system, and from AID. We presently have a considerable reservoir of technical knowledge covering many of the types of food production problems of the less developed countries and large groups of trained professional personnel competent on many of these problems and capable of quickly adjusting to the food production problems. In addition, the non-profit organizations such as the

Rockefeller and Ford Foundations, and the private industry sector, stand ready and are capable of supplying outstanding technical assistance.

The extent to which we will be able to increase the percentage of technical assistance participation above current levels is not known. An expansion in our technical assistance participation, from all sources, might well occur; however, we have no way at this time of precisely estimating the amount of the anticipated technical assistance that can be supplied. The non-profit organizations have definite limits on funds and personnel. The Universities are struggling hard to keep up with rapidly growing student enrollments. And our Federal agencies are being charged with ever increasing responsibilities. But the universities and other public and private agencies recognize the great importance of this work and will undoubtedly respond to its challenges. Private industry also looks very promising as a source of supplies of technical assistance and we are hopeful in regard to this source of supply for certain types of personnel.

Steps Taken to Enlarge the Supply

To enlarge the source of supply AID has engaged in a very extensive process of developing more effective working relations with the Land-Grant Universities, the Department of Agriculture, and other public and private sources of technical competence. Specifically, AID has worked with the U.S. Department of Agriculture to organize an international agricultural development staff, under an Assistant Secretary of Agriculture for International Affairs. This activity with strong support from the Secretary of Agriculture and his immediate staff, has resulted in a substantial increase in the participation of USDA scientific and other professional personnel in AID technical assistance programs.

AID has similarly improved its working relations with the universities. At AID's request, Mr. John W. Gardner (our present Secretary of Health, Education, and Welfare) carried out an extensive study eventuating in a report entitled *AID and the Universities*. This study was a direct contribution to enlarging our capabilities to mobilize agricultural specialists from the universities. Concurrently with these two efforts, several additional steps were taken to expedite AID arrangements with universities specifically in the field of agriculture and rural development. A first and important step was work with the Association of State Universities and Land-Grant Colleges in setting up an International Rural Development Office. This office of the Association serves to improve liaison between AID and the university community on all matters pertaining to agriculture and rural development—technical assistance, research, the training of foreign nationals in our universities, and related matters.

Growing out of this improved liaison, the AID, the USDA, and the Association of State Universities and Land-Grant Colleges sponsored in July of 1964 a conference on International Rural Development. This Conference was attended by high ranking university officials from all but two of the 50 states of our country. This conference provided an opportunity for thorough discussion

of the problems, and the necessary measures to be taken to further the purposes of international rural development assistance. Your own university president, Dr. Elmer Ellis, played a leading role in that Conference.

Consequent to the Gardner Study and the Conference on International Rural Development, several changes of far reaching significance have been made in our contractual and other relationships with the Universities which we feel will in time importantly and favorably affect both the quantity and the quality of the technical assistance personnel available. To a much higher degree than previously, the AID, the USDA and the Land-Grant University community now look upon the international assistance effort as a necessarily joint enterprise in which each has an appropriate role and responsibility.

How the U.S. Might Help India Meet its Food Crisis

In my opening remarks I mentioned that I should like to again refer to India. Although Indian problems are probably more acute than those of any other country we are assisting, the problems of India are indicative of the obstacles of food production and agricultural development in many of the other less developed countries.

India's food grain production in 1965 is estimated to be 7 million to 10 million tons short of the record 88.4 million to production in 1964. It will be some 10 to 17 million tons short of actual food requirements.

In assessing the present food deficit situation in India, it is well to consider recent trends in production over the past five years. In the report on *India's Food Crisis and Steps to Meet It*, by the Agricultural Production Team sponsored by the Ford Foundation in 1959, it was suggested that a third plan target of 110 million tons of food be required by 1965-66 and that this target would be realized only by an all-out emergency food production program. Since the above report was published, in April 1959, there has been essentially a leveling off of food grain production, as follows:

1960	78 million metric tons
1961	80 million metric tons
1962	80 million metric tons
1963	82 million metric tons
1964	88 million metric tons

During the past five years, the Government of India has taken steps (although belatedly) to implement certain recommendations of the Ford Foundation team relating to a so-called "Package District" in seven of the 325 districts. The Government of India has furnished substantial financing for this package program, as has the Ford Foundation, with leadership from highly competent U.S. personnel employed by the Ford Foundation. Other recommendations of the Ford Foundation team as related to countrywide programs to provide for adequate research, farmer incentives, production inputs, and know-how have been largely ignored.

After four years of operation, production in the "Package Districts," is reported to be 35 percent higher than at the outset of the program. However, the areas represented in relation to all of India, are so small as to have an insignificant effect on total food supplies. And the gains within the "districts" were obtained, to a considerable degree, by depriving other areas of needed fertilizer, seeds, credit and technical assistance. While the 35 percent increase in production represents a reasonable accomplishment it is less than half of the goal originally set. There are various reasons for this lower level of accomplishment, but one rather obvious deficiency was the failure to give adequate attention to the combined technological inputs of improved varieties, fertilizers, and pest control practices. For example, with the use of the highly productive rice variety Taichung Native 1 (from Taiwan), yields at 20 locations ranged from 6800 to 9000 kilograms per hectare. These yields are approximately four times the average paddy rice yield of the district.

Moreover, it has been demonstrated in the United States, Canada, Western Europe, and in Mexico, that well organized systems of agricultural science and technology can furnish the base for the doubling and tripling of crop yields within periods of 10 to 20 years. The increase in the national average yield of wheat in Mexico, from approximately 11 bushels in 1943 to 39 bushels in 1964, is evidence that this level of progress can be achieved in traditional agricultural systems. Production incentives must be of this magnitude or greater. The possibility of small gains is not enough of an inducement for a farmer and his family, and the prospect of a 50 percent increase in yield is of the magnitude really required to overcome the lethargy associated with traditional farming.

In view of the importance of research and technical assistance, the experience of AID and its predecessor agencies must be reassessed. We find there has been a lack of concerted effort on research and on efforts to provide technological inputs of the significance of Taichung No. 1 rice or the improved Mexican wheat varieties. Major emphasis in the first decade of the Point IV activities was on efforts to extend U.S. farming "know-how" without adaptation accounting. The scientific inputs were scattered, isolated, and largely uncoordinated, with no infrastructure or science matrix in which to inbed the technical contributions made by the limited numbers of U.S. specialized personnel.

Major deficiencies in the efforts of AID, its predecessor agencies, and other organizations cooperating in agricultural development in India and elsewhere have been: (1) the lack of concentration on integrated or coordinated nationwide, regional and state programs and (2) the lack of emphasis on new biological and physical inputs from research that should be combined to bring about the magnitude and continuity of change required.

Suggested A.I.D. Assistance

With regard to India, any attempt by the United States to help meet food requirements will be largely futile unless the Indians themselves: (1) have the

will to put forth the efforts required by the urgency of the situation, (2) allocate resources toward this effort to the fullest extent of their capability, (3) correct those organizational and administrative shortcomings that have impeded aggressive action in the past, (4) adopt policies favorable to private enterprise so this sector of the economy can make its appropriate contribution, and (5) establish favorable price and other incentives so the farmers will be justly rewarded for their extra efforts.

In addition, India should recognize that it needs technical assistance as well as capital assistance. India has been much too prone to consider needs for external capital without recognizing the significance of technical shortcomings—especially the applied science required to build a continuously more productive agriculture. Steps should also be taken to insure more effective use of technical advisors in India since the present system is wholly inadequate. Technical advisors should not occupy decision-making positions but they should be sufficiently active in the operations and enmeshed in the organizational structure to help assure that decisions are based on reliable information and procedures are followed that will achieve the desired goals.

Strengthening Adaptive Research

A first priority need is to strengthen the Indian program of adaptive research. The improvement of varieties of the principle food crops, and getting seeds of these varieties into the hands of farmers is an urgent need. On this regard the Rockefeller Foundation, in cooperation with the Government of India, is supporting effective research on the improvement of sorghum, millet and maize.

The maize improvement scheme is well along, but further support and strengthening of the sorghum - millets research is needed. A national coordinated wheat improvement program is just now taking shape. A national scheme for rice improvement research is yet to be implemented. Essentially what is now needed is a nation-wide program with adequate financial and technical support, and with coordinated leadership from the central government, working with and through a network of state operated research facilities, that will permit appropriate regional adaptation studies for selection of improved varieties of the principal food crops.

For example, the principle source of new materials and methods for improving rice production in India is the International Rice Research Institute (IRRI), at Los Banos, the Philippines. The Institute, with a staff of 28 scientists in the various research disciplines related to agriculture, is giving attention to essentially all problems related to rice culture.

The Institute has developed and maintains a world collection of rice varieties that presently numbers more than 10,000 strains or selections. Many of these have been evaluated in field and laboratory trials, and are available for testing in different areas of tropical Asia. These improved selections include materials

developed at various research centers in the "rice bowl" as well as from the Institute's breeding program which was initiated in 1962.

The agencies that would collaborate in an expanded rice improvement program would include the central government of India, the Indian Council of Agricultural Research, the Indian Agricultural Research Institute, the state governments and the agricultural universities, together with the research stations of the rice growing states, and the U.S. Land-Grant Universities cooperating in the rice growing areas. The International Rice Research Institute would furnish the principle basic and background research.

Each of the contract U.S. Land-Grant Universities would require about ten additional personnel, to give attention to the adaptive research in rice breeding, soil and water management, pest control, economics, marketing, and to the organization of extensive test-demonstration programs that would insure maximum effectiveness in convincing rice growers to adopt innovations. Provision should be made for an equal number of U.S. graduate students annually from each of the participating U.S. universities.

The program that I have described for rice is indicative of the expanded effort that is also needed for wheat, corn, sorghum and millet improvement.

In this agricultural development effort, the University of Illinois, Ohio State University, and the University of Missouri would be the principle non-Indian collaborating agencies, with close cooperation also from the International Corn and Wheat Improvement Center in Mexico. The adaptation of the Mexican dwarf or semi-dwarf wheat, that has yielded over 100 bushels per acre, and can utilize and respond to 120 pounds or more of nitrogen fertilizer (in contrast with about 40 pounds of it for Indian varieties) should furnish immediate impact on Indian food supplies.

Another equally important technical assistance effort is needed to help the states get the results of research to the farmers along with the production inputs of fertilizer, seeds, pesticides, tools, credit, and the incentives that will make it possible for the farmers to do a better job of farming. I will not go into detail on what would be involved in this extension and production effort but we would hope, if the U.S. is involved in it, that the universities presently in India under contractual arrangements with A.I.D. will carry a major share of this technical assistance and advisory load.

Obviously, the suggestions for India that I have just outlined are illustrative only—the details as to the extent to which they might become a reality must be worked by the Government of India. I think we can say, however, that there is, in the offing, a greatly enlarged role—and responsibility—for the Universities in India and in other countries if the U.S. is to make a significant contribution to the solution of the food problem.

Future Role of the Universities

As an indication of the acceptance of the importance of technical assistance to agricultural development and the contribution the Land-Grant Universities

can play, I should like to quote from the President's message on Foreign Aid, delivered to Congress January 14, 1965. Among other things he said:

"In the years ahead, if the developing countries are to continue to grow, they must rapidly enlarge their capacity to provide food for their people. Up to a point, they can and should improve their ability to buy some of their food abroad. For the most part, however, they must expand and diversify their own production of food. This will require many things: changes in traditional methods, abundant use of fertilizer, greater incentives for producers, and, frequently, changes in pricing practices and more effective organization of distribution.

"To meet their needs for food, the developing countries will need help.

"We, in the United States, are uniquely equipped to give it.

"We are rightly proud of our dynamic and progressive agriculture, with its record of success which contrasts so sharply with agricultural failures of the Communist countries. We must use our agricultural abundance and our extensive technical skills to assist the less developed countries to strengthen their ability both to produce and to buy agricultural commodities and, more generally, to support rural development.

"We can and must mount a more comprehensive program of technical assistance in agriculture engaging the United States Department of Agriculture, our state universities and Land-Grant Colleges, and the most creative of our people in agriculture, marketing and industry . . ."

At the Conference on International Rural Development, held in the summer of 1964 and referred to above, President Johnson told us:

"In our national character, one trait has run unbroken. It is the trait of putting the resources at hand to the fullest use—to make life better tomorrow for those who follow." In making this statement, he was mindful of the fact that the major resource of this country is the technical know-how of the Land-Grant Universities in ways and means of improving agriculture. That know-how generally needs some adaptation in applying it in the less developed countries. But, here again, the Land-Grant Universities have had much experience in adaptation and change—they have had to in order to carry out the leadership role they have exercised—and shared—in agricultural development of this country.

I think I can assure you that those who determine the policies concerning our foreign assistance program have determined that the program will, in the future, give increased attention to agricultural development and food production. I can also assure you that they are thinking in terms of greater involvement of the Land-Grant Universities in order to meet U.S. objectives. From my experience and association with a Land-Grant University, I am sure the universities will help fulfill the hopes of our policy makers, as well as the aspirations of the millions of ill-fed, ill-clad, and ill-housed people of the underdeveloped part of the world in which we live.