

Employment:

Agricultural and Agribusiness Occupations

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Abstract

This article reports an employment study by a national committee of education, labor, and agriculture members that used data from the Census of Population. Employment in occupations requiring agricultural competencies totaled 8 million, but should be adjusted upward by a million or more additional farm workers. Data are also presented by states. Implications are that, in the face of the large world demand for food, a great deal of work is needed in education in agriculture at all levels.

Obtaining useful data on employment in farming and related occupations has concerned educators, agricultural economists, and sociologists for a number of years. Data on farm operators, family workers, and hired farm workers are available from reports by the Bureau of the Census; but information has been lacking on employment in off-farm agricultural jobs.

The lack of data may have led some persons to conclude that little opportunity for employment exists for persons trained in agriculture. For example, an Illinois Board of Vocational Education report in 1967 listed agriculture as the only major industry losing workers; however, use of the word "agriculture" seemed to be synonymous with farming, as has often been the case, rather than including other phases of the industry (Illinois Board of Voc. Ed., p. 16).

The Vocational Education Act of 1963 changed vocational agriculture as it had operated under the Smith-Hughes Act of 1917. The Smith-Hughes Act made education in agriculture available through supplementary federal funding for "persons over 14 years of age who have entered upon or are preparing to enter upon the work of the farm or the farm home." The 1963 Act broadened the training to include those occupations which involve "knowledge and skills in agricultural subjects, whether or not such occupation involves work of the farm or of the farm home" (U.S. Dept. of HEW, p. 14). The Act also provided that training programs in all areas respond to training needs. Therefore, it became essential for vocational educators to have data on various kinds of employment in the broad agricultural industry.

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This article reports the results of a study conducted to obtain a better indication of agricultural and agribusiness employment. The full study citation is: U.S. Department of Agriculture, Economic Research Service, **Employment in Agriculture and Agribusiness Occupations**, by United States and Standard Federal Regions, ERS 570 to 580, Aug.-Dec. 1974.¹

As stated in the study's introduction the purpose was to provide more information about the agribusiness sector of the economy as related to conducting formal education and manpower training programs. This information was needed to provide data on the composition of the agribusiness sector, its demographic makeup, expansion or contraction, future problems, and competencies needed by workers.

Events Leading to the Study

In the mid-1960s, undoubtedly in response to the Vocational Education Act of 1963, leaders in the Federal government set up a National Committee on Employment Opportunities and Training Needs in Agribusiness. In 1972, the National Agribusiness Manpower Project was established, with the report on employment the first phase of the project.

The subcommittee on the employment phase had background in agriculture, education, and labor. An agribusiness occupation, as defined in the study, requires or utilizes skills in or knowledge of: "1) agricultural production and propagation of animals (land and aquatic), animal products, plants (crops and ornamental), plant products, forests and forest products; 2) the provision of services associated with agricultural production; 3) the designing, installation, repair, operation, and servicing of machinery, equipment, and power sources, and the construction of structures and conveniences used in agricultural production; 4) the inspection, processing, and marketing of agricultural products and primary byproducts; 5) aspects of greenhouse, nursery, landscaping, and other ornamental horticultural operations; 6) the conservation, propagation, improvement, and utilization of renewable natural resources; 7) the multiple uses of forest lands and resources; and 8) other agribusiness competencies" (USDA, ERS, p. 1).

¹ The author received cooperation and encouragement from Dr. H.N. Hunsicker of the U.S. Office of Education, HEW, and Dr. Melvin R. Janssen of USDA in releasing data of this study through NACTA Journal.

Based on that definition, the committee examined over 90,000 industry-occupational cross-classifications to identify the maximum number in agribusiness. Specialists from a number of states indicated the relevance of selected matrix cells in each of the competency groups. The National Committee reviewed the specialists' proposals and made the final determination of the cross-classification to be used.

Responsibilities of the Various Agencies

The Bureau of Labor Statistics, in cooperation with the Manpower Administration and the State Employment Security Agencies, has developed a national-state industry-occupation employment matrix system. Counting the District of Columbia, the system contains a series of 51 state matrices; each of these matrices covers employment in 441 occupational categories cross-classified by 201 industrial sectors. The data are designed to provide national, state, and some substate manpower projections on employment opportunities in occupations requiring agribusiness competencies. The state matrices and projections may be updated periodically by the state employment agencies. The program will help to assess the education and training needed to meet projected manpower needs. The BLS also has responsibility for tabulation, estimation, analysis, and publication of the national data.

Responsibility for coordination of the program has been assumed by the Manpower Administration, along with providing guidance and assistance to states in using and applying the projections for manpower program planning and employment service operations.

At the state level, state employment security agencies are responsible for operation of the program, under the technical guidance of the BLS, and for utilizing techniques within their states and disseminating any resulting estimates to state and local users. Questions about national use and future concerns in agribusiness occupations should be directed to the National Committee on Employment Opportunities and Training Needs in Agribusiness.²

Source and Comparability of Data

The data on employment were derived from the 1970 census of population. Employment questions had been asked in a sample representing about 20 percent of the population. Information was included on occupation, industry, and class of worker. Data were also obtained for the experienced unemployed and the latest jobs of experienced workers not in the labor force during the reference week but who had worked at some time during the previous 10 years. For employed persons, the reported job was the one held during the reference week. If em-

ployed at two or more jobs, the respondent was to indicate the job at which he worked the greatest number of hours.

The employment data were acquired from the Census Bureau by the Manpower Administration for BLS. The latter agency reformatted the data for their national-state matrix system. The national committee transposed the data to its own tapes. Computer programming techniques were designed to provide a tested model so that any subsector matrix on employment can be derived at a reasonable cost (USDA, ERS, p. 7).

Comparability and Limitations

Since the reference week for the census of population was in March, the figures are not the same as those reported in the 1969 census of agriculture. The agricultural census reported 2.7 million farm operators, including a million who worked 100 days or more off the farm. However, in the 1970 census of population, most of the persons working 100 days or more off the farm had another job in March. Typically, more hours would be worked in the off-farm job, so it was reported as the primary occupation. Thus, the number of farm operators is understated by a million workers. The addition of unpaid family workers would mean that the understatement of farm workers was even greater.

Another group to consider is hired farm workers employed on farms for less than 75 days. Many of these persons did not work on the farm in March; therefore, the number of hired farm workers is also understated. Some of the persons who worked off the farm during the reference week would be included as workers in an agribusiness occupation, but, of course, others would not.

The 1970 census of population defined industry categories similar to those in the 1967 Standard Industrial Classification sponsored by the U.S. Office of Manpower and Budget. In that system, establishments are classified by the primary type of industrial activity in which they are engaged. A major purpose of the Standard Industrial Classification was to promote uniformity and comparability in the data collected by various agencies.

Sections I, II, and III

These three sections are based on the prevalence of workers within specific occupations that require or utilize agribusiness competencies, parallel with concepts developed by the U.S. Office of Education. Table 1 shows classification of occupations in the three sections.

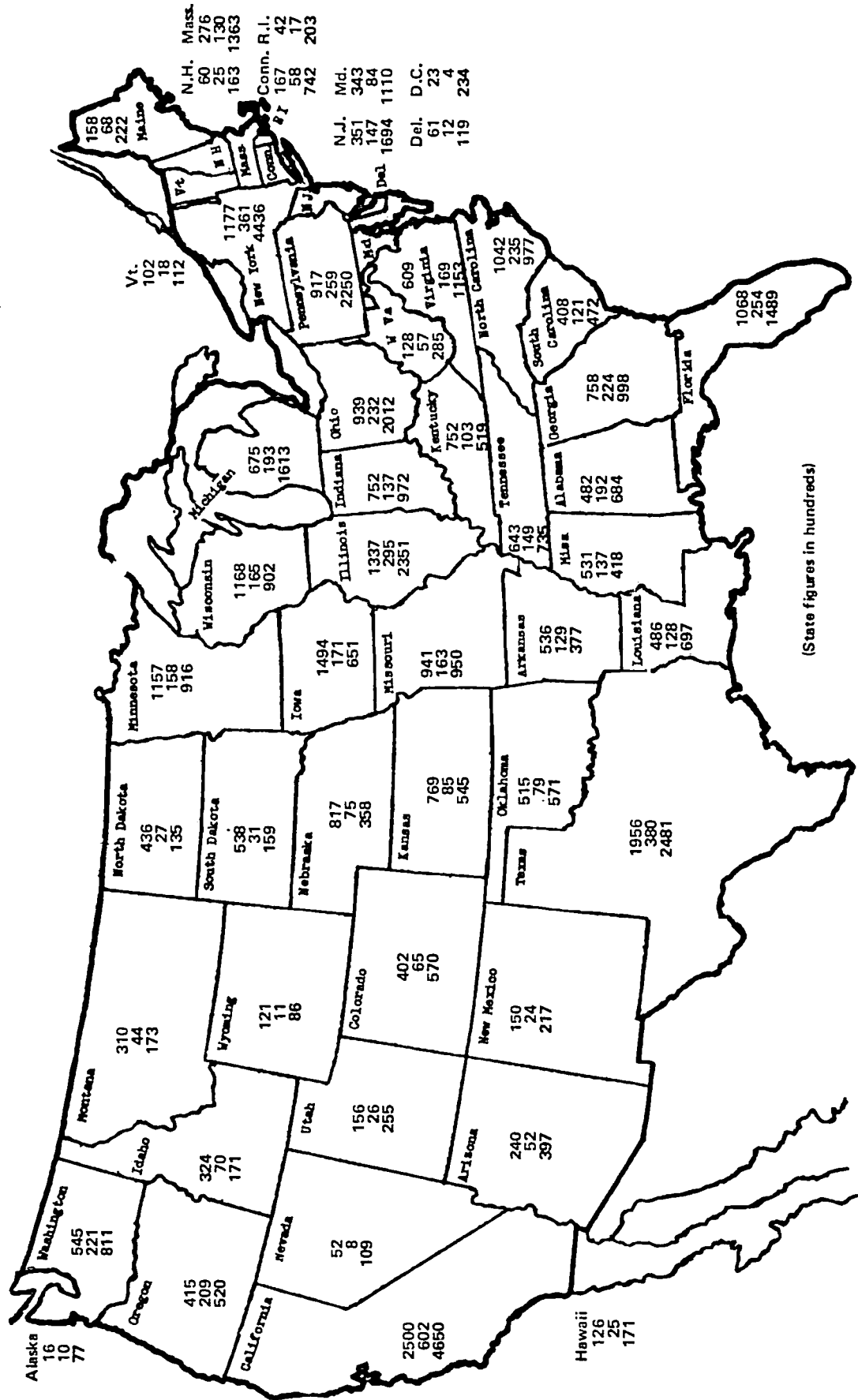
Section 1 includes 18 selected occupations where all industries "where employed" require or use agribusiness competencies. Examples are farm managers, animal scientists, and farm laborers. The study reported about 3 million workers in this category.

Section 2 includes, for 54 selected occupations, all workers in the listed industries that require or use agribusiness competencies. Examples are all buyers and

² Chairman of the Committee is H. N. Hunsicker, Educational Program Specialist, U.S. Dept. of HEW, Washington, D.C., 20202.

Table 1. Index to Matrix - Occupations

Occupation Code	Section 1	Section 2	Section 3	Occupation Code	Section 1	Section 2	Section 3
Professional, Technical, and Kindred Workers							
001 Accountants		X	X	262 Demonstrators		X	
002 Architects		X	X	265 Insurance agents, brokers, and underwriters			X
005 Computer specialists, n.e.c. (not elsewhere classified)			X	271 Stock and bond salesmen			X
011 Civil engineers		X	X	281 Sales representatives, manufacturing industries		X	X
012 Electrical and electronic engineers		X		282 Sales representatives, wholesale trade		X	
013 Industrial engineers		X	X	283 Sales clerks, retail trade		X	
014 Mechanical engineers		X	X	Clerical and Kindred Workers			
022 Sales engineers		X	X	320 Enumerators and interviewers			X
023 Engineers, n.e.c.		X	X	321 Estimators and investigators, n.e.c.			X
024 Farm management advisors	X			323 Expeditors and production controllers			X
025 Foresters and conservationists	X			326 Insurance adjusters, examiners, and investigators			X
036 Statisticians			X	363 Real-estate appraisers			X
042 Agricultural scientists	X			372 Secretaries, n.e.c.			X
043 Atmospheric and space scientists			X	374 Shipping and receiving clerks		X	
044 Biological scientists		X	X	392 Weighers		X	
048 Chemists		X	X	394 Miscellaneous clerical workers		X	X
056 Personnel and labor relations workers		X	X	Craftsmen and Kindred Workers			
072 Veterinarians	X			403 Blacksmiths		X	
085 Health technologists and technicians, n.e.c.		X	X	425 Decorators and window dressers		X	
091 Economists		X	X	441 Foremen, n.e.c.		X	X
102 Agricultural teachers (College)		X		450 Inspectors, sealers, and graders; log and lumber		X	
104 Biological teachers (College)			X	452 Inspectors, n.e.c.		X	X
105 Chemistry teachers (College)			X	480 Farm implement repairmen			
111 Engineering teachers (College)			X	481 Heavy equipment mechanics, including diesel	X	X	X
113 Health specialties teachers (College)			X	501 Millers; grain, flour, and feed	X		
116 Economics teachers (College)			X	514 Pattern and model makers, excluding paper		X	X
134 Trade, industrial, and technical teachers (College)			X	575 Craftsmen and kindred workers, n.e.c.		X	
135 Miscellaneous teachers, college and university			X	610 Checkers, examiners, and inspectors; manufacturing		X	X
141 Adult education teachers			X	624 Graders and sorters, manufacturing		X	
144 Secondary school teachers			X	625 Produce graders and packers, except factory and farm		X	
150 Agriculture and biological technicians, except health	X			631 Meat cutters and butchers, excluding manufacturing	X		
151 Chemical technicians		X	X	633 Meat cutters and butchers, manufacturing	X		
152 Draftsmen		X		662 Sawyers		X	
153 Electrical and electronic engineering technicians			X	690 Machine operatives, miscellaneous specified		X	
163 Airplane pilots		X	X	694 Miscellaneous operatives			X
174 Vocational and educational counselors			X	Transport Equipment Operatives			
180 Athletes and kindred workers			X	715 Truck drivers		X	
181 Authors			X	Laborers, Except Farm			
183 Designers		X	X	740 Animal caretakers, excluding farm		X	
184 Editors and reporters			X	752 Fishermen and oystermen		X	
192 Public relations men and publicity writers		X	X	755 Gardeners and groundskeepers, excluding farm		X	
Managers and Administrators, Except Farm				761 Lumbermen, raftsmen, and woodchoppers			
201 Assessors, controllers, and treasurers; local public administration			X	763 Teamsters		X	
202 Bank officers and financial managers			X	780 Miscellaneous laborers		X	X
203 Buyers and shippers, farm products		X		Farmers and Farm Managers			
205 Buyers, wholesale and retail trade		X	X	801 Farmers (owners and tenants)		X	
210 Credit men		X	X	802 Farm managers		X	
215 Inspectors, except construction, public administration			X	Farm Laborers and Farm Foremen			
220 Office managers, n.e.c.		X		821 Farm foremen		X	
221 Officers, pilots, and pursers; ship		X		822 Farm laborers, wage workers		X	
222 Officials and administrators; public administration, n.e.c.			X	923 Farm laborers, unpaid family workers		X	
223 Officials of lodges, societies, and unions			X	824 Farm service laborers, self-employed		X	
225 Purchasing agents and buyers, n.e.c.		X	X	Service Workers, Excluding Private Household			
231 Sales managers and department heads, retail trade		X	X	933 Attendant, personal service, n.e.c.			X
233 Sales managers, except retail trade		X	X	*Data currently not available on agribusiness project ADP tapes.			
235 School administrators, college			X				
245 Managers and administrators, n.e.c.		X	X				
Sales Workers							
260 Advertising agents and salesmen		X	X				
261 Auctioneers		X	X				



(State figures in hundreds)

Top Figure: Section 1 data; Middle Figure: Section 2 data; Lower Figure: Section 3 data
 (Data from 11 publications: ERS-570 to 580)

U.S. 2,996,998
 663,541
 4,427,483

Figure 1. Employment in Agriculture and Agribusiness Occupations, 1970.

shippers of farm products and produce graders and packers. About 665,000 workers were included.

Section 3 includes, for 67 selected occupations, 4.4 million workers, some of whom require or use agribusiness competencies. For example, some agricultural chemists - in the chemical industry use agribusiness competencies.

The agribusiness employment tables, consisting of 108 occupations and 201 industries, make up a subsector of the BLS matrix. Section 1 occupations may exist within any one of the 201 industries. A maximum of 82 selected industries may contain occupations included in sections 2 and 3.

Some Observations

Figure 1 shows data accumulated from 11 publications of the ERS which contain the employment figures. Total employment shown amounts to over 8 million workers. The number of workers in section 3 who need substantial knowledge and skills in agricultural subjects is difficult to determine. Perhaps local or state agencies can provide some help in this respect. Hopefully, methods of gathering data about employment in the future through the Census of Population will permit increased accuracy.

Adding another 1 million persons to allow for understatement of farm operators and making additional allowance for low employment of hired farm workers during the reference week of the survey may bring the total workers in agriculture and agribusiness near 10 million. This is a substantial number, even after allowing for some in section 3 who do not require substantial knowledge and skills in agricultural subjects.

The figure of 10 million workers in the United States in agriculture and agribusiness is considerably below the 16 million listed by the USDA and reported in a land-grant college brochure in the early 1960s (Amer. Assn. of Land-Grant Colleges, p. 12). Of course, the concept of an agribusiness worker in the earlier study included any worker in an agricultural business, whereas the present study refers to workers requiring substantial knowledge and skills in agricultural subjects.

A Cornell study pointed out that processing firms have a lower percentage of workers with farm backgrounds than production or supply firms. Also, only a small percentage of workers in processing firms (16 percent) reported having attended vocational schools, but 60 percent of the workers in supply firms reported such attendance (Cornell Univ., p. 129). Thus, there may not be as general recognition of knowledge and skill requirements or agribusiness workers in the processing industries.

A comparison of results for a state, as reported in Figure 1, can be made with a comprehensive study in a recent year. Such a detailed study was completed in Louisiana in 1967. Data were gathered from 2,430 nonfarm agricultural businesses. These firms had 51,719 em-

ployees, 20,025 of whom required agricultural competencies (Louisiana State Univ., p. 8).

Figure 1 shows 12,800 employees in section 2 and 69,700 in section 3 or a total of about 80,000 nonfarm employees in agribusiness occupations. These results are not irreconcilable with the study reported in this paper because the national study recognized that some of the section 3 workers did not require agricultural competencies. Perhaps a few firms and employees were missed in the Louisiana study; however, another suggestion might be that perhaps 20 or 25 percent of the employees in section 3 did require agricultural competencies. It would take considerable study to test that hypothesis.

While section 3 includes some workers who do not require agricultural competencies, the writer feels there are other instances, besides an understatement of farm workers, where this may be partly balanced out by "missed" workers. For example, agricultural scientists in government work at federal and state levels are listed at 167 for Illinois. This figure seems low when we consider the number of scientists in our college of agriculture and make allowances for others in the state.

Besides the nonfarm jobs in agribusiness, it seems important that many jobs still exist on farms. The section 1 figure for most states suggests that there are considerable employment opportunities in the area. Part of the demand for persons for work on farms may be illustrated by the increasing percentages of our college of agriculture graduates who return to farms. In recent years, this figure has been about 25 percent for the University of Illinois, whereas it was about 10 percent in 1968.

Undoubtedly, further study will show areas where the data on employment in agricultural and agribusiness occupations can be improved. However, the study reported in this paper seems to be a valiant attempt to bring forth improvements in the data on employment in such occupations. It will be advantageous to educators, rural sociologists, and agricultural economists to use the data available and to help improve future data so as to assist the development of the agricultural industry, both farm and nonfarm, enabling it to make its greatest contribution to the economy and society as a whole.

Conclusions

Many jobs exist in agriculture and agribusiness. Most of these jobs require technical knowledge, much of which needs to be acquired through formal education.

Knowledge and skills needed by workers in agriculture and agribusiness have been defined, and estimates have been made of the number of workers in various groups. Further work is needed to refine some of the data. Much of this will likely be left to the individual states or to groups within the states.

An example is the study underway on marketability of agriculture graduates by Professor Harvey Woods of Illinois State University at Normal. Woods is gathering data relating to jobs and placements from all higher institutions in Illinois offering agriculture programs (39 in

all, including community colleges and four-year institution — secondary school, community college, and four-year institution. With the continued demand for food in

Further work is needed to determine what knowledge and skills should be taught at each level of instruction — secondary school, community college, and four-year institution. With the continued demand for food in the world, our job in agricultural education at all levels is a very great one indeed.

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INTERNATIONAL AGRICULTURE

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A Personal Challenge

During the World Food Conference in Rome in 1974, a proclamation was developed which included the following statement: "Every man, woman, and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties. Society today already possesses sufficient resources, organizational ability, and technology; and hence the competence to achieve this objective." This is a very noble objective, and those involved are to be complimented for reminding us of our responsibilities as human beings. However, the measure of our humanity is not the proclamations and resolutions we pass but our past, present, and future performance in relieving the suffering and hunger of other people regardless of their creed, color, race, religion, or global location.

The performance of U.S. agriculturists is impressive by any standard of comparison. Agricultural aid to other countries did not begin with the 1974 Food Conference in Rome but has been available for more than a century. Agriculture Commissioner Horace Capron led a group of Americans to Japan in 1872 to help Japanese farmers improve their food production methods. From that time to the present, agricultural aid and technical assistance has been continuous. During the last ten years, Americans have provided over \$15 billion in development aid and technical agricultural assistance to foreign countries.

The USDA has provided training for over 20,000 foreign agriculturists during the last two decades. Agricultural universities have provided over 10,000 man-years of technical assistance during the last ten years. In addition, about 300 USDA personnel work to improve agricultural development in foreign countries each year.

Unquestionably, American agriculturists have accepted the challenge to provide their time and expertise to help solve the problems

of world hunger. For those agriculturists who have contributed to the international effort, I salute you and ask that you make at least one more contribution - share your experiences. We need the benefit of your wisdom. Indeed, it is your responsibility. Please don't take it lightly.

Although the service record of U.S. agriculturists abroad is impressive, the task of fighting world hunger is not over. In fact, the current and future needs are greater than ever. We cannot afford to relax our efforts. We have too much to lose.

Involvement in foreign agriculture is not limited to a long period of service in a foreign country. Assistance is needed in training prospective workers, developing foreign programs, supervising in-the-field technicians, and numerous other activities. It may be that your best opportunity is making your students aware of foreign agricultural problems through new courses, seminars, or foreign exchange programs. The main point to remember is that your involvement is needed, whatever contribution you can make.

For those agriculturists who have not been involved directly in foreign agriculture, won't you give this area of service serious consideration? I challenge you to expand your frame of reference. Look beyond your local community, your state, even your nation. You have chosen a profession that is truly international. What can be more international than the problem of feeding the hungry? Hunger knows no national boundaries, and it cannot be contained when agricultural expertise is restricted to regional and national limits.

There is no greater challenge in the world today than the opportunity to reduce hunger, and there is no group more qualified than professional agriculturists. I challenge each of you to do your part, whatever it may be. To paraphrase a quote from President Kennedy: "Ask not what International Agriculture can do for you. Ask what you can do for International Agriculture."