HUMAN CAPITAL NEEDS OF BLACK LAND-GRANT INSTITUTIONS

Alfred L. Parks and Richard D. Robbins

There is a growing concern among leaders of our nation about the impending human capital shortage in agriculture. The United States, a nation that leads the world in the production of agricultural products, is seriously threatened by deepening shortages of highly qualified scientists, managers, and technical professionals—including agricultural economists. The U.S. agricultural system, which contributes some 20 percent to the nation's gross national product, 23 percent to the nation's employment, and 19 percent of export earnings, increasingly integrates advanced technologies and intensive capital investment (Bicentennial Committee). This challenge was dramatized in a forum entitled, "Investing in Brain Power: Keeping U.S. Agriculture's Competitive Edge," jointly sponsored by the U.S. Department of Agriculture and the National Research Council's Board on Agriculture. At that conference, in framing the challenge to the group, John Block, Secretary of Agriculture, called for a closer working relationship between academe, industry, and government to *"help short circuit a growing concern before it becomes a full-fledge problem."* Block further stated that the concern was *"to ensure that our industry has both the quantity and quality of scientists and professionals available to meet our future needs."*

The purpose of this paper is to address some of the problems of human capital shortages within the agricultural sector, within the agricultural economics profession, and within the historically black land-grant institutions. Much of this paper is devoted to addressing some of the concern about the increasing shortages of agricultural expertise. A considerable amount of time is devoted to the labor market conditions for agricultural economists and finally, attention is given to the theoretical issues relating to the segmented labor markets of black agricultural economists and the black land-grant institutions.

SUPPLY/DEMAND RELATIONSHIPS OF AGRICULTURAL SCIENTISTS

An examination of the supply/demand relationships of agricultural scientists reveals that there is growing evidences of deficits of college-educated agricultural scientists. Surveys by Coulter and Stanton (1980, 1983), the Resident Instruction Committee of the National Association of State Universities and Land-Grant Colleges, and others, have predicted that quantity demanded will exceed quantity supplied by as much as 50 percent in some occupational areas, Table 1 and figures 1 and 2.

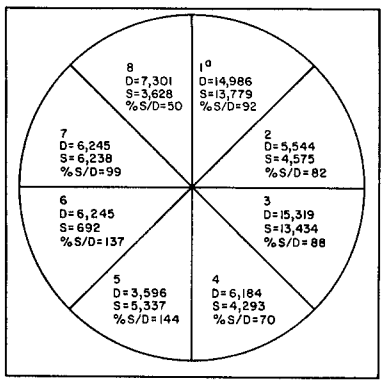

Figure 1. Supply/Demand Relationships for Recipients of Agriculture and Agriculturally-Related Degrees by Occupational Cluster, 1976-85.[a]

[a] Average annual supply expressed as a percentage of average annual demand from 1976 through 1985. Occupational clusters are: 1) scientific and professional specialists, 2) manufacturing and processing scientists and engineers, 3) sales and service representatives and purchasing agents, 4) administrators, managers, and financial advisors, 5) educators, 6) media specialists, 7) agricultural production and management specialists, and 8) miscellaneous agricultural specialists.

Alfred L. Parks is Chairman, Department of Agricultural Economics and Rural Sociology, Prairie View A & M University, and Richard D. Robbins is Chairman, Department of Agricultural Economics and Rural Sociology, North Carolina A & T State University.

Invited paper presented at the annual meeting of the Southern Agricultural Economics Association, Biloxi, Mississippi, February 3-6, 1985. Invited papers are routinely published in the July *SJAE* without editorial council review but with review of the copy editor (as per Executive Committee action June 25, 1982).

TABLE 1. AVERAGE ANNUAL QUANTITIES SUPPLIED AND DEMANDED, COLLEGE GRADUATES QUALIFIED FOR POSITIONS IN THE FOOD AND AGRICULTURAL SCIENCES-AGRICULTURE, NATURAL RESOURCES, AND VETERINARY MEDICINE, UNITED STATES, 1980-85

Occupational cluster	Quantity demanded	Quantity supplied by degree level				
		Assoc.	B.S.	M.S.	Ph.D. and D.V.M.	Total
	number					
Scientific and professional specialists	14,986	—	10,227	1,664	1,888	13,779
Manufacturing and processing scientists and engineers	5,544	44	3,377	806	348	4,575
Sales and services representatives and purchasing agents	15,319	1,378	10,991	922	143	13,434
Administrators, managers, and financial advisors	6,184	—	3,185	1,044	64	4,293
Educators	3,696	—	3,231	1,358	748	5,337
Media specialists	505	—	149	267	6	692
Agricultural production and management specialists	6,245	1,384	4,497	357	—	6,238
Miscellaneous agricultural specialists	7,301	1,726	1,902	—	—	3,628
Total	59,780	4,532	37,829	6,418	3,197	51,976

Source: Goecker.

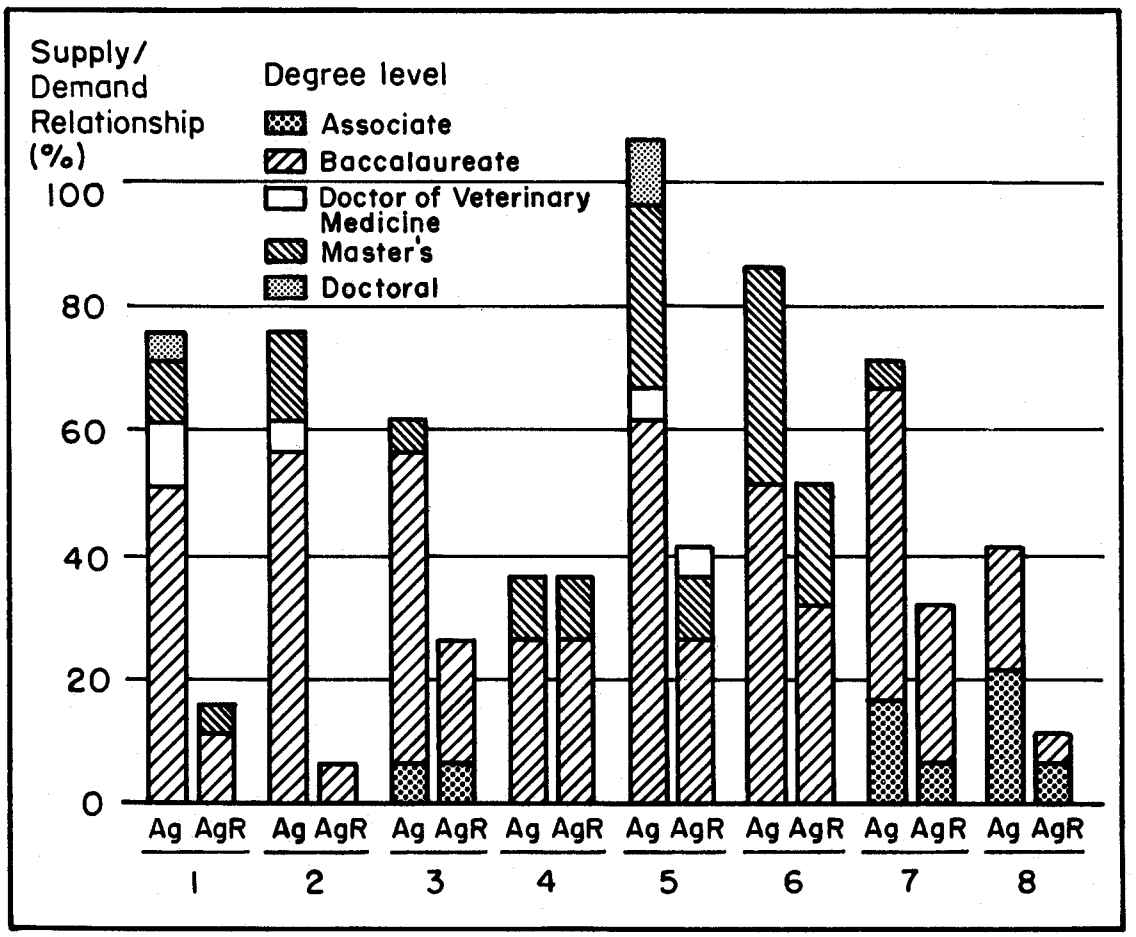

Figure 2. Relationship of the Supply of Recipients of Agriculture and Agriculturally-Related Degrees to Employment Demand, by Occupational Cluster and Degree Level, 1976-1985.*

* Average annual supply expressed as a percentage of average annual demand from 1976 through 1985. Because projections are unavailable for Associate degrees, 1976-77 supply data were used in lieu of average annual estimates for Associate degree recipients. Occupational clusters are: 1) scientific and professional specialists, 2) manufacturing and processing scientists and engineers, 3) sales and service representatives and purchasing agents, 4) administrators, managers, and financial advisors, 5) educators, 6) media specialists, 7) agricultural production and management specialists, and 8) miscellaneous agricultural specialists.

Table 1 summarizes the average annual quantities supplied and demanded by degree level and occupational cluster for college graduates qualified for positions in the food and agricultural sciences, for the period 1980-1985. For this period, there is projected to be an average annual demand of 59,780 college graduates in agriculture, natural resources, and veterinary medicine. At the same time, there is projected to be an average annual supply of 51,976 college graduates. Of this total, 74 percent, or 38,424, are projected to be graduates of colleges of agriculture, natural resources, and veterinary medicine. Some 26 percent, or 13,552, are projected to have related degrees such as economics, microbiology, marketing, mechanical engineering, business, and genetics which compete in the professional employment market in the food and agricultural sciences (Goecker).

As depicted in Table 1 and Figure 1, the average annual quantity demanded exceeds average annual quantity supplied by the largest percentage factors for occupational clusters representative of miscellaneous agricultural specialists (50 percent), administrators/managers/financial advisors (30 percent), and manufacturing and process scientists and engineers (18 percent). In absolute numbers, the largest shortages occur in the occupational clusters for miscellaneous agricultural scientists, administrators/managers/financial advisors, sales and services representatives and purchasing agents, and scientific and professional specialists. Also summarized in Table 1 and Figure 2 are the supply/demand relationships by occupational clusters, degree types (i.e. agriculture and agriculturally related), and degree level—associate, baccalaureate, masters, doctoral, D.V.M., (Coulter and Stanton, 1980). The extent to which the various degree levels should be available to meet the needs is highly variable by cluster groupings and requirements. For example, within the Scientific and Professional Specialists grouping the average annual number of agriculture degree recipients satisfies 75 percent of the needs; agriculturally-related graduates satisfy approximately 15 percent of the needs (Coulter and Stanton, 1980). However, within the total demanded, approximately 50 percent is supplied by baccalaureate degree recipients and the remaining 25 percent is supplied by masters, doctorates, and D.V.M. degree recipients.

With the exception of the Educators grouping, there appears to be significant shortages of college graduates forthcoming in the 1980s. This cluster includes secondary school vocational agriculture teachers, adult education teachers specializing in agriculture and food, and college faculty involved in teaching and research directly related to agriculture (Goecker). This group also includes occupations within the Cooperative Extension Service, excluding home economics. For this group, projected average annual quantity demanded is 3,639 graduates while average annual quantity supplied is 5,337. On the surface, it would appear that a surplus of educators will be available. According to Goecker, however, one must look beyond the number of educators trained each year to effectively analyze this particular component of the labor force. Various studies have shown that many, as much as 55 percent, of vocational education graduates do not accept employment as educators (Goecker, p.7).

Thus, it might appear that many vocational education graduates are bid away by business and industry. This might suggest that many of the shortages otherwise thought to exist in some of the other occupational clusters are being filled by these graduates. Likewise, Goecker indicates that there is significant evidence that colleges and universities are also being outbid by other employers for entry-level professors. Areas where the most significant shortages of college educators appear to occur are in agricultural engineering, agricultural economics, animal production, and in the plant and forest sciences.

The continued success of American agriculture is highly dependent upon a stable flow of human resources in the form of well-educated recruits (Dunkelberger et al.). In response to expanded missions in food and agricultural teaching and research during the late 1940s and early 1950s, many universities significantly increased their faculties (Goecker). As these faculties reach retirement now and within the next few years, there appears to be some significant shortages looming ahead. The attraction to youth of high ability and motivation is vital to the maintenance of the status achieved by U.S. agriculture.

LABOR MARKET CONDITIONS FOR AGRICULTURAL ECONOMISTS

Labor market conditions for economists and

agricultural economists have long been monitored by their respective associations (i.e., the American Economics Association (AEA) and the American Agricultural Economics Association (AAEA)). A review of the literature over the past few decades reveals that considerable attention has been devoted to labor market conditions for economists and agricultural economists. Some of the works relating specifically to economists include those of Boddy (1962, 1973), Broder and Ziemer; Carter; Chandler; Clague and Levine; Helmberger; Reagan; and Schotzko. Works relating specifically to the agricultural economics profession included the works of Davis; Davis and Allen, 1983, 1985; Hathaway; Ihnen; Jones et al.; Lane; Lee; Peck and Babb; Redman; Robbins and Evans; Strauss and Tarr; and Williams. At recent meetings of the AAEA, considerable attention has been given to the status, role, and opportunities of women and blacks in the profession. This is evidenced by the works of Lane; Lee; Lundeen and Clauson; and Redman related to the opportunities and status of women in agricultural economics. The role, status, and opportunities for blacks is represented by the works of Davis and Allen; Jones et al.; and Robbins and Evans.

SUPPLY/DEMAND CONDITIONS FOR ECONOMISTS

Various surveys of agricultural economists have discussed labor market conditions. Most studies have delineated conditions based on educational attainment and employment distribution. Helmberger analyzed market conditions for agricultural economists in an attempt to identify: Who they are? For whom do they work? What do they do? What are their salaries? What is their supply? What is the demand for their services?, and in general, What is their outlook? Helmberger identified agricultural economists as a subset of economists listed in the National Science Foundation's definition of economists. Helmberger's analysis focused primarily on the 13,386 economists listed in the 1970 National Science Foundation Register. Of the 13,386 economists listed, 1,501 or 11.2 percent, were agricultural economists. A very high proportion (57.5 percent) of the agricultural economists held a Ph.D. degree. Of those holding the Ph.D. degree, 72.5 percent worked in educational institutions. Helmberger indicated that the number of economists had been adequate, relative to needs, but cautioned that conditions were not likely to remain as favorable in the future.

Schotzko analyzed supply/demand conditions for Ph.D. agricultural economists using data for the period 1951-1977. His analysis showed the number of Ph.D.'s granted by citizenship during this period. There was a general upward trend from a total of 57 Ph.D.'s granted in 1951 to a peak of 217 in 1971. From 1971 to 1977 the number fluctuated somewhat, but generally declined. In 1955, the first year in which a distinction was made between United States citizen recipients and foreign recipients, 57 United States citizens received Ph.D.'s compared to 13 foreign recipients. In 1971, when the peak of awarded degrees occurred, 145 were United States citizens and 72 were foreign. In 1977, the numbers were 84 and 66, respectively.

Schotzko also projected the placement needs of agricultural economists in the United States. Replacements in the first half of the 1980's would average about 60 Ph.D.'s per year and in the second half of the decade about 83 Ph.D.'s per year. Certainly, the decline in the number of degrees granted and an increase in the proportion of foreign recipients, results in a much smaller number of Americans entering the U.S. labor market each year. Schotzko assumed that 25 percent of the foreign recipients would remain in the United States and that the average number of Ph.D.'s entering the U.S. labor market would be 96. Of the 96, about 64 percent would find employment in universities or colleges. He projected that 28 percent would be employed by the federal government and the remainder would be employed by private industry or foundations. He also estimated that 50 would be required to cover retirements and deaths; thus, of the 61 new Ph.D.'s that would be needed by universities in general, only 11 would be to cover resignations, positions created through upgrading educational requirements, or other positions. Thus, the projected replacement needs would absorb all the new Ph.D.'s for university employment.

The trends that Schotzko projected through 1977 have certainly continued throughout the early 1980's. More and more foreign students are enrolling in U.S. universities, especially in the master's and Ph.D. programs. The college age population has continued to decline, which means fewer students are enrolling in colleges in general and colleges of agriculture in particular. While all institu-

tions, agencies, firms and others will be affected by the apparent shortages of highly skilled and trained agricultural economists, the black land-grant institutions will be particularly affected in several ways. Certainly, increased competition during a period of shortage is going to increase prices for new Ph.D.'s, especially, and to some extent at the masters level. These prices (higher salaries) will adversely affect the black land-grant institutions even more. While there already appears to be substantial differences in faculty salaries of the 1862 and the black land-grant institutions, the gap is likely to widen.

Strauss and Tarr analyzed labor market conditions for agricultural economists from a list of 2,295 agricultural economists listed in the Illinois Department of Labor and the AAEA Registry composed by both AAEA members and job seekers. Educational institutions were the major source of employment for the agricultural economists on both lists. With regard to the extent of educational attainment achieved by respondents, a majority held Ph.D.'s (61.9 percent). The preponderance of agricultural economists at educational institutions and the unusually high level of education have been characteristic of the profession for a considerable period of time (Strauss and Tarr, Table 3). Strauss and Tarr's study showed that in 1966, 58 percent of the agricultural economists were at educational institutions as compared to 54 percent in 1976, and 57 percent in 1981-82. The educational attainment level of agricultural economists was generally stable, with 58.9 percent holding Ph.D.'s in 1966, 63.2 percent in 1976, and 62.5 percent in 1981-82.

EDUCATIONAL ATTAINMENT OF BLACK AGRICULTURAL ECONOMISTS

The educational attainment and opportunities of black agricultural economists stand in striking contrast to that of the profession in general (Davis and Allen, 1983). Davis and Allen analyzed black agricultural economists listed among those on the Illinois Department of Labor and American Agricultural Economics Association Registry. They identified 41 black agricultural economists representing 1.8 percent of the registrants. Of those holding Ph.D.'s, 18 (1.3 percent) were black, while 4 (1.9 percent) of the Ph.D. candidates were black. Generally speaking, black scientists in the United States are far below parity with the non-black scientist population. The National Science Foundation reports that 1.6 percent of nearly two million scientists are black. Other studies also point out that few blacks are agricultural economists. The National Research Council's survey of earned doctorates from 1973-76 shows that only 5 American blacks, compared to 353 whites, earned doctoral degrees in Agricultural Economics (Robbins and Evans). Thus, blacks represented only 1.4 percent of the total degree recipients from 1973-76.

Other estimates of black agricultural economists have shown similar results. Davis and Allen (1983), in analyzing estimates developed from a 1982 list of black economists prepared by the AAEA committee on the Status and Opportunities of Black Agricultural Economists in collaboration with the AEA, identified 232 black economists. They identified 59 (25 percent) as holders of Ph.D. degrees. They also indicated that 28 (47 percent) of the Ph.D. holders were agricultural economists, and 20 (71 percent) were employed at predominately black land-grant institutions. Davis and Allen (1983) suggested that the educational characteristics of black agricultural economists have some bearing on their employment distribution. They go on to say that within a competitive market structure one would expect that employment groups would have different derived demands for the stocks of human capital.

THEORETICAL ISSUES

Despite the number of studies that have focused on the demand, supply, and market for economists and agricultural economists, very little attention has been given to how sex and/or race may differentiate the "product" (Jones et al.). That is, the majority of studies have tended to treat economists and agricultural economists as homogenous products and the market as perfectly competitive. Recent studies on the role and status of women in the two professions report findings which suggests that, at least in the view of employers, male and female members of the two professions are viewed as differentiated products (Reagan, Lee, Redman, Lane).

Many theories have been developed to explain black-white occupational and earnings differentials (Davis and Allen, 1985). The most widely accepted economic theory of black-white earnings, as suggested by Davis

and Allen (1985) is the neoclassical human capital theory. This theory attributes black-white employment differentials and/or prospects to: (a) differences in productivity, (b) subordination of blacks by limitation of their socioeconomic opportunities, and (c) discrimination (Davis and Allen, 1985, p.2). The human capital concept began to receive attention for analysis as concerns for poverty, economic development, the distribution of capital, and unemployment grew. Becker (1975) and Schultz developed the human capital concept from physical capital investment theories during the latter 1950's and early 1960's. This concept has grown in importance and has received considerable attention as recent concern for human capital development in the agricultural sciences has increased (Schultz; Thurow, 1970).

On the other hand, there have been other theories, including the segmented labor market which asserts that earnings are determined largely by the market in which the individual works (Davis and Allen, 1985). The segmented labor market theory emphasizes the characteristics of jobs and job markets and not the skills (human capital) of the individual workers (Hoffman). In terms of black-white earnings and occupational difference, the relevant issue is whether the parameters of the human capital model vary significantly by race (Hoffman). Studies have shown that blacks have real opportunity costs of human capital accumulation that are different for whites. Data from the 1960's suggest that not only are black returns to education lower than for whites, but they decrease relative to the white rate with increasing years of schooling. More recent studies indicate that returns to education for blacks educated in the fifties and sixties increased sharply at all educational levels, but still remain low relative to whites (about 17 percent). A 1984, American Association of University Professors salary survey reports that salaries at 1862 institutions average $10,000 higher than salaries at the 1890 institutions, where a majority of the black agricultural economists are concentrated.

Other proponents of the human capital model suggest that the acquisition and monetary value of human capital may be affected by discrimination (Davis and Allen, 1985). Thurow (1969) asserts that lower human capital investment of blacks is the result of labor market discrimination. In the presence of labor market discrimination, fewer blacks are hired by whites than would have been in the absence of discrimination. Blacks, who in general are unable to find employment in the relatively capital abundant white sector, experience disparity in income since a correspondingly lower wage will be paid to their capital-constrained contribution to production. The accumulated effects of discrimination are therefore manifested in the observable phenomena of job reserving or "crowding" of blacks into occupational categories with lower median income than those of whites (Davis and Allen, 1985).

CHANGING NATURE OF AGRICULTURAL ECONOMICS AND TRADITIONS OF 1890 LAND-GRANT INSTITUTIONS

History of the Land-Grant System

The Land-Grant System, as we know it today, was created in 1862 by the Congress of the United States when it passed the first Morrill Act which provided for the establishment of a land-grant institution in each state to educate citizens in the fields of agriculture, home economics, the mechanical arts, and other useful professions. In the South, under the premise of legal separation of races, the Negro was not permitted to attend the institutions first established under the Morrill Act of 1862 (Bicentennial Committee). Hightower, in *Hard Tomatoes, Hard Times* asserts that the land-grant colleges that developed were "white bastions" which barred blacks from admission both by custom and by law.

In 1890, the Congress passed the second Morrill Act which provided funding and opened the door for equivalent training for blacks. Sixteen border states, some of which had already established institutions, took advantage of this opportunity and created the historically black, or "1890", Land-Grant Institutions. Even though these institutions have been and still remain the main source of blacks trained in agriculture in the United States, they have been less than full partners in the land-grant experience (Hightower).

Traditionally, blacks trained in agriculture have not successfully penetrated the employment market, other than predominantly black land-grant institutions. The demand in these institutions has been limited and unsustained. After World War II, a number of blacks obtained graduate degrees and formed what could be called *one-man-departments*

in the 1890 Institutions. These departments grew virtually at a zero rate because of a lack of: demand for students (graduate school and employment), funds, and activities other than teaching. "Departments" of agricultural economics existed as service units within colleges of agriculture and produced virtually no students in the area of agricultural economics (most programs in these institutions were in general agriculture or agricultural education). However, recent surveys show that a majority of blacks trained in agriculture received their first degree from a historically black institution (Jones et al.). In a 1983 survey of graduate students enrolled in graduate programs in agricultural economics, 60 percent reported that they had obtained their first degree from a historically black institution. Thus, the historically black, or "1890" Institutions, have had, and are expected to continue to have, a major role in supplying blacks who are entering graduate degree programs. It is essential that these schools continue to get qualified doctoral graduates so that they can continue to train students and provide the type of training that is needed to enter into professional and graduate studies. Not only is there a need to satisfy instructional programs, but there is also a need to satisfy the research programs of the 1890 Institutions.

For nearly 100 years, virtually no funds were available on a continuing basis for research at the 1890 Institutions. It was not until fiscal year 1967 that any money became available. In the first year, $283,000 or $17,692 per campus, was available for research administered by the Cooperative States Research Service (CSRS), USDA under Public Law 89-106. In 1972, the annual allocation for funds for research at the black land-grant institutions, was raised to $8.83 million. Over the 5-year period from 1972-77, the amount gradually increased to $13.35 million. During that period, all of the money was treated as "soft" money. That is, they were grant monies provided by USDA. Individuals wrote specific proposals which were funded from these funds, and had up to 5 years to expend the funds. In 1977, with the passage of the new bill, changes were made in the formula and funding process. This new bill, known as the Evans-Allen Act, created "hard" money for the 1890 Institutions and patterned the program after the 1862 Institutions' allocation. The bill specified that not less than 15 percent of the total allocation would go to the 1890 Institutions. It further provided only one year to spend the money, at which time it reverted back to USDA. The law did not require a matching part on behalf of the states. Further, few states have chosen to make any substantial matching amounts. Thus, for all practical purposes, the funds available through the USDA/CSRS Evans-Allen Bill are the only source of hard money available for this purpose.

In 1981, Congress passed legislation providing $50 million to upgrade and improve facilities at the 1890 Institutions. These funds were allocated over a 5-year period and are subject to the annual approval of Congress. The allocations of Evans-Allen funds are based upon a formula similar to the Morrill Act fund for the Agricultural Experiment Stations at the 1862 Institutions.

Currently, approximately $23 million are allocated annually for research at the 1890 Institutions. It ranges from a few hundred thousand dollars at the smallest institutions to over $2 million at the largest institutions. As the research programs at these institutions begin to grow and as they seek funds not only from the Evans-Allen Bill, but also from competitive grants and other awards, it is more important that qualified and trained faculty in all agricultural disciplines be available for employment at these institutions. While the amount of money is small relative to the flow to the 1862 Institution, it is a substantial amount for those 1890 Institutions which had not received much research funding prior to this recent legislation. Thus, it is more critical than ever that qualified people at the Ph.D. level are available for research at the 1890 Institutions.

The historical nature of the black land-grant institutions has been such that they have provided a multiplicity of services to black people residing in the rural and urban areas of their respective states (Williams). The broad nature of the training programs, and more recently, the research and extension programs have shown that these institutions have had major impacts on higher education and human capital development. Enrollment and graduation figures have demonstrated the extent to which these institutions provide training for blacks (Jones et al.; Robbins and Evans).

Recent surveys of research efforts directed toward small farms have shown that the historically black land-grant institutions share a

major portion of this effort (Ghebremedhin and Johnson). The thrust of this effort signifies the mission of these institutions and has implications about human capital needs. As funding levels for research and extension in these institutions have increased, the need for adjustments at these universities has increased. These institutions, despite their mandated missions, have been regarded primarily as "teaching" institutions. Therefore, administrators and others have been attuned to this way of thinking. However, added funding for research and extension, and more recently, funds for improved research facilities, create a new challenge. The human capital needs for these new activities are different from those for primarily teaching efforts and the administration of these resources must be such that they are utilized as intended. This means that faculty tenure and promotion policies will have to be adjusted. The atmosphere for creative thinking (research) will have to be enhanced. Incentives for permanence and excellence will have to be created, and faculty appointments, promotions, etc. will have to be adjusted accordingly.

CONCLUSIONS

Human capital needs in the historically black Land-Grant (1890) Institutions are different from those for 1862 Institutions for a number of reasons. First, 1890 Institutions have had a history of serving the needs of a predominantly black population who by heritage and/or by circumstance have been economically disadvantaged. Second, teaching and not research has been and still is, for the most part, the primary focus in these institutions. Third, the recent research efforts that have resulted from increased funding are aimed primarily at the small, limited resource farm sector. And fourth, historically black Land-Grant Institutions are required to conduct more broad-based activities than their counterparts in the 1862 Institutions. Consequently, the human capital needs (training) in the 1890 Institutions are more broad-based than training traditionally provided at most 1862 Institutions.

REFERENCES

Becker, G. S. *Human Capital,* 2nd ed., New York: Columbia University Press, 1975.

Bicentennial Committee of the Association of Research Coordinators. *Development of Research at Historically Black Land-Grant Institutions,* 1976.

Block, John R. "Remarks" at the Secretary's Challenge Forum on "Investing in Brain Power-Keeping, U.S. Agriculture's Competitive Edge." USDA/Board on Agriculture, National Research Council, National Academies of Sciences and Engineering; January, 1984.

Boddy, Francis M. "The Demand for Economists." *Amer. Econ. Rev.,* 52(1962):503-8.

Boddy, Francis M. "The Market for Economists." *Amer. J. Agr. Econ.,* 55(1973):720-4.

Broder, J. M. and R. F. Ziemer. "Determinants of Agricultural Economics Faculty Salaries." *Amer. J. Agr. Econ.,* 64(1982):301-3.

Carter, Allan M. "Whither the Market for Academic Economists?" *Amer. Econ. Rev.,* 61(1971):305-15.

Chandler, Cleveland A. "An Affirmative Action Plan for the Economics Profession." *Amer. Econ. Rev.,* 60(1970):416-23.

Clague, Ewan and Morton Levine. "The Supply of Economists." *Amer. Econ. Rev.,* 52(1962):497-502.

Coulter, Kyle J. and Marge Stanton. *Graduates of Higher Education in the Food and Agricultural Sciences: An Analysis of Supply/Demand Relationships,* Vol. I, USDA, Misc. Pub. 1885; July, 1980.

Coulter, Kyle J. and Marge Stanton. *Graduates of Higher Education in the Food and Agricultural Sciences,* Vol. III, USDA, Misc. Pub. 1433; January, 1983.

Davis, Carlton G. "Traditional Graduate Admission Standards as Constraints to Increasing the Supply of Black Professional Agriculturalists: The Florida Experience." *Amer. J. Agr. Econ.,* 55(1973):952-66.

Davis, Carlton G. and Joyce E. Allen. "Black Agricultural Economists in the Labor Market: Theoretical and Empirical Issues." *Amer. J. Agr. Econ.,* 65(1983):993-8.

Davis, Carlton G. and Joyce E. Allen. Chapter II, "Theoretical Issues" in Opportunities and Status of Blacks in the Agricultural Economics Profession - a Final Report (forthcoming),

1985, by the AAEA Ad Hoc Committee on the Role, Status and Opportunities of Blacks in Agricultural Economics.

Dunkelberger, John E., Joseph J. Molnar, Carlton R. Sollie, Thomas A. Lyson, George W. Ohlendorf, and A. Lee Coleman. "Higher Education in Agriculture: Students at Southern Land-Grant Universities." So. Coop. Series Bull. 270, Ala. Agr. Exp. Sta., Auburn University; July, 1982.

Ghebremedhin, Tesfa G. and William M. Johnson. "Small Farm Research and Policy Implications." Invited paper, presented at the SAEA annual meeting, Biloxi, Mississippi, February, 1985.

Goecker, Allan D. "Supply and Demand of College Graduates in the Food and Agricultural Sciences." A 1980 National Assessment Condensed Report from a U.S. Department of Agriculture study entitled *Graduates of Higher Education in the Food and Agricultural Sciences.*

Hathaway, Dale E. "The Economics of Agricultural Economics." *Amer. J. Agr. Econ.,* 51(1969):1011-26.

Helmberger, John D. "The Market for Agricultural Economists." *Amer. J. Agr. Econ.,* 55(1973):725-34.

Hightower, Jim. "Hard Tomatoes, Hard Times: The Failure of the Land-Grant College Complex." Washington, D.C., Agribusiness Accountability Project, 1972.

Hoffman, Saul D. "Black-White Life Cycle Earning Differences and the Vintage Hypothesis: A Longitudinal Analysis." *Amer. Econ. Rev.,* 69(1979):855-67.

Ihnen, Loren A. "Black Agricultural Economists: Discussion." *Amer. J. Agr. Econ.,* 65(1983):999-1,001.

Jones, Dewitt, Mack Nelson, and Alfred L. Parks. "Demand and Supply Factors of Black Agricultural Economists." *Amer. J. Agr. Econ.,* 65(1983):988-92.

Lane, Sylvia. "Evidence on Barriers to the Parallel Advancement of Male and Female Agricultural Economists." *Amer. J. Agr. Econ.,* 63(1981):1025-31.

Lee, Linda K. "A Comparison of the Rank and Salary of Male and Female Agricultural Economists." *Amer. J. Agr. Econ.,* 63(1981):1013-8.

Lundeen, Ardelle A. and Annette L. Clauson. "The Conduct of the Survey on the Opportunities for and Status of Women in Agricultural Economics." *Amer. J. Agr. Econ.,* 63(1981):1011-2.

National Research Council, National Academy of Sciences. "Survey of Earned Doctorates, 1973-1976." *Chronicle of Higher Education;* March; 1978.

Peck, Anne E. and Emerson M. Babb. "The AAEA Membership: Employment Mobility Patterns." *Amer. J. Agr. Econ.,* 58(1976):600-5.

Reagan, Barbara B. "Two Supply Curves for Economists? Implications of Mobility and Career Attachment of Women." *Amer. Econ. Rev.,* 65(1975):100-7.

Redman, Barbara. "The Women Who Become Agricultural Economists." *Amer. J. Agr. Econ.,* 63(1981):1019-24.

Resident Instruction Committee on Organization and Policy, Division of Agriculture, National Association of State Universities and Land-Grant Colleges. *Human Capital Shortages: A Threat to American Agriculture,* 1982.

Robbins, Richard D. and Sidney H. Evans. "Characteristics of Black Agricultural Economists." *Amer. J. Agr. Econ.,* 65(1983):993-8.

Schotzko, R. T. "Projected Replacement Needs for Agricultural Economists." *Amer. J. Agr. Econ.,* 62(1980):525-9.

Schultz, Theodore W. "Investment in Human Capital." *Amer. Econ. Rev.,* 51(1961):1-17.

Strauss, Robert P. and Michael J. Tarr. "Salary Patterns of Agricultural Economists in the Early 1980's. *Amer. J. Agr. Econ.,* 64(1982):1053-61.

Thurow, Lester C. *Investment in Human Capital,* Wadsworth Series in Labor Economics and Industrial Relations, Wadsworth Publishing Co., 1970.

Thurow, Lester C. *Poverty and Discrimination,* Washington: The Brookings Institution, 1969.

William, T. T. "The Role of the 1890 Colleges and Universities in Research on Minority Problems." *Amer. J. Agr. Econ.,* 55(1973):947-51.