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Edited with an introduction by

THOMAS T. WILLIAMS

SOUTHERN UNIVERSITY

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In Observance of Southern University's Centennial Year

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The 1890 Land-Grant Institutions

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During the Workshop, a draft copy of each paper was presented and discussed by a peer group with members from universities, government agencies and non-governmental organizations. Workshop participants provided constructive comments and information. In addition, presidents or chancellors of the 1890 and 1862 land-grant institutions and the planning committee provided useful suggestions during the Workshop and the preparation of this publication. To all of these individuals, the editor expresses his gratitude.

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PART ONE

INTRODUCTION

Thomas T. Williams

Dr. Thomas T. Williams is professor of agricultural economics and director of the Unemployment-Underemployment Institute; the international component at Southern University. He earned Ph.D. in agricultural economics from the Ohio State University. He is adjunct professor at Cornell University and Louisiana State University and a member of the Economic Council for the governor of Louisiana. Dr. Williams is the author or co-author of over 25 papers, reports and articles spanning domestic and international development. In 1966, he served as a Fulbright professor at the Agricultural College of Malaysia and from 1967-68 he was chief economist for Ford Foundation development projects. Currently, Dr. Williams' professional interests focus on programs to transfer appropriate technology to people in developing countries. He has served as director of a study to help the United States prepare for the 1979 United Nations Conference on Science and Technology for Development. In addition, he serves on a number of international boards and groups to help prepare the United States' position paper.

Included in this publication are the papers prepared by scholars and presented by them at the July 8 to 10, 1979 Workshop held at Southern University. The papers are as follows: (1) The Role of the 1890 Land-Grant Institutions as Change Agents for Development; (2) Social, Cultural and Economic Characteristics of the Clientele; (3) Educational Thrust of the 1890 Land-Grant Institutions; (4) Research as a Tool for Development; (5) Mechanisms for the Delivery of Appropriate Technology—Extension, and (6) The Uniqueness of the 1890 Land-Grant Institutions as Viewed by an Administrator of a 1862 Land-Grant Institution.

The papers listed above offer valuable insights into the role 1890 land-grant institutions have played and continue to play in the development of America. These papers mirror the expertise located at these institutions for international development. For those who are knowledgeable of the history of the 1890 land-grant institutions, the papers should serve as a catalyst to increase involvement of these institutions in both domestic and international development. The unique perspectives offered in the papers should strengthen the sense of purpose of the 1890 institutions, renew their commitments to excellence, and foster greater financial support from government and foundations for these institutions.

In Retrospect:

There are insights the papers cannot fully quantify or transmit and this introduction will address some of these limitations and offer some specific recommendations for expanding the international role of these institutions.

The history of the 1890 land-grant institutions is part of the history of the struggle of American blacks for equality. That history is the story of destroyed dreams and abandoned hopes. It is the story of courage against seemingly insurmountable odds, the refusal to let hope be quashed by intolerance, and the relentless dedication to principles. It is perhaps best left to the artists and poets to convey the full scope of that struggle of blacks.

Written words, television documentaries, or filmed reports cannot fully mirror the obstacles citizens in many developing countries face. Starvation, disease, famine and deprivation are commonly used words in news reports to describe situations in many developing countries. These words convey a message of something that is happening to "others" somewhere else, as though brutal and grisly episodes of ancient history were repeating themselves. It is fortunate that humans have the ability to forget the pain they have suffered. It is not as fortunate that we have the ability to forget and ignore the pain that humans are now suffering elsewhere.

Full recognition of the challenges faced by people in developing countries depends on person-to-person contact. Awareness of the necessity for meaningful change hinges on the awareness that borders cannot protect a country from the problems that affect another country. Fostering sensitivity to these human problems that respect no border, sex, skin color or age depends on factors that social scientists have not yet been able to pinpoint or identify.

We are aware of the challenge faced by most developing countries. We are also aware that the possibility of solving problems dies when "hope" and perseverance are quashed. Certainly, the history of blacks in America and the 1890 institutions are examples of what hope and commitment can accomplish. The background for each paper in this publication deals with the problems associated with poverty, geographic and academic isolation, and exclusion from the social and economic mainstream of black people. The 1890 land-grant institutions have accumulated invaluable expertise needed by peoples in developing countries.

The obstacles that people in developing countries face in their attempt to achieve full economic and social parity with people in the developed nations have become more difficult. While oil shortages have disrupted trade balances in the developed nations, such shortages

threaten to bankrupt the developing countries. While the history of American agricultural productivity was fostered by access to fertile virgin land, developing countries are left with land scarred by soil erosion, infertile from centuries of cropping, and farms too small to support a family.

Coupled with the increased costs of manufactured inputs and the escalating costs of energy, the need to increase agricultural productivity has taken on a new urgency. Natural resources are finite and so, unfortunately, is human understanding. The combination of these two factors associated with the accelerated pace and costs of change means that many developing countries cannot afford the luxury of well-intentioned mistakes. There are real dangers that efforts to help developing countries will be viewed as hopeless.

The benefits that accrue from international cooperation and mutual assistance have become hostage to political and social factors. Research to develop a new rice variety, plans to open a new school, implement a nutrition program, or eradicate livestock disease in a developing country are often overshadowed by the news of an international conflict. Too often news of international strife receives greater attention and coverage than the dramatic steps that are underway to foster enduring development that helps people improve their quality of life. Today, we are beset by news of social and economic ills, both here and abroad. In the future, there will probably be more pressure in this country to curtail international development assistance on the assumption that such efforts somehow imperil domestic growth and tranquility.

Support for international development assistance is likely to reflect the perceived utility of the development efforts. Although international development has always confronted formidable challenges and has belied simplistic or ideological solutions, the pressure for easy and quick solutions to complex problems are likely to increase. Scholars and researchers would be foolish to ignore these perceptions or to deny their legitimacy. Instead, researchers and scholars should recognize that international efforts must develop realistic and viable solutions to pressing problems. The mounting pressure in this country that international assistance produce "immediate results" could be a positive force for applied or action-oriented research. Communication that transcends borders and ideological differences in the pursuit of solutions to the world pressing problems is greatly needed.

Facing the Future

A clear message obtained from an examination of the history of the 1890 land-grant institutions is that abandonment of hope or commitment will be a prelude to the failure of any development program. The task of

international development is not easy but it is not impossible. The time developing countries have to test theoretical models of development that do not conform with reality is running out.

Theories of international development are useful and invaluable to organize what can be conflicting and confusing facts. Theories can provide new insights into possible development alternatives and can point out the deficiencies of past policies. But theoretical conceptions can also conceal a basic lack of sensitivity to the problems faced by developing countries.

International development efforts must transcend ideological barriers and must be jarred loose from the constraints of theoretical misconceptions. Models of economic development should serve as a point of reference and should not serve as immutable models that limit development options. Each of us might be extremely skilled in our specialty, but few of us have the ability to ascertain every minute factor that will affect development. International development requires workers who are sensitive to the needs of others. The individuals must be strong enough to tolerate criticism, forceful enough to press for what they know to be true, humble enough to recognize that they do not have all the answers, wise enough to understand that they may be misunderstood, and human enough to accept the fact that they can be changed and can also be the impetus for change. All of these factors should be understood by those who seek to affect change. Again, the history of the historically black 1890 land-grant institutions mirrors their understanding of these development constraints.

As an economist, interested in the full utilization of all resources, the editor has faith in the legitimacy of the economic laws that govern our lives; but, as a researcher and international scholar, the editor also recognizes events and circumstances when economic principles are woefully inadequate. For example, profit is an integral and necessary part of economic activity and should not be ignored as a motivating force. However, the pursuit of profit alone does not always work in accordance with the precepts advanced by Adam Smith's concept of the "invisible hand."

Multi-national corporations have an important and irreplaceable role in fostering economic development. While multi-national corporations can effectively and efficiently transfer certain appropriate technologies, developing countries are questioning whether the technology transfer serves the pursuit of profits at the expense of their economy. International corporations find more lucrative markets in developed nations where per capita disposable income is higher than in developing countries where per capita personal disposable income equals several hundred pennies. The logic of this economic dictum is obvious; however, it is not so apparent when developing countries

attempt to determine whether development that increases profits and economic growth will also be the best course for development of human resources or sustained quality of life.

Papers presented in this publication provide another view to economic development. The content of these six papers illustrate the belief that international development efforts must rely on people who are aware that solutions to problems may change as circumstances change. Review of the accomplishments of the 1890 land-grant institutions presented in this publication are encouraging and with minor changes, the blueprint they have developed can be appropriately transferred to developing countries. Developing countries are not asking for theoretical solutions for such answers are readily available in textbooks and articles. Developing countries are asking for help in finding solutions to their pressing problems. The distinction is an important one, though it may not be readily recognized.

Raising literacy levels is an important component of economic development and is an integral part of the search for solutions in developing countries. Education must be more than retention of facts or an infusion of skills. It must teach independence of thought and the ability to reason. Education as a development tool must instill people with the sensitivity to accept differences as well as the ability to recognize similarities. These are precepts that are difficult to quantify or to transmit. This publication is important for it provides us with a demonstrated educational plan for development.

The papers in this publication convey factors that have helped millions of black Americans press for change while contributing to society. Emphasis has been given to lessons learned through working with small farmers, low-income rural and urban populations, and the know-how developed. The 1890 universities are located in areas where agriculture is similar to that found in many developing nations. Limited adaptation would be required to enable personnel from the 1890 land-grant universities to help other countries alleviate the problem of achieving self-sufficiency in food production. The Workshop and the papers presented by the scholars stress the extended commitment of the 1890 land-grant institutions to participate in international development assistance.

Summary

Enumerated below is a summary of the unique resources located at the 1890 land-grant institutions with implications for international development:

- The rationale for involvement of the 1890 land-grant institutions in international development is justified by their commitment to, and

competence in, c. communicating with the people of developing countries.

- Significant justifications for involving the 1890 land-grant institutions in international development programs include reciprocal benefits to United States agriculture and the economy, and support for the need to strengthen the international component of these institutions.
- The potential role of the 1890 land-grant institutions in international development has been influenced by recent legislative mandates and political trends.
- The extensive involvement of the 1890 land-grant institutions in international development is contingent upon cooperation and support by the Agency for International Development (AID), Food for Peace (PL-480), FAO, UNDP, UNICEF, World Bank, private philanthropy and foundations.
- The Title XII legislation has important potential for facilitating the involvement of the 1890 land-grant institutions in food, nutrition, and agricultural development.
- Since inception, the 1890 land-grant institutions have been by design extensively involved in human and community resource development.
- The 1890 land-grant institutions have been and continue to be involved in rural development in the United States under conditions which parallel the needs in most developing countries.
- Among the 1890 land-grant institutions are those which have been and continue to be involved in international development programs, particularly, agricultural development.
- There is a pool of scientific and technical indigenous personnel who were trained at the 1890 land-grant institutions and who could be used in international, human, and community resource development.
- Maximizing the benefits of technical assistance provided by the 1890 land-grant institutions will require major input by the government, as well as institutions, research centers, and individuals of the host country.
- The 1890 land-grant institutions must affirm their commitment to international human and community resource development.
- The formation of an informal coalition of donor agencies within developing countries could facilitate the coordination and implementation of appropriate technology transfer by 1890 land-grant institutions.
- An organizational mechanism for the transfer of appropriate technology to developing countries by one or more 1890 land-grant institu-

tions in administrative association with one or more 1862 land-grant institutions could be mutually beneficial.

- Conduits should be developed and implemented to publish professional articles emphasizing international development research underway at the 1890 land-grant institutions. Foundations and USAID should support such an endeavor.
- Joint involvement by two or more 1890 land-grant institutions could be mutually beneficial.
- The 1890 land-grant institutions constitute an invaluable national resource that should be increasingly strengthened and utilized for fulfilling USAID's commitment to famine prevention and the elimination of hunger around the globe.
- Final outcome of the involvement of the 1890 land-grant institutions in appropriate technology transfer to specific countries is influenced by the prevailing socio-cultural and political structures.
- Existing and potential linkages which show promise of aiding the implementation of international agricultural and rural development should be strongly encouraged and promoted by the 1890 land-grant institutions, government and private funding agencies.
- Site visits to the 1890 land-grant institutions by AID personnel should be immediately planned and implemented.
- Site visits to the 1890 land-grant institutions by teams of representatives from government, foundations, and individuals from developing countries should be planned.

The 1890 land-grant institutions have a proven record of educating blacks in the United States and could now utilize that expertise to help improve the quality of life for people in developing countries. These institutions have the know-how to identify latent talent; the willingness to use their expertise to develop that talent; the commitment to persevere in working with that talent; and the understanding to know where the talent can best be used to assure maximum impact on development. This publication not only represents a "design" by the 1890 land-grant institutions for development, but it also expresses their desire, capability, and availability for greater involvement in international development.

PART TWO

THE 1890 LAND-GRANT INSTITUTIONS AS CHANGE AGENTS FOR DEVELOPMENT

Jesse N. Stone, Jr.

Dr. Jesse N. Stone, Jr. is president of the Southern University System. He holds B.S. and J.D. degrees from Southern University, Baton Rouge, Louisiana. The Southern University System consists of three campuses with a combined enrollment of approximately 14,000 students with a professional staff in excess of 600. The number of classified and unclassified staff members in the system total about 1,000. President Stone has received many awards. He is a trustee or director of numerous organizations, and an active public servant. He is a member of the Louisiana Bar Association and is qualified to practice before the Louisiana and U.S. Supreme Courts. President Stone has traveled extensively in developing countries and provides aggressive leadership to assure significant involvement in international programs by the Southern University System community.

When the Association of University Directors of International Agricultural Programs (AUSUDIAP) met at Southern University in June 1979, the conference dialogue focused on how to meet the manpower needs for international agricultural development. There was no doubt about the continuing viability of the 1890 land-grant institutions nor was there any doubt about the ability of these institutions to conceive and design programs to assist the underdeveloped nations by delivering the necessary appropriate technologies.

The 1890 land-grant institutions have played, and continue to play, a large role in the progressive evolution of human society. The accumulated knowledges and skills of the 1890 institutions have developed over nearly 90 years to meet the needs of people, wherever they live.

Utilizing the resources of 1890 land-grant institutions to raise the level of living of persons to whom life has been harsh and frightening is an undertaking worthy of honorable men. All of us envision larger responsibilities for these institutions based on their commitment to those who would build a better world. The endeavor will prove, beyond any doubt, that the hopes and aspirations of people who seek to share the bounty of this earth are neither flights of fantasy nor vain.

The recent memorandum President Carter issued to the heads of executive departments and agencies committed his administration to enhancing the strength and prosperity of this nation's 1890 institutions. His statement recognized the basic role played by these institutions in the social and economic growth of this nation and, directly or indirectly, of the world. The official recognition of these contributions by the President is an exciting development. This new legitimacy may bring increased support that will enable the 1890 institutions to extend their services.

Even with the meager support that 1890 land-grant institutions have received in the past, these institutions have helped innumerable people advance themselves. The clientele which they served, both by custom and by law, has largely lacked literacy, possessed limited economic resources, and was often dispirited. These institutions have also been agents of change for those outside the black community of America—an accomplishment conceived by no one at the time these institutions were founded. Even today, there are many who have a narrow view of these institutions and foolishly argue that their usefulness has passed.

Although their services are limited to a small sphere, much to their regret, these limitations spawned their preparedness to serve the present age. "The stone which the builders rejected," so it has been said, "has become the chief cornerstone" in this age of the development of an international community.

The 1890 land-grant institutions have historically been the academic meeting places for the disadvantaged of this nation. The minds trained by these institutions have fostered talents and revived creative spirits and enthusiasm to aid development of the new moral consciousness of America. These students have raised the productivity of America in every area of economic activity, enhanced the cause of justice, fostered equity, helped forge the new humanism abroad in the land, and have even induced a new framework for artistic expression by showing the inadequacy of the old in an age of technocracy.

This nation is far different than when the second Morrill Act was passed in 1890, it is different from what it was 20 years ago, and it is also different from what it was a month ago. These changes reflect not only the advances made in the pure and the applied sciences, but also reflect advanced social awareness. Among agents which have changed this nation must be included the work and the human products of the 1890 land-grant institutions. If they can affect such changes for good in a nation as self-sufficient as the United States, they should certainly, in some way, be able to affect positive changes in the commonwealth of nations.

Changes are needed. The Food and Agricultural Organization of the United Nations surveyed the state of food and agriculture in 1977 and

reported that 12 out of the 45 countries most seriously affected by drought were suffering severe food shortages; eight of these were African countries. The Sahelian countries faced a food deficit considerably higher than in the previous 2 years. Only small gains in food production were found in Latin America. Food production in the Near East was estimated to have increased by less than 1 percent in 1977.

In the developed regions, food production increased in Western Europe, decreased somewhat in Eastern Europe and Russia and increased in North America.

These data show that hunger is still the major unsolved problem confronting the international community. Malnourished people are retarded in their intellectual and physical development, suffer from debilitating diseases, and their frustration can be exploited. Changes are needed if the developing countries are to contribute to the health and welfare of the international community.

The 1890 land-grant institutions can assist these efforts by applying the skills they have developed and used with the black community in the United States. The techniques that have lowered the level of illiteracy among the educationally, economically and culturally deprived; made black farmers more productive and better citizens; transformed skilled but untrained people into skilled artisans and craftsmen; and freed minds to conceive and create are now available to help the peoples of developing countries. More specifically, these institutions have demonstrated that they can do the following:

- Help developing countries enlarge their knowledge base and learning skills and establish moral standards to match their new knowledge and skills.
- Help the third world institute technologies appropriate to their own environmental circumstances and resources.
- Convince developing countries to make accurate assessments of their natural, economic, cultural, and human resources.
- Demonstrate that patience in planning and in execution is the key to enduring development.

Enlarging the Knowledge Base

Research conducted at the 1890 land-grant institutions involves both undergraduate and graduate students and increases the number of potential investigators who, in turn, will produce new knowledge. What a boon it would be for the developing countries if they could produce their own researchers! Our experiences can be of immeasurable value to them.

More knowledge is added by the attention given to the day-to-day problems encountered in community life through extension programs. Application of the knowledge garnered through research into the needs of people enlarges knowledge and sustains hope.

The 1890 land-grant institutions have always imbued their students with a sense of moral purpose. Programs at the 1890 land-grant institutions that enhance intellectual and moral development have borne fruit. Knowledge development and skill development without ethical development can create social misfits who impede social progress.

Guidelines for improvement must also transmit those virtues which have strengthened black Americans' thrust toward full development. This wholeness has helped our clientele and can also help those in developing countries.

Effective change agents must consider the environmental circumstances and the resources of those whom they assist. They should define need in terms of environmental circumstances and resources to avoid providing meaningless knowledge.

The technological know-how commonplace in this nation exceeds that in most other countries. Techniques that may be effective in our environment which utilize our resources may not be effective in developing countries. We know how to develop technology adapted to the unique conditions faced by those for whom the program is planned.

We have seen the failure of many programs designed to help us. Many have failed because they did not accurately assess the problems they hope to alleviate.

Progressive change results only when limitations are considered. The resources define what can be achieved. Change agents know the wisdom of making accurate assessments and they must convey that wisdom to those who they would assist.

Key Element to Development

Experiences have shown that raising the standard of living of a deprived people is not accomplished in a fortnight. Since 1890, much has been done to bring black Americans to the point where they enjoyed the fruits of liberty through fuller participation in the mainstream of American life. These efforts have been rewarded as is evident by the roles that blacks are assuming in government, education, the professions, service occupations, and in the lives of persons with learning deficiencies who have been transformed into productive individuals. Our students become productive not simply because their communications skills have been improved, but because they are exposed to the story of human progress, to the lessons of that story, and to the liberalizing effects induced by this kind of involvement. At the same time, they

developed the prerequisites for meaningful career experiences in an environment where an appreciation for self-worth is developed. Evidence of the character of the educational experience in the 1890 land-grant institutions work is found throughout America.

We need to organize those experiences and promulgate them for the world community. The Piagets and the Montessoris have influenced the pedalogical development throughout the developed world; the techniques employed in our classrooms can influence the pedalogical development throughout the developing world. Our educational process has proved that the international programs we have developed can transmit these achievements to nations which sorely need educational models.

The knowledge base is enlarged through research as well as teaching. The paucity of research in the 1890 land-grant institutions prior to the 1960's has hopefully ended. Federal support of research in 1890 institutions will support American communities.

Black Americans have been sustained these many years by patience and hope. We have executed our plans with patience. Patience has been the key to our continuing development.

Anxiety and frustration are part and parcel of life for developing peoples and developing countries. Enduring change, however, comes only with those who can bridle their anxieties and override their frustrations.

As agents of change, the 1890 institutions have demonstrated what can be accomplished to other developing nations. As has been said elsewhere, "The wheels of progress grind slowly, but they grind." The rich and varied experiences of the 1890 land-grant institutions have shown that dedication and skill can successfully lead to change. These accomplishments can also transform life for deprived people elsewhere in the world.

PART THREE

SOCIAL, CULTURAL, AND ECONOMIC CHARACTERISTICS OF THE CLIENTELE

John Moland, Jr.

John Moland, Jr. is a professor of sociology and director of the Center for Social Research at Southern University. He earned B.A. and M.A. degrees in sociology from Fisk University and a Ph.D. degree in sociology from the University of Chicago. Before coming to Southern University, he taught at Florida A&M University, Grambling State University, and Fisk University. Professor Moland's major academic and research interests include social psychology, juvenile delinquency, community studies, and race relations. His current research involves rural community development and farmers' cooperatives relationship with socio-demographic and economic factors and studies of community satisfaction and integration. His research projects have been conducted in the United States and developing countries. Articles and book reviews by Dr. Moland have appeared in the American Sociological Review, the American Journal of Sociology, Social Forces, and Sociological Quarterly. He is a member of the American Sociological Association, the Association of Social and Behavioral Scientists, the Southwestern Sociological Association, the Southern Sociological Society, and the Rural Sociological Society.

The 1890 land-grant institutions, as other institutions, reflect the social, political, economic, and cultural milieu in which they exist. Historically, the conflict of values, economic inequality, and attitudes towards race have impinged upon black institutions and black life in general. These factors resulted in a constant struggle for survival for 1890 institutions.

The pursuit of education and equality of opportunity have been central themes in the struggle for black survival. The persistence and survival of the 1890 land-grant institutions, the services they rendered and continue to render for their constituents and for American education have provided a unique resource for development.

The Land-Grant Act of 1890 sought to remedy the systematic exclusion of blacks from the nation's 1862 land-grant institutions and private colleges. The Act created institutions that would serve the higher education needs of the families of poor black farmers, merchants, and mechanics.

In the South, the decades following the Morrill Act of 1890 were a period of great indifference to public education for blacks. The planter aristocracy and the ruling class thought that formal education was not meant for blacks because few blacks were thought capable of learning subjects such as mathematics, Greek, Latin, and philosophy. They justified this neglect by arguing that too much education would ruin a good farm worker.

Blacks' prescribed social status was influenced by racism—a philosophy which assumed that blacks belonged to a subhuman species and should be kept in their places as servants and farm laborers. Any training provided blacks was geared toward making them better farm workers.

Within a decade or so following passage of the Morrill Act of 1890, 15 southern states had established separate land-grant institutions for blacks. However, the social and political climate during this era was one of general hostility toward education for blacks. Most whites in the South were apathetic or indifferent to any kind of education for blacks. Sensing the national mood of appeasement, Booker T. Washington presented a program that reflected this mood and developed a program that stressed agriculture, mechanics, commerce, domestic service, and the professions. Washington's advocacy of vocational and industrial training expressed one of the basic capitalist assumptions, namely, that education at all levels should be more practical and provide training for profitable industrial pursuits. Thus, while higher education met some needs of blacks, it also mirrored the subordinated status of black people.

The original mission statements of the 1890 land-grant institutions emphasized practical education in industrial work and teacher training. At the time 1890 institutions were established, because of the literacy level of the black population, most of these institutions were organized into normal schools. Because of the heavy concentration on teacher education, they were sometimes called "teacher-preacher factories." Nevertheless, the teacher training programs of the 1890 land-grant institutions made major contributions to primary and secondary school instructional programs in the South and throughout the nation.

In 1890, about 61 percent of the blacks in the United States were illiterate; by 1910, illiteracy among blacks had dropped to about 33 percent. During the same period in the South, where about 90 percent of American blacks lived, illiteracy among blacks dropped from about 65 percent to 36 percent. By 1969, illiteracy among blacks in the United States dropped to 4 percent. The 1890 land-grant institutions have provided training and service programs to all age groups in thousands of communities.

The greatest obstacle confronting 1890 land-grant institutions has always been inadequate financial support by states. Since the second

Land-Grant Acts stated that: “. . . no portion of said monies, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings,” these schools had to rely on the states for all building funds and other operating funds. The inadequacy of financial support to the 1890 land-grant institutions is mirrored in statements from the publication, *A History of South Carolina State College*:

During these early years there not only were insufficient funds to support the institution there was also no separation of operational and capital funds. President Miller had to use operational funds for capital improvements . . . the Board of Trustees, in one of the reports to the State Superintendent of Education, made this statement: ‘The College has never been able to complete work at hand because of lack of funds, but has been on the hand-to-mouth basis ever since its establishment.’

Expansion of 1890 Land-Grant Institutions

Through strong leadership, faculty self-determination, and assistance from constituents and supporters, the 1890 land-grant institutions’ development persisted in spite of inadequate funding.

Departments have provided extension and home demonstration programs in farm and home gardening, food preparation and preservation, home improvement, clothing, furnishing, health, and sanitation.

The college community extended beyond the campuses into local areas. Short courses and demonstration programs attracted people from throughout the respective states in which institutions were located. These programs resulted in the development of leadership, pride, confidence, and interest as programs introduced blacks to the larger world of ideas and gave them a more realistic picture of the world. Felton G. Clark, former president of Southern University, wrote: “This new perspective served to make him acquainted and more dissatisfied with his personal inadequacies and the limited opportunities for correcting the inadequacies.”

The mission of these institutions responded to changing times and student interests and expanded to include instruction in agriculture, engineering, law, English, science, economics, military science, and graduate study.

The first institution to initiate a graduate program was Virginia State University in 1937 followed by North Carolina Agricultural and Technical in 1939. By 1950, six of the institutions had established graduate programs, and six more had established graduate programs by 1975. Regional accreditation was achieved by six of the institutions prior to 1940 and 11 had achieved regional accreditation by 1963.

The development of accredited 4-year programs and graduate programs is associated with decades of economic, social, and political growth and change. Eight of the institutions, or about half, qualified for 4-year programs during the 1920's while most graduate programs were initiated during the 1940's and 1950's. These programs gained regional accreditation and various curricula and programs have been accredited and approved.

Herman B. Smith, chancellor of the University of Arkansas in Pine Bluff, summed up the contributions of the 1890 land-grant institutions in this manner:

These colleges, in many respects, are truly national resources. In addition to serving their respective local areas as responsible and responsive centers of education and service, their alumni make important contributions to society across the entire nation.

Each of the public black institutions has gained full regional accreditation. In addition, various schools, departments of programs in these institutions also have achieved accreditation. This historical record offers some evidence of the commitment and potential of the institutions for continued achievement with more adequate financial and professional support.

Socio-Economic Considerations

The social, cultural, and economic background of black students reflected the struggle of an underprivileged group to obtain education formerly available only to the upperclasses and aristocrats. The drive for education and faith in education was very intense among the freedmen. The 1890 institutions did not select students according to their income, sex, or place of residence. Tuitions at 1890 land-grant institutions were usually kept as low as possible so sons and daughters from poor families could attend. These institutions and their programs served all segments of the population, including low income citizens, and mirrored the American ethic of equality of opportunity for all.

Current socio-economic characteristics of the 1890 land-grant institutions are significant. From 1974 to 1978, data show that a slightly greater percentage of females were enrolled at 1890 institutions than males. Fifty percent or more of the students were from families with annual incomes of less than \$5,000. The percentage of students from families with incomes of \$10,000 or more enrolled in 1890 institutions ranged from a low of 13 percent to a high of 47 percent. The 1890 land-grant institutions have historically had an overwhelmingly high proportion of low-income rural students. Education received at these institutions had been the means by which male and female students attained upward mobility.

Entrance into college has called for a wide variety of new adjustments on the part of these students. The problems of guidance and student adjustment to college life are complicated by the low-income rural background of many students. These students' views of the world are usually limited by their language and ideas combined with the folk-psychology resulting from restricted communication with the larger society.

Low-income rural families must cope with urgent needs and the vicissitudes of an uncertain economic status. Thus, long-range thinking, planning, and time budgeting required to achieve a college education which previously were either of little immediate value or unknown, must be learned. The faculties at the 1890 land-grant institutions are sensitive to the problems and conditions of their students. Personal relationships between understanding faculty members and students imbues the students with the feeling that "I'm somebody." Channels for educational communication and understanding are opened. The students' sense of genuine acceptance sets the stage for teaching and learning. W. E. B. DuBois wrote, "The proper education of any people includes sympathetic touch between teacher and pupil; knowledge on the part of the teacher, not simply of the individual taught, but of his surroundings and background, and the history of his class and group." Because of past social and cultural conditioning, it requires time for low-income rural students to unlearn old habits and acquire new ones. This tradition mirrors the economic, political, and social conditions under which blacks have lived and struggled to survive while promoting the growth and development of 1890 institutions which aided the black community and society as a whole.

Implications for Developing Countries

Many of the programs at 1890 institutions have significant implications and parallels to programs now required in developing countries. The 1890 land-grant institutions have had to struggle for survival and constantly adjust to changing conditions. These constraints have resulted in flexibility in achieving goals, including flexible teaching methods. Flexibility and sensitivity to the social and political climate were necessary for personal and institutional survival.

The 1890 institutions experimented with a variety of techniques to overcome the educational handicaps of their clientele. The techniques were not limited to classroom meetings and the teaching of traditional subject matter. They also prevailed in community development work in nonformal instruction, one-on-one instruction, and the use of citizen communicators or indigenous leaders as para-professionals.

Working with developing countries requires knowledge and sen-

sitivity to the social, economic, and political conditions, including a recognition of cultural taboos. Sensitive, patient, understanding persons are needed to teach and work in developing countries.

Another theme evident in the experiences of the 1890 land-grant institutions is their total commitment to equality of opportunity. Although there is a growing concern for human rights, the doors of these institutions have always been open to all faculty and students, regardless of race, creed, color, or sex. These institutions have championed the cause of equal opportunity to those who were denied it or who could not afford it. The presence and significant involvement of American blacks with programs in developing countries will demonstrate America's belief in human rights.

Extension, home demonstration, and research programs at the 1890 institutions were designed to work with farmers and homemakers in community development often with the assistance of trained, para-professional indigenous leaders. The training of indigenous community leaders is a necessary component of a viable and operative economic development program designed for people with limited resources. These leadership training programs assume that:

- There are talented indigenous community leaders in every community;
- Grassroots leaders can be identified through social research techniques and by professional and conventional workers;
- Indigenous community leaders are sensitive to the problems in their local communities;
- Universities and other agencies can be helpful when they listen to community leaders talk about their problems as they perceive them;
- Universities and other agencies can initiate efforts to aid in the amelioration and solution of community based problems;
- Trained indigenous community leaders can become participants and catalytic agents for socio-economic change; and
- Indigenous community leaders are effective communicators and disseminators of information.

The 1890 land-grant institutions have always enrolled disadvantaged and low-income citizens. Many students come from rural backgrounds with limited exposure to new ideas and little experience in an urban industrial setting. The faculties' sensitivity to the problems and conditions of these students has provided them with the patience and knowledge to foster the educational growth and development of these students. The experience of working with low-income rural students and families and the methods these institutions have developed are invaluable resources that should be fully utilized for development efforts in developing countries.

PART FOUR

EDUCATIONAL THRUST OF THE 1890 LAND-GRANT INSTITUTIONS

C. A. Williams

Dr. C. A. Williams is executive vice-president and professor of education at Alabama A & M University. He has served as professor of education at Tuskegee Institute and deputy administrator in the U.S. Department of Agriculture. Dr. Williams is a graduate of Tuskegee Institute with a B.S. Degree in Agriculture and received a Ph.D. from Cornell University. Dr. Williams has distinguished himself in program and staff development, personnel training, and management systems. He has written on a number of subjects in the field of education including the transfer of appropriate technology to limited resource people in the United States. Dr. Williams serves as a member of the Executive Officers' Committee for Institutional Planning and supervisor of the university-wide development and long term planning activities.

Title XII of the United States Foreign Assistance Program and other international efforts have brought into sharp focus the need to increase and improve agricultural production in the world. The legislation emphasizes the role of land-grant universities in food production and agricultural development. In describing the role of land-grant universities, Public Law 94-161, Section 296, Congress declared:

That the establishment, endowment, and continuing support of land-grant universities in the United States by Federal, State, and country governments has led to agricultural progress in this country;

That land-grant and other universities in the United States have demonstrated over many years their ability to cooperate with foreign agricultural institutions in expanding indigenous food production for both domestic and international markets;

That research, teaching, and extension activities, and appropriate institutional development are prime factors in increasing agricultural production abroad (as well as in the United States) and in improving food distribution, storage, and marketing.

This legislative mandate and the commitment of the president and other federal and state officials clearly point up the need for involvement

by the United States in international development. The developing countries face extremely serious agricultural problems. As the population of these countries continues to accelerate, the problem of increasing food output to keep pace with consumption is indeed serious.

Agriculture not only provides an adequate supply of food, but also contributes to community and economic development. Complex agricultural problems also affect social, cultural, and educational development. The successful agricultural and educational systems of the United States will be largely wasted if they are not understood and accepted by decision makers in the developing countries. Cooperation and collaboration with officials of developing countries is essential to plan, implement, and evaluate technological assistance provided by 1890 land-grant institutions.

While few developing countries have the resources and technology for agricultural development that are available in the United States, most have the potentials for development. Developing these potentials requires steps to develop formal and informal educational systems to generate scientific knowledge and to disseminate the research results to users. New institutions and technology centers may have to be established to discover, disseminate and adapt information, as indicated in the following excerpt from the first annual report of the chairman of the Development Coordination Committee:

The toll in human suffering, in hunger and debilitating disease, in environmental degradation due to agricultural practices that result in widespread erosion and salination of productive land, cannot be fully described in statistical terms. Most are correctable through the spread of knowledge and skills and addition of physical capital. New job opportunities can be recited in numbers, but the value of a new sense of command over one's future, or a new perception by the poor of their ability to improve their own and their children's prospects, are benefits beyond calculation.

The greatest need for assistance is among the poorest group of countries. In general, these are countries at the lowest stage of development, with the least access to private sources of capital, the current domestic savings rates, and the poorest growth records.

The 1890 land-grant institutions have always helped the poor, the alienated, and the deprived. International development programs would strengthen 1890 land-grant institutions. The international experiences of faculty and staff will bolster teaching, research, and extension programs. International experiences will also foster greater understanding of the problems faced by developing countries as foreign students attending 1890 institutions exchange ideas and experiences with American students. The resulting dialogue will sharpen awareness of problems

and identify new solutions to these problems. The establishment of an international development component will integrate domestic activities (teaching, research, and extension) with short- and long-range programs and objectives.

In order to best utilize faculty and staff resources, 1890 and 1862 land-grant institutions and participating historically black institutions of higher education may need to form consortiums or similar groupings. Such arrangements will help personnel and foster the interchange of knowledge needed to accelerate international development.

Any formal or informal system of education must be based on the needs, policies, conditions and political, social, and economic constraints of the countries involved. Most developing countries have European systems of education which are often different from the U.S. system of education and from the educational system in land-grant institutions. Only sound systems of education and adequate research and extension can alert developing nations to alternative and enduring solutions to problems. Providing assistance to these nations is a challenge that will also provide long-range benefits to 1890 land-grant institutions and to the United States.

Similarities, Differences and Constraints

The Morrill Acts which established the land-grant system provided for the teaching of agriculture, the mechanical arts and other related subjects. These institutions, established especially for the working people were known as "People's Colleges."

When the second Morrill Act was passed, the United States and the South in particular, were predominantly rural and agrarian. Farmers, however, based farming decisions on practical experience or empirical knowledge. Such knowledge did not meet the needs of a developing agricultural industry. Land-grant colleges soon found that empirical knowledge was not meeting farmers' needs and they established the experiment station system. Research conducted by these stations became the basis for the curriculum in agriculture. But education and research information was usually only available to a few farmers. The masses, who also needed information, were not receiving it. Useful research results were not reaching farmers who lacked scientific knowledge, skills, and understanding. A gap was created between available research and farmers' use of new techniques.

Many different ideas attempted to narrow the gap such as farmers' institutes, conferences, movable schools, and town hall meetings. Such efforts were designed to extend the education and research results to individuals who could not or did not attend school. In arranging the Fifth Annual Conference in 1896, Dr. Booker T. Washington stated the

purpose as follows:

The aim will be, as in the four previous years, to bring together for a quiet conference, not the politicians, but the representatives of the common, hard-working farmers and mechanics—the bone and sinew of the Negro races—ministers and teachers. Two objects will be kept in view. First, to find out from the people, themselves, the facts as to their condition and to get their ideas as to the remedies for the present evils. Second, to get information as to how the young men and women now being educated can best use their education in helping the masses. . . . It is believed that such a meeting of workers for the elevation of the Negro, held in the “Black Belt,” with the lessons and impressions of the direct contact with the masses of the colored people fresh before them, can only result in much practical good to the cause of Negro education.

The movable school concept developed from these conferences. Homes, churches, and other meeting places were visited to determine existing conditions—needs assessment—and how to best teach new and improved farming and living methods. The philosophy started with people where they were—socially, economically, educationally, culturally—and moved them to predetermined desired goals and objectives.

Dr. Washington described the movable school as, “A farmer’s college on wheels which educates farmers in the field, while the Institute is teaching his children—a kindergarten method of making thrifty land-owners out of hand-to-mouth Negro tenants.”

The success of these and other initial ventures in informal education led to the concept of cooperative extension education, and the Smith-Lever Act of 1914. Cooperative extension’s educational mission does not merely extend and apply technology. Early extension leaders at the 1890 land grant institutions saw cooperative extension ultimately developing people so that they, through their own initiative, might analyze situations and identify and solve problems. Thus, the extension educator became more than a “teacher” and the extension service became more than an “educational organization.” Extension workers helped people solve problems they confronted in everyday living. While these land-grant institutions have successfully revolutionized American agriculture, there is a need to move cautiously in attempting to “transplant” this technique to developing countries. Thus, we must carefully establish criteria and guidelines to design systems and development programs that are flexible enough to meet the needs of specific countries.

There are similarities between conditions in the developing countries and those that existed in the rural South around the turn of this

century. Similarities include: labor-intensive rather than capital-intensive systems; low educational levels; small farm operations; an inadequate knowledge base and technology-transfer system; poverty and malnutrition; inability to take the financial risks required to implement new technology; high infant mortality rates; and inadequate health services.

The similarities between rural life and agriculture in the South and conditions in many developing countries indicate that 1890 land-grant institutions are sensitive to the needs and problems of developing countries and provide much-needed technological assistance. The educational philosophy of 1890 institutions has always been based on the following principles:

- The masses are intelligent and opportunities will motivate them to utilize that intelligence.
- All human endeavors can be bettered through education.
- If people cannot get to school, the school must go to them.
- Effective education must begin at levels accessible to, and understood by, the people to be helped.

There is much to learn about the educational problems of developing countries and how to solve such problems. Communications have changed temporal and spatial relationships in this country but have not had the same dramatic effects in developing countries. Economic patterns, cultural and social behavior of people in this country are quite different from those of developing countries. Education shaped the organization of agriculture and industry in the United States and land-grant institutions were the key element in communicating knowledge and technological advancement. Agricultural education, especially formal education, in this country is supported by a strong knowledge base and research system. The system integrates counties, states, universities, and federal agencies, each of which is free to contribute to the total development effort. Developing countries lack such clear-cut structures and systems. Initial land-grant efforts bypassed the very poor, and did not help many Americans move into the mainstream. However, the 1890 land-grant institutions developed and implemented programs for this group in our society.

The second Morrill Act provided education to Americans who had previously been denied not only education, but full participation in the economic system. Disadvantaged citizens in many developing countries are similarly removed from the benefits of technological advances and educational opportunities.

Designs for international development assistance should be based on the needs and conditions of specific countries. Without such an

approach, one cannot focus on high-priority issues and problems so vital to future success. Failure to assess needs and capabilities will limit progress to plans, eloquent discussions, quick starts—ultimate failure. With effective designs for international development, 1890 institutions can provide useful and meaningful assistance.

To plan an educational system, the social, political and religious forces must first be examined. Educational systems generally reflect the philosophy of the country, whether or not that philosophy is explicitly stated. Many developing countries do not have uniform patterns of formal education. Some educational systems reflect a long, slow evolution and can be understood only by studying the history and traditions of these countries. Others have resulted from sudden revolutions and have been used by governments to foster changes favored by the emerging nations. The suddenly accelerated pace of social and economic changes for some developing nations may be reflected in changes in the educational system. These diverse conditions must be understood when conceptualizing an educational system.

During recent years, most of the developing countries have become increasingly interested in providing better educational systems and programs for their people. The interest has been stimulated by many developments, including the establishment of, and contributions from, such organizations as the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Although the UNESCO constitution succinctly states some basic goals for member nations, and hopefully for all nations, these trends do not suggest that nations will or should adopt identical educational systems. Some differences that reflect diverse cultures may be stimulating and challenging. Most national plans have weaknesses as well as strengths and continued study is needed to provide information that will help each country gain better insights into their problems and solutions to these problems.

Although some problems hamper the development of an effective educational system for developing countries, there are some factors that should be considered: sense of national unity, economic status, attitudes toward international cooperation and understanding, political awareness, basic beliefs and traditions, including religious and cultural heritage, and status of progressive educational thought.

Educational reforms and practices may be imported to other countries, but they must be modified to fit local traditions and practices. More change will occur when educational systems are organized so that personnel in developing countries can receive, evaluate, and adopt new ideas. There is, in short, no simple design for an educational system which will be "right" for all developing countries.

A comprehensive educational system should train people so they can participate more intelligently in community affairs and thereby

contribute to social and economic development. Since most developing countries do not have the required financial or human resources, cooperative linkages between the 1890 land-grant institutions and the developing countries should be encouraged.

Adult education and literacy programs will be emphasized in those countries where many adults lack formal education. A network of community based programs that meet community needs could provide basic trade instruction. Such a program would provide additional training for those students who do not have the opportunity to complete their formal education.

Leadership training could provide a continuous-learning program for community leaders. A carefully determined series of steps could progress from a readiness-for-training stage through induction, orientation, basic and advanced training, and informal on-the-job help. Such training could help community leaders establish groups engaging in a great variety of activities including recreation, cultural, and social and political action.

Extension education depends on voluntary participation. Education is the primary function of the extension service. Professional extension staff members and the people plan, implement, and evaluate educational programs designed to solve problems. Extension education ultimately develops people so that they can analyze situations, identify problems, and implement solutions themselves. Education triggers changes in behavior through changes in knowledge, skills, attitudes, and understanding.

It may be some time before secondary and higher education become available for farmers and rural people in many developing countries. Therefore, effective extension education will ensure that research results contribute to agricultural education and social development while secondary and higher educational systems are being planned. Developing nations seek a fresh approach to update, revamp, and restructure curricula in an effort to design and sustain an adequate, timely, appropriate, and relevant educational system. The 1890 land-grant institutions can take the initial steps to transcend local boundaries and broaden the goal of the two Morrill Acts to serve society in all corners of the world. Because 1890 institutions have always worked in areas that are critical to basic education and have successfully served people similar to those that must be served in developing countries, they are uniquely qualified to help developing countries plan and implement educational programs. The 1890 institutions stand ready to assist developing countries eradicate the twin scourges of hunger and disease and achieve economic and educational stability and growth.

Hundreds of specialists from these institutions have served as consultants in developing countries and 1890 institutions have trained

thousands of students from these countries. Such involvement in international development poses challenges and opportunities. Although there are vast differences between the United States and developing countries, the history of 1890 institutions shows that these differences can be a source of cooperation and progress. Educational development must be nurtured and progress will require careful planning. Efforts in the rural South may not show the exact methods by which to assist developing countries, but accomplishments indicate that the task can—and must—be accomplished.

PART FIVE

RESEARCH AS A TOOL FOR DEVELOPMENT

Ivory V. Nelson

Dr. Ivory V. Nelson is vice-president for research and special programs at Prairie View A & M University. He received his B.S. and M.S. degrees from Grambling State University and his Ph.D. Degree from the University of Kansas, summa cum laude, in 1963. Dr. Nelson is a person of diverse talents and interests. He has distinguished himself in research at both Southern University and Prairie View A & M University. As a chemist, he has published over 15 studies on applied and empirical subjects. He directs domestic research programs and coordinates the increasing international thrust of Prairie View A & M University. In addition to serving on a number of local, state, and national research committees, Dr. Nelson has assumed a major role in the coordination of research at the 1890 land-grant institutions.

The 1890 land-grant institutions have made lasting contributions to instruction, research, and extension in America. Although the research functions of these institutions were clearly set forth in the second Morrill Act, most of these colleges were immediately transformed into "normal schools" to train the commodity needed most during this period—black teachers. Material and human resources were not initially available to allow 1890 institutions to conduct research. Tuskegee Institute, where George Washington Carver conducted research at the Tuskegee Experiment Station, was an exception to this pattern.

The transformation of the 1890 land-grant institutions to normal schools was, however, the foundation of these institutions' orientation to people and their problems. Thus, subsequent research efforts reflected this concern for people; a concern that has been coupled over the years with quality research.

At Tuskegee Institute in 1897, the Alabama State Legislature established the Tuskegee Experiment Station under the direction of Dr. George Washington Carver. More than 300 synthetic products from peanuts were eventually developed in Carver's laboratory. In addition, 118 products were developed from sweet potatoes and 60 natural products were developed from peanuts. Carver also published more than 48 bulletins for farmers in the South.

In 1888, Prairie View Agricultural & Mechanical University estab-

lished an Experiment Station where research primarily focused on demonstration projects to improve farming practices and facilitate agricultural instructional programs. The application and use of science and technology obtained through research at 1890 institutions was the ultimate goal.

The rapid flow of information to clients is as much a part of the research methodology as is the conduct of the research. "People-oriented research" with immediate application has always been emphasized at 1890 institutions. Past experiences have equipped researchers at 1890 institutions to search for solutions for today's problems and the problems of the future. These universities recognize that society is interested in solutions to problems and that priorities must effectively allocate limited resources for the most efficient use of research funds and personnel.

The 1890 institutions make hard "reality based" decisions and redirect research efforts as new problems emerge. For these and related reasons, the research efforts of these colleges have been directed into those areas which promise to produce the most useful results for practical solutions to problems.

Research problems cannot be based solely on individual interests and researchers at 1890 institutions use a systems approach which involves a team of scientists who work on a particular problem. The systems approach has been used to study human nutrition, energy, human resources, small farmers, emerging cooperatives, the environment, space-related topics, transportation, and biomedical problems. The following brief descriptions of research conducted at 1890 institutions gives an insight to the researchers who work at these institutions.

Human Nutrition Research

Human nutrition is one of the highest research priorities at the 1890 institutions. Discussed below are some findings relative to human nutrition research underway at 1890 land-grant institutions.

Data from several studies indicated that serum cholesterol levels were high among low-income family members and that members of many of the families lack vitamin A, riboflavin, and thiamin. Other data suggested that members of many low-income families suffered from anemia.

Research that has focused on the relationships between nutrition and diseases found that rural low-income women consumed less than the recommended daily allowance (RDA) of calories, protein, calcium, phosphorus, magnesium, iron, riboflavin, niacin, thiamin, vitamin A, and higher than the RDA of vitamin C.

Baseline data studies have helped community nutritionists plan

diets for low-income school children and senior citizens. Additional studies are examining whether some peanut varieties contain more of the essential amino acids than other varieties.

Other studies have examined the nutritional problems of the unborn, the young, pregnant mothers, and senior citizens. Among them are studies of nutrition and eating habits, psychological and personality factors that might be associated with food selection, factors that affect vitamin A retention in commonly consumed foods, and biological and behavioral variables associated with subclinical malnutrition of the elderly.

Researchers at the 1890 land-grant institutions have found that the dental health of low-income citizens is generally poor and is particularly poor for the low-income elderly. Study findings relative to rural black children have shown that most rural black children's serum albumin levels are below acceptable levels and that overweight children have relatively higher levels of serum cholesterol than do children of more normal weights. Researchers have also found that anemia due to folic acid deficiency is a potential health problem for some low-income citizens, as are abnormal serum levels of calcium and a dietary deficiency of ascorbic acid. Chromium deficiency has also been found to impair glucose tolerance in post-partum laboratory animals. Other nutrition investigations underway within the 1890 land-grant system are determining whether certain selected proteins might be chemically modified to improve the functional characteristics of these proteins.

Human Resources

Social scientists at the 1890 land-grant institutions began major research programs in human resources among black rural residents during the early 1960's. The advent of funding from the Cooperative State Research Service and the Science and Education Administration of the U.S. Department of Agriculture have meant an increase in the number of studies that relate to the human resources of minority residents. The Current Research Information System (CRIS) of the Science and Education Administration gives an overview of human resources research at 1890 institutions.

Researchers at the 1890 land-grant institutions are studying the demography of the disadvantaged, problems confronted by the elderly in rural areas and in small towns, how to improve learning opportunities for rural youth, and methods that might be used to improve the income and employment opportunities for disadvantaged rural residents.

The problems of unemployment are a high research priority among researchers at the 1890 land-grant institutions. Social scientists are evaluating several strategies that might reduce the impact of rural

poverty through rural development. Others are studying how increasing energy costs will affect low-income families and how home safety can be improved among low-income families.

The research at 1890 institutions attempts to provide solutions or answers to the problems confronted by the disadvantaged people living in rural areas. Such research efforts are directly related to problems faced by people in many developing countries of the world.

Research Related to Small-Scale Farms

The 1890 institutions recognize the importance of research that is geared to the relatively small farmers. Too often the larger research community has neglected these farmers and developed sophisticated—and expensive—machinery and equipment which do not meet the needs of small-scale farmers.

An organized, well-planned, and well-coordinated research effort is required to maximize the impact of knowledge generated for small-scale farmers. The challenge is partially being met through innovative programs underway at 1890 land-grant institutions.

Researchers are studying triticale breeding, production, and utilization and the development of forest crop alternatives for limited resource landowners. Sweet potato, grape, and other small fruit breeding studies are underway to provide crops tailored to smaller farms. Other scientists are studying optimum poultry phenotypes, the best combination of on-farm enterprises, management systems for small scale farms, and the profitability of goat production on small farms. Research also focuses on increasing the earnings of farmers through cooperative action.

The development of beef cattle, swine, and fish production systems suited to small farms and high cash value crops for farmers with limited resources are also underway at the 1890 land-grant institutions. Studies also examine methods by which incomes might be increased through off-farm employment. Scientists at the 1890 institutions are adapting technological advances so they serve people and are developing methods by which the land-grant complex can best meet the needs of the rural and urban people.

Environmental Research

The 1890 land-grant institutions have developed expertise in research relating to energy and environmental problems. As issues surrounding the quality of our environment become more controversial, it is important to note that the brunt of the effects resulting from the deterioration in the quality of air, water, soil, and standard of life are

disproportionately borne by those who can least afford it—the poor and the disadvantaged.

How heavy metal pollution of soils affects agricultural production in areas adjacent to urban centers, possible adulteration of the food chain by heavy metals, and the effects of 2, 4-D and Monuron on the oxygen uptake of *Cholera pyrenoidosa* organisms are being studied by scholars at the 1890 institutions. In addition, the accumulation and degradation of certain herbicides by algae, the movement of nitrates in soils, and the formation of nitrosamines in soil are examined.

Experiments are underway to study the ability of *Gambusia Princtata* to tolerate acid phosphate and how to determine the quantity of lead that accumulates in *Daphnia* grown in experimental microcosms.

Nitrite in runoff water in rural areas is studied by scientists to determine possible nutritional and physiological implications of nitrites of humans. The extent and longevity of pesticide runoff from field plots is examined by scientists at these institutions, as is the relationship between fertilizers, and manure on pesticides in the soil. In addition, scientists are also isolating and identifying bacterial flora of soils on which waste water has been disposed.

Moreover, researchers at the 1890 land-grant institutions are studying methods to modify the environment to reduce noise and air pollution, use of minnows as a forage to produce finfish, and the effects of agricultural drainage on natural systems. Some researchers have begun studying the presence of carcinogenic metabolites in wines and beers, and the comparative ecology of selected species of aquatic insects.

Wetlands in several southern states are being studied by scientists to determine the productivity and value of these ecosystems. Other researchers are investigating the effects of some common atmospheric pollutants, such as Freon-22, the recycling of lagoon effluents through dairy waste transport systems, using these wastes to irrigate crops, and recovering nutrients from animal wastes.

Investigators at the 1890 land-grant institutions are assessing the environmental impact of seasonal resorts in rural areas, the biodegradation of animal wastes, and how lagoon effluents affect soils, ground and surface water, and soil-crop systems.

Scientists are attempting to determine how septic tank effluents might be disposed of in problem soils, the effects that agricultural pollutants have on farm ponds, the ability of grasses and legumes to withstand grazing pressures while also preventing particulate pollutants from entering surface water, and how phosphorus-32 affects vital fish organs. The air around a major southern industrial city is analyzed to determine the concentration of trace metals and impurities.

Crawfish productivity in small ponds is being studied at the 1890 land-grant institutions and scientists are also determining whether it is

possible to develop inexpensive livestock feed and vitamins from the foliage of southern conifers. Some researchers at these institutions are studying the activity rhythms of the northern rock crab, the oxygen requirements of oysters, the mercury content of fish consumed by rural residents, and methods to determine trace metal contaminants.

Pollutants in rural drinking water supplies are being identified and scientists are determining whether swine wastes might be converted to high-quality animal protein. At other 1890 institutions, researchers are measuring the response of corn to different levels of lime and magnesium. Investigators are also identifying the most profitable combination of fish for fish farming, whether various light sources might attract different organisms and insects for use as catfish food, and the effects of irrigation on soybean yields and growth. Other researchers are testing varieties and genotypes of pine and red cedar trees to determine their suitability as Christmas tree crops.

Space-Related Research

In recent years, many of the land-grant institutions have participated in the space research program. Researchers are studying atmospheric effects on carbon dioxide laser doppler systems, and the heat-transfer characteristics and energy-storage capability of solar energy beds that utilize water filled cans to store energy.

Methods are being developed to culture, store, and handle macrophage cells during space flights, scientists are collecting the available digital design languages and associated software, and are studying the crystal mechanisms of electro-optic materials.

The ionosphere/protonosphere is being studied by researchers to measure electrons via Faraday rotation and group-delay techniques. Underway are studies designed to produce bio-gas and methane from microbial anaerobic decompositions of alligator weed. The specific heat data for pure platinum, iridium, gold alloys, and platinum-gold-ruthenium alloys is being determined.

Central nervous system drugs, stimulants, and depressants are identified and studied by scientists to determine their circadian variations in toxicity and therapeutic effectiveness. Other scientists are studying the function of the adrenal gland in rats under stress.

Researchers are utilizing a distorted wave procedure to calculate the total and differential electron-molecular nitrogen impact cross sections of elastic and electronic excitation processes. Other scientists are determining what effects reduced-pressure, oxygen-enriched atmospheres have on the fruit fly, *Crosophila melanogaster*.

Researchers are studying the feasibility of using graphite composites as substrate materials in designing precision mirrors and the material

growth, characterization, and fabrication of III-V semi-conductor compounds and alloys grown by a liquid-phase epitaxy for use in solar-energy cells and other opto-electronic devices.

A communications technology satellite feasibility study presently underway will utilize more minority scientists and engineers in the United States. These highly trained space scientists will strengthen the growing research program underway at the 1890 institutions.

Nonlinear analysis is used to study lossless and steady-state plane waves. Research into the mechanism of nonlinear laser interactions uses phonons as models to determine the laser-induced parametric interactions in optical waveguides and fibers. Studies are underway to determine how projectile impact, at low velocities, affects the strength of composite sandwich beams at high and low temperatures.

Ground measurements of selected meteorological and soil parameters of grain sorghum canopies are studied to determine how these parameters are related to infrared radiation levels over these canopies. Investigators are determining how scatter measurements from tiny glass spheres placed on a mirror are correlated with sphere size. Researchers are updating state vectors for the filter used on the autoland portion of the shuttle landing and are studying potential corrosion inhibitors for use on the NASA solar heating and cooling systems.

Analytical models are being developed to study dynamic stress and deformation in the left ventricle of the human heart, mathematical models are being developed to describe the light intensity lobe-configuration of scattered light that falls on a particular spherical test particle, and studies are underway to examine the extensive constrained-variational calculations on neutrons and symmetrical nuclear matter for simple central two-nuclear potentials containing hard cores.

The evaporation behavior of several selected super alloys at high temperatures and high vacuums are being studied, as well as the simultaneous effects of very high electrical voltages and thermal stresses on insulating materials used on solar cells. Heat pipe radiators use in a spacecraft heat rejection system and absorbers and radiators for solar power systems are studied. Researchers are using electron microscopy to study the effects of radiation on lamp-rush chromosomes and the morphometrics of cellular damage in irradiated mice.

Investigators at the 1890 institutions are studying microwave radiation in soil sterilization for possible use in protecting crops against major diseases and pests and are developing an information filing and retrieval system to give scientists access to atmospheric data. Researchers are also measuring the internal magnetic fields of solids and the dynamic behavior of muons, particularly the diffusion rates of these subatomic particles.

Transportation Research

The effects of transportation systems on the disadvantaged, minorities, and the elderly are studied at several 1890 land-grant institutions. Researchers are studying motor carrier services to evaluate rural and urban public transportation and to ascertain whether existing public transportation systems provide the services needed by present and potential riders. Investigators are assessing modal options for freight service to rural communities and are examining what impact motor carrier service has on the economic growth and development of rural areas.

Researchers are determining how redevelopment affects congestion, minority housing, land use, business, and recreation and are determining what changes, such as increased minority-community input, may avert the negative effects and increase the beneficial impacts of redevelopment.

Studies underway at the 1890 institutions are designed to assess transportation needs and methods to improve the efficiency of social service agencies that operate transit systems for low-income, elderly, and handicapped residents in rural areas.

The socio-economic impact of common motor carriers on rural economic development is also being assessed by scientists at the 1890 land-grant institutions. Researchers are determining user satisfaction with the services they receive under current regulations, and whether better services would result if common carriers were deregulated.

Biomedical Research

The clinical significance of airborne pollen and fungi is studied as is the mode of action of naturally occurring pesticides in plant and animal systems. Researchers are examining the immunochemistry of cellulose and the toxicity of freon, the role of tryptophan metabolism in carcinogenesis, and nucleoside analogs that might have possible anti-tumor activity.

The immunosuppression of immediate and delayed hypersensitivity reactions by colchicine and prednisone derivatives is studied; methods to separate, identify, and quantify anti-cancer drugs are being developed; and the bio-transformation of nucleoside antibiotics and their effects on cultured cells are being analyzed.

Researchers are studying the mutagenic effects of nucleosides. Anti-cancer drugs obtained from biological fluids are analyzed with gas chromatography and mass spectroscopy, and researchers are preparing compounds of silicones that may have biomedical applications.

The role of the urease regulatory gene and its relationship with carcinogenic agents is being studied. The biological effects of *in vivo*

and *in vivo* environmental insults on cells and tissues using amino acid incorporation and protein synthesis as an index are studied to determine biological effects. Scientists also monitor *in vitro* changes that transform normal cells to tumor cells by the action of carcinogenic compounds found in tobacco smoke.

Scientists at the 1890 land-grant institutions are studying the pharmacological and physiological effects of toxins on various species of marine algae and are isolating and purifying toxins from various marine algae and the stingray eel.

The structure of glycoproteins is analysed, fluorescence is used to study serum albumins, systemic insecticides are evaluated for their ability to control the oriental rat flea, and the substitution reactions of metalloporphyrins are studied.

Researchers are determining methods which would apply electronic instrumentation to biomedical research, analyzing the chronology of protein differentiation in the chick, and the kinetics of enzymes.

Scientists are determining the mode of action of thyroxine, diiodothyronine, tri-iodothyronine, and cortisone in amphibians, and are determining the active site of mammalian deoxyribonuclease I.

Researchers are studying synthetic porphyrins, the spectroscopic interactions between iron porphyrins and air pollutants, and the effect of particular herbicides on the phenotypic and genotypic expression of selected soil microorganisms.

Bovine serum albumin denaturation, the epidemiology of allergic dermatitis, and the function of the amino group and thiol form of vitamin B₁ in a model system are examined. Exploratory studies have also begun examining histidine ammonia lyase.

Scholars at the 1890 land-grant institutions are locating and describing the ultra-structure of thymic germinal centers in mice, the effects of amphetamines on the immune response, changes in tissues following ingestion of alcohol and cigarette smoke, the effects of mercury on mouse tissues, and the effects of sublethal doses of lead nitrates on the ultra-structure of germinal centers of mice spleens and lymph nodes.

Naturally occurring aquatic polluted habitats and simulated laboratory microcosms are intensively studied. Scientists are determining how several drugs affect cells and subcellular units.

Researchers are also investigating the kinetic properties of red cell hexokinases, the mechanisms of pathogenicity and immunity in listeriosis, the heterochromatic patterns in venereal tumors and in normal canine cells, the circadian rhythm of genital tract activity in domestic hens, and the effects of amino acid starvation on the acylation of branched chains in bacterial RNA.

Other studies focus on the electrophysiology and neurochemistry

of selected invertebrates, the mitogenic and mutagenic responses of cultured lymphocytes, the effects of parasites on algae, and the host-parasite relationship of trypanosomiasis in mice.

Some faculty members are engaged in numerous research projects funded by such groups as National Science Foundation, the Environmental Protection Agency, and several foundations. The research under these headings generally reflects the ideas of faculty members and may or may not have specific program thrusts.

Dissemination of Research Findings

Several 1890 land-grant institutions have established a series of publications and newsletters to disseminate research findings. These publications do not supplant the official organs of the respective disciplines, but are additional avenues for reporting research findings. Faculty members at each 1890 land-grant institution publish in recognized professional journals.

Conclusion

It is obvious from a review of some research findings that the 1890 land-grant institutions are committed to systematic research. These institutions have the research capabilities, the faculty expertise, and the "grantsmanship" to maintain well-coordinated and viable research programs. The commitment to research and the dedication to scholarly competency at these institutions, coupled with the methods by which research findings have been applied to solve pressing problems and to meet human needs, have given the 1890 land-grant institutions a unique place in history. These factors will continue to enhance the excellence and professional reputation of these institutions. The United States and the developing countries have the opportunity, the obligation, and the need to utilize the expertise and enthusiasm of researchers employed at the 1890 land-grant institutions to design and implement development programs.

PART SIX

MECHANISMS FOR THE DELIVERY OF APPROPRIATE TECHNOLOGY—EXTENSION

B. D. Mayberry

Dr. B. D. Mayberry is a native Alabamian. He received his B.S. degree in Agriculture from Tuskegee Institute and the Ph.D. degree from Michigan State University. His professional career is wide and varied. He has been a vocational teacher, high school administrator, professor of horticulture and is the author of over 20 publications on domestic and international development. Dr. Mayberry served in administrative positions at several 1890 land-grant institutes. Dr. Mayberry has served as dean of agriculture, dean of applied sciences, and vice-president for development, and is now associate director of the Carver Research Foundation and also directs agricultural and natural science research and coordinates international development programs at Tuskegee Institute. Dr. Mayberry has traveled extensively in Africa, Europe, Middle East, South America and the Caribbean.

The United States' Civil War was the single most important factor leading to the establishment, growth and development of educational institutions for blacks in the Southern States. The end of the war marked the close of 244 years of black slavery in the South; an era when it was a crime to provide education or training in a useful trade for blacks in most Southern States.

The close of the Civil War did end the suppression, oppression, and the dehumanizing experiences of slavery and signaled the dawn of a new day in social, economic and political power for freed men.

Although the war determined that the United States would remain undivided and that black people would no longer be slaves, another equally important question remained unanswered: What would be the place of the nearly 4,000,000 blacks for whom freedom had been won? The South was already aware of the significance of education in a free society. Educational institutions had been established for white youths as early as 1794 in Tennessee, 1801 in South Carolina, 1833 in Delaware, 1839 in Missouri, 1853 in Florida, and 1860 in Louisiana.

In 1862, the United States Congress passed the first Morrill Act

which provided for a land-grant institution in each state to offer training in agriculture, home economics, the mechanical arts and other useful professions. Since the races were legally separated in the South, blacks could not attend the institutions established under the Morrill Act of 1862. The Act did provide for separate but equal facilities, however, only Mississippi and Kentucky established institutions for blacks under the first Morrill Act.

During the quarter century following the Civil War, most Southern States established institutions to train black teachers. However, the federal government found it difficult to encourage the Southern States to provide land-grant support to these institutions.

The second Morrill Act was passed in 1890 specifically to support higher education for blacks and was referred to as the 1890 "land-grant institutions." Those Southern States which did not have black institutions to 1890 established them under this Act.

Tuskegee Institute was created by an act of the Alabama Legislature in 1881, but the State established and incorporated a Board of Trustees and named the School private twelve years later. Thus, Tuskegee Institute is not a land-grant institution, even though it was granted 25,000 acres of land by the United States Congress in 1899.

The 1890 land-grant institutions came into existence in the sequence shown in Table 1.

Table 1.—Dates 1890 institutions were founded and sponsoring agency

Date	Institution	Sponsor
1866	Lincoln University	Civil War Negro Infantry Men
1871	Alcorn State University	State Legislature
1872	South Carolina State College	State Legislature
1873	University of Arkansas, Pine Bluff	State Legislature
1875	Alabama A & M University	Group of Ex-Slaves
1876	Prairie View A & M University	State Legislature
1880	Southern University	State Legislature
1881	Tuskegee Institute	State Legislature
1882	Virginia State College	State Legislature
1886	Kentucky State University	State Legislature
1886	University of Maryland-Eastern Shores	Methodist Episcopal Church
1887	Florida A & M University	State Legislature
1891	Delaware State College	State Legislature
1891	North Carolina A & T University	Citizens' Group
1895	Fort Valley State University	Citizens' Group
1897	Langston University	Territorial Legislature
1909	Tennessee State University	State Legislature

In the early years of the 1890 institutions, the content or the level of program offerings varied among institutions. Academic programs at these institutions were variously described as elementary, secondary, normal or general education. A few of these early institutions were called agriculture, home economics or mechanical arts colleges. The most common purpose of these institutions by the turn of the century was for "the training of black teachers."

Although most of the 1890 land-grant institutions were established in the first quarter century following the Civil War, their growth and development was limited by a lack of resources. The growth and development of these institutions is seldom correlated with age nor were growth rates of the 1890 and the 1862 land-grant institutions in each state related.

Indications of institutional growth and development are (1) time required to qualify to offer the 4-year degree, (2) time required to offer graduate training, and (3) time required to achieve regional accreditation. As data presented in Table 2 show, there were no apparent correlations among these three indicators.

The Organic Act establishing the 1862 land-grant institutions in the United States outlined the mission as the teaching of subjects in agriculture, home economics, and the mechanical arts. Later, the concept was expanded to include engineering, nursing, veterinary medicine and many more subjects. However, the Act did not include provision for the teaching of land-grant subjects to black boys and girls in the states where racial segregation was legal. This condition was satisfied by the second Land-Grant Act of 1890 which authorized and subsequently established the historically black land-grant institutions. These institutions were committed to the land-grant philosophy and were dedicated to racial uplift. The unique founding mission identifies the 1890 land-grant institutions with the struggles, hopes and aspirations of black people. Since these institutions are administered mainly by black people, they are responsive to the needs and demands of the black community.

Commitment to Clientele

Traditionally, the 1890 land-grant institutions have attracted students mainly from the black community. In the Southern States, these students have attended, until recently, segregated high schools that were inadequately funded. Because of limited money, facilities, personnel and teaching materials, graduates from the high schools were poorly prepared for traditional college level work. On the other hand, these high school graduates deserved the opportunity to enter college. For about 100 years, the historically black land-grant institutions have accepted some students who were less than adequately prepared for

Table 2.—Dates 1890 institutions were founded, initiated, 4-year programs, graduate programs, and achieved regional accreditation

Institution	Founded	Initiated 4-year program	Initiated graduate program	Achieved regional accreditation
	----- Year -----			
Alabama A & M University	1875	1939	1958	1963
Alcorn State University	1871	1871	1975	1961
University of Arkansas—Pine Bluff	1873	1929	*	1933
Delaware State College	1891	1947	*	1957
Florida A & M University	1887	1909	1951	1949
Fort Valley State University	1895	1945	1957	1957
Kentucky State University	1886	1929	1972	1939
Langston University	1897	1897	*	1948
Lincoln University	1866	1935	1940	1935
University of Maryland—Eastern Shores	1886	1936	1978	1953
North Carolina A & T University	1891	1925	1939	1936
Prairie View A & M University	1876	1901	1954	1958
South Carolina State College	1872	1924	1948	1960
Southern University	1880	1922	1957	1958
Tennessee State University	1909	1922	1942	1946
Tuskegee Institute	1881	1928	1943	1933
Virginia State College	1882	1943	1937	1933

*Not applicable

higher education. Over the years, the 1890 institutions have developed a rather unique expertise to train this special clientele.

Flexibility has been the key to the success of the 1890 institutions in dealing with the problems of poorly prepared students. The technique has entailed flexible admission standards and academic programming that has not detracted from the quality of college instruction. The flexibility, interest, and concern for the poorly prepared high school graduate extends beyond the borders of the college campus through the extension and out-reach programs.

Although blacks have been freed from slavery for more than one hundred years, a rather high proportion of the black population still cannot master the basic communications skills. In spite of this handicap, the 1890 land-grant institutions accept the responsibility to transfer technology to them in the areas of agriculture, and rural community and human resource development. Acceptance of this responsibility has given these institutions unique experience in dealing with functional illiteracy, adult basic education, and providing technical assistance in the rural and urban areas to benefit the disadvantaged.

Delivery of Appropriate Development Services

As has been pointed out, the 1890 institutions are organized basically under the traditional land-grant functions. The programs include (1) instruction, (2) research, and (3) extension. Appropriate technology is transferred to those outside the academic community primarily through extension programs.

Extension programs at the 1890 land-grant institutions can be grouped under two categories (1) cooperative extension and (2) general extension.

Cooperative extension is funded with public funds and operates under a rather prescribed set of guidelines developed by funding sources. Though activities are prescribed, flexibility is common.

General extension is usually funded by private sources and the guidelines are usually developed to meet the needs of the grantee or institution. Flexibility is limited by the needs or demands of the target population and the creativity of the institution. The flexibility inherent in privately financed activities has enabled the institutions to participate in developmental activities that assist their clientele. Such programs are of great value when dealing with problems that may be identified in developing countries.

International Development Orientation and Experience

The 1890 land-grant institutions have always grappled with the problems of poverty, geographic isolation, and exclusion from the social mainstream. It is remarkable how these institutions survived and thrived. In the process, however, these institutions have accumulated invaluable experience in areas that are related to the needs of citizens in developing countries.

Few people know that some 1890 land-grant institutions have been involved in international development activities since the turn of this century. In fact, some of these institutions were involved in transferring cotton-production technology in West Africa before the second Morrill

Act was enacted. Admittedly, institution involvement with international development was sporadic, until the 211 (d) legislation was passed in 1966. Under the 211 (d) program, several of the 1890 institutions have been involved in agricultural development in Africa, Asia, and South America.

It is anticipated that all of the 1890 land-grant institutions will be involved in international development efforts through the Title XII university-strengthening grants.

By far, the most serious problems facing the people of developing countries are food and nutrition. The most feasible solution to these problems is to increase agricultural production rather than to increase imports.

The 1890 land-grant institutions are located in areas where culture is similar to that found in many developing countries. Little attention will be required to enable selected institutions to provide appropriate technical assistance to tropical and/or sub-tropical countries.

The importance of the socio-cultural similarities of the 1890 land-grant personnel and clientele with those in developing countries should not be overlooked. Expertise has taught us that there are occasionally feelings of distrust between people of different origins or ethnic backgrounds. Distrust hampers communication essential to the success of development. The expertise at the 1890 land-grant institutions are an invaluable national resource that should be increasingly strengthened and utilized by USAID to prevent famine and eliminate hunger in the world.

PART SEVEN

THE UNIQUENESS OF THE 1890 LAND-GRANT INSTITUTIONS AS VIEWED BY AN ADMINISTRATOR OF AN 1862 LAND-GRANT INSTITUTION

L. L. Pesson

Dr. Lynn Pesson is vice-chancellor for administration and professor of extension and international education at Louisiana State University in Baton Rouge. He has had wide experience as an administrator, professor, and consultant on both the national and international scene. He is an authority on the design and management of organizations and on program development and evaluation, for higher education and in extension and agricultural development programs. He has co-authored one book and contributed to four books and is the author or co-author of 14 publications, 11 articles and 34 papers. His work involved all regions of the United States and 18 foreign countries.

The land-grant colleges were the great American experiments in higher education. They were created to educate the masses and to provide education in the applied and practical areas. Thus, the land-grant colleges have been described as the "People's Colleges," a description that emphasized their grass roots nature. Today, the land-grant colleges enroll approximately 25 percent of the university students in the United States, an amazing percentage considering the thousands of colleges and universities in America. The land-grant institutions have truly revolutionized higher education in the United States as they democratized life and made our country more progressive and prosperous.

The development at the land-grant institutions of the triple-mission concept of research, instruction, and extension service activities placed the responsibility for applied problem-solving research programs within the university and required that universities help people utilize research results in their daily lives. Agriculture in the United States has particularly benefited, although many other fields have also been helped. Again, the United States is relatively unique in the utilization of the land-grant concept. The typical university in some developing countries is an "ivory tower" academic institution where applied research and

extension functions are carried on by government bureaucracies. There is often little communication or coordination among the groups.

Social, Cultural and Economic Considerations

The well-known social, cultural and economic problems confronting the world need little elaboration. It is sufficient to say, however, that the land-grant institutions are involved in solving these problems.

Some basic human concerns that have affected land-grant colleges are also related to development programs. There is a belief in the United States that each person has a right to education, including higher education. Thomas Jefferson described this as a "crusade against ignorance" and added that "the object is to bring to action that mass of talents which lies buried in poverty in every country." The 1890 land-grant institutions have largely fulfilled this expectation and their record has been particularly impressive among the disadvantaged, as more of these students enter colleges and universities.

This concern is not easily transferable to the developing countries. Although the need for education is universally recognized, limited resources in these countries require that programs be adapted to cope with the realities. In Malaysia, for example, efforts were made to help the agricultural college re-orient their admissions policy in the late 1960's toward a preference for rural young people, even though only one of twenty applications was likely to be accepted. Rural young people, who were more likely to return to work in this environment, were given preference in the competitive admission process. It is a well-accepted maxim that the basic purpose of education is to make people useful, contributing members of society and good citizens and to help them utilize their talents in the best possible manner.

We must always be concerned about the development of the individual, but we must also keep national development goals in perspective. One is reminded of the student from a developing country trained at one of the prestigious 1862 land-grant institutions as an animal climatologist who, upon returning to his country, was almost useless because he had not been trained to cope with that country's basic livestock husbandry problems. Developing countries cannot afford the luxury of people "doing their own thing" unless that "thing" happens to fit in with needs of developing countries.

Higher education has been given increasing responsibility for the achievement of social justice and equality of opportunity. The 1890 land-grant institutions have played an important role in this regard. The realization of social justice and equality of opportunity is a complex process. An important aspect has been access to a college education for all people, regardless of a student's sex, social background, or ethnic

origin. Progress toward this goal has been particularly rapid during this decade, and the 1890 land-grant institutions have again been in the forefront in increasing educational opportunities for the disadvantaged. Similar problems of social justice and equality are often found in the developing countries and because of their unique background, the 1890 land-grant institutions are qualified to cope with these kinds of problems.

Educational Considerations

There seem to be at least five major trends in higher education in the United States at the present time. They are:

- The days of booming enrollment are over. Student demand for admission has reached a plateau.
- Change rather than expansion is required in higher education and innovative approaches are needed to adjust to the changing times.
- Graduate programs are on the decline as the demand for graduates with advanced degrees, in the non-vocational, non-applied science areas decrease.
- The improvement of the quality of our product—the student—is of more concern today. The public is questioning the capabilities of our graduates.
- There is a growing public attitude that institutions of higher education should cooperate and share resources. The proliferation of curricula and programs has come almost to a standstill.

On the other hand, developing countries face other fundamental problems centering around scarce resources and the isolation of rural families. These impediments to development are not unlike those which occurred several generations ago in the United States and which were faced by black Americans immediately after the civil war.

Higher education has two major missions to perform for students—helping them develop as persons, and helping them perform a useful function in society. Higher education has a basic mission to help students build their characters. Students must discover their identity as human beings, examine their purpose, role in society, and other basic development tasks. The time students spend in universities is a time when they discover who they are, what they are, what they believe, and what they shall do or become.

College is a traumatic time for students. They should have the freedom to explore and experiment on the one hand, and a guiding, helping structure to keep them from going too far afield. In essence,

students attend an institution of higher learning to earn degrees which presumably equip them to do something.

Ralph Tyler, an eminent educational psychologist, wrote that the curriculum must be designed so that students are able to perform capably in their professions. It is the institution's responsibility to design the learning process so that these role behaviors are mastered by students. The ultimate test comes when the students are out in the world of work. Can they capably perform in their roles?

Tyler also says that 90 percent of all students are capable of achieving an "A" in a given subject if they are adequately motivated and have enough time to master the material. Time becomes crucial if student attitude is favorable. Class experiences and testing procedures often emphasize time. Mental quickness is favored, but quickness does not necessarily indicate intellectual capability and creativity. Slower students that fail to do well can become demoralized and discouraged.

The time problem is accentuated in developing countries. Rural students are often deficient in academic skills, particularly in mathematics and science, and it is especially crucial that these students receive help to overcome their deficiencies. In Malaysia, for example, a make-up program for disadvantaged rural students was successfully developed and implemented.

The 1890 land-grant institutions are uniquely prepared and qualified to work with students from developing countries who come from disadvantaged backgrounds. Over the years, these institutions have developed a unique resource and technique for dealing with problems so basic to effective learning experiences. The 1862 land-grant institutions have difficulty matching this uniqueness.

There is a serious shortage of post-high school trained persons to work in semi-professional areas that offer opportunities for graduates with associate degrees. At the same time, there is a serious shortage of minority persons in the basic and applied sciences with baccalaureate and graduate degrees. These areas are crucial and offer great opportunities and challenges to the 1862 and 1890 land-grant institutions.

Research can be categorized as either basic or applied, or as precision-oriented technical-type research contrasted with action-oriented research or research with "now application." The 1890 land-grant institutions have been involved with precision-oriented and action-oriented research. However, there has not been enough research oriented in the most propitious direction.

The United States and the developing countries need applied or action-oriented research in fields such as agriculture, education, health, nutrition, and family life. Basic concepts and theories need to be applied and tested under field conditions. Implementation of research findings

in developing countries require workers who have the expertise to work with the disadvantaged and apply findings in solving identified problems.

There are innumerable possibilities for research by land-grant institutions and the 1890 institutions should be provided with adequate resources so that they can assume a leadership role in developing countries. The international economic development programs at Southern University are examples of such an international thrust.

Delivery Mechanisms for Technical Assistance

Poverty is a fact of life for over half the world's people. People lack food, health problems are endemic, economic resources are scarce, and illiteracy abounds.

A recent study in Chad found that 90 percent of the residents were subsistence farmers who had to produce enough sorghum or millet to last until the next crop or face starvation. Ninety-three percent were illiterate, almost all had malaria, and half the children died in their first year of life. In addition, findings from a community study in Haiti revealed that the average rural Haitian family of six lived in a two-room mud hut with thatched roof, dirt floor, and an outdoor kitchen.

The problems of poverty are not confined to the developing world. In *The People Left Behind*, a report of the president's National Advisory Commission on Rural Poverty in 1967, 14 million persons were described as living in poverty in the United States.

Extension links the knowledge centers and the people, takes solutions to the people, helps them properly apply solutions, and brings back to knowledge centers the utility of new ideas and information about other problems. The poor often lack the education and the experience to cope with new ideas, they lack the resources with which to purchase the inputs often required by new technology, and they often are unwilling to take the risk of trying something new. The old methods may not produce bountifully, but they know that these methods do produce. The dilemma is that poor people need appropriate technology, and they cannot afford to try techniques that fail for failure means their families will starve.

Action-oriented adaptive research determines how new ideas work under local conditions and verifies that these methods can produce or work better. The SU-LSU Consortium, a new joint venture between Southern University and Louisiana State University, is involved in a project in Sierra Leone which employs this concept. This planned, joint venture in Sierra Leone emphasizes the unique capabilities of both institutions and each will lend their unique resources for development in Sierra Leone.

Holistic Look

This is an incomplete assessment of the 1890 land grant institutes. A total look is necessary in order to make some assessment of the holistic nature of these institutions. Each institution must determine its mission and probably will arrive at different answers. Although each institution is unique, it is possible to generalize about them.

Dr. G. Leon Netterville, former president of Southern University, had an interesting viewpoint. He commented that Southern University must make things happen in the lives of children from low-income families. The university must educate their children so they can take their rightful and useful place in society; it must conduct research on their problems and it must help ameliorate these problems. Dr. Netterville concluded by saying that Southern University must further develop their expertise to accomplish this mission to the best of their ability. This statement mirrors the uniqueness of the 1890 land-grant institutions. These institutions have a noble mission to perform in the United States and in the developing world. The 1862 land-grant institutions join with the 1890 land-grant institutions in this worthwhile endeavor and pledge their support for this joint effort.