

Y4
Ag 8/1
R 31/2

1010

Ag 8/1
R 31/2

AGRICULTURAL RESEARCH AND RESEARCH EDUCATION

GOVERNMENT

Storage

HEARINGS

BEFORE THE

SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH

OF THE

COMMITTEE ON AGRICULTURE

HOUSE OF REPRESENTATIVES

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

H.R. 4394 and H.R. 4863

MARCH 21 AND 22, 1977

Serial No. 95-B

KSU LIBRARIES



546006 300945



Printed for the use of the Committee on Agriculture

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1977

88-149 O

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION



COMMITTEE ON AGRICULTURE

THOMAS S. FOLEY, Washington, *Chairman*

W. R. POAGE, Texas,

Vice Chairman

E DE LA GARZA, Texas

WALTER B. JONES, North Carolina

ED JONES, Tennessee

DAWSON MATHIS, Georgia

GEORGE E. BROWN, Jr., California

DAVID R. BOWEN, Mississippi

CHARLES ROSE, North Carolina

JOHN BRECKINRIDGE, Kentucky

FREDERICK W. RICHMOND, New York

RICHARD NOLAN, Minnesota

JAMES WEAVER, Oregon

ALVIN BALDUS, Wisconsin

JOHN KREBS, California

TOM HARKIN, Iowa

JACK HIGHTOWER, Texas

BERKLEY BEDELL, Iowa

MATTHEW F. McHUGH, New York

GLENN ENGLISH, Oklahoma

FLOYD J. FITHIAN, Indiana

JOHN W. JENRETTE, Jr., South Carolina

RAY THORNTON, Arkansas

LEON E. PANETTA, California

IKE SKELTON, Missouri

JOSEPH S. AMMERMAN, Pennsylvania

JERRY HUCKABY, Louisiana

DAN GLICKMAN, Kansas

DANIEL K. AKAKA, Hawaii

HAROLD L. VOLKMER, Missouri

CHARLES WHITLEY, North Carolina

WILLIAM C. WAMPLER, Virginia,

Ranking Minority Member

KEITH G. SEBELIUS, Kansas

PAUL FINDLEY, Illinois

CHARLES THONE, Nebraska

STEVEN D. SYMMS, Idaho

JAMES P. JOHNSON, Colorado

EDWARD R. MADIGAN, Illinois

MARGARET M. HECKLER, Massachusetts

JAMES M. JEFFORDS, Vermont

RICHARD KELLY, Florida

CHARLES E. GRASSLEY, Iowa

TOM HAGEDORN, Minnesota

W. HENSON MOORE, Louisiana

E. THOMAS COLEMAN, Missouri

RON MARLENEE, Montana

PROFESSIONAL STAFF

FOWLER C. WEST, *Staff Director*

ROBERT M. BOR, *Counsel*

HYDE H. MURRAY, *Counsel*

JOHN R. KRAMER, *Special Counsel*

L. T. EASLEY, *Press Assistant*

SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH

E DE LA GARZA, Texas, *Chairman*

GEORGE E. BROWN, Jr., California

IKE SKELTON, Missouri

JOHN BRECKINRIDGE, Kentucky

JACK HIGHTOWER, Texas

GLENN ENGLISH, Oklahoma

FLOYD J. FITHIAN, Indiana

JOHN W. JENRETTE, Jr., South Carolina

RAY THORNTON, Arkansas

JOSEPH S. AMMERMAN, Pennsylvania

CHARLES THONE, Nebraska

MARGARET M. HECKLER, Massachusetts

CHARLES E. GRASSLEY, Iowa

RON MARLENEE, Montana

CONTENTS

H.R. 4394, a bill to establish a National Agricultural Research, Extension, and Teaching Policy Advisory Board, and for other purposes.....	Page 2
H.R. 4863, a bill to strengthen U.S. agricultural research and research education, to improve the policy formulation and coordination for agricultural research and education activities, and for other purposes.....	48

STATEMENTS

Abdnor, Hon. James, a Representative in Congress from the State of South Dakota.....	144
Adkisson, Perry, president, American Registry of Professional Entomologists.....	270
Anderson, Hugh, president, Pacific Rubber Growers.....	252
Barton, Jo Anne, assistant professor of foods and nutrition, College of Home Economics, Virginia Polytechnic Institute and State University.....	212
Bergland, Hon. Bob, Secretary, U.S. Department of Agriculture.....	191, 193
Bishop, Charles E., president, University of Arkansas.....	147
Bogorad, Lawrence, professor of biology, Harvard University.....	238
Browning, C. D., chairman, Resident Instruction Committee on Organization and Policy.....	185
Burris, Robert H., professor of biochemistry, college of Agricultural and Life Sciences, University of Wisconsin.....	113
Call, David L., director of cooperative extension, State of New York.....	178
Dahl, Jack, chairman, American National Cattlemen's Association and the National Livestock Feeders Association.....	246
Delano, Robert B., vice president, representing the American Farm Bureau Federation.....	154
Dollahon, J. C., dean, College of Agriculture, University of Wisconsin.....	124
Douglass, Gus, commissioner of agriculture, State of West Virginia.....	256
Duncan, Donald P., president, Association of State College and University Forest Research Organizations.....	216
Gorman, Harry A., president, American Veterinary Medical Association.....	231
Grassley, Hon. Charles E., a Representative in Congress from the State of Iowa.....	111
Miller, William P., Development Specialist, Bureau of Indian Affairs, U.S. Department of the Interior.....	129
Morrison, Richard David, president, Alabama Agricultural and Mechanical University.....	157
National Milk Producers Federation.....	271
Robins, John S., dean of agriculture, Washington State University.....	162
Robinson, Harold F., chairman of the Committee on Agriculture, American Association of State Colleges and Universities.....	118
Rollins, Reed C., chairman, National Academy of Sciences panel on guayule.....	136
Rouse, R. Dennis, director, Alabama Agricultural Experiment Station.....	165
Stockton, Jack, dean, School of Veterinary Medicine, Purdue University, representing the Association of American Veterinary Colleges.....	226
Thone, Hon. Charles, a Representative in Congress from the State of Nebraska.....	112
Thornton, Hon. Ray, a Representative in Congress from the State of Arkansas.....	106
Van Slyke, William H., executive director and chairman, Association of American Railroads.....	293
Vause, E. H., vice president, science and technology, Charles F. Kettering Foundation.....	275
Vietmeyer, Noel D., professional associate, National Academy of Sciences.....	133
Wampler, Hon. William C., a Representative in Congress from the State of Virginia.....	93

IV

CORRESPONDENCE

Anderson, Ned, San Carlos, Ariz., mailgram of March 16, 1977, to William P. Miller, U.S. Department of the Interior-----	Page 130
Applegate, Jimmie R., special assistant to the president, Central Washington State College, letter of March 28, 1977-----	290
Catron, Gary, Assistant to the Secretary for Congressional and Legislative Affairs, U.S. Department of the Interior, letter of March 18, 1977-----	90
Davis, Hilton, vice president, Legislative Action, Chamber of Commerce of the United States, letter of April 6, 1977-----	300
Hiltzheimer, Charles I., chairman, Sea-Land Service, Inc., letter of April 4, 1977-----	298
Powell, John M., Acting Legislative Counsel, U.S. Department of the Interior, letter of March 30, 1977-----	91
Schleusener, Richard A., president, South Dakota School of Mines and Technology, letter of March 24, 1977-----	289
Smathers, George A., Smathers, Symington & Herlong, letter of April 1, 1977-----	296
Toft, Robert J., director of Federal Relations, Grand Valley State Colleges, letter of March 25, 1977-----	291
Van Slyke, W. H., executive director and chairman, Association of American Railroads, letter of April 1, 1977-----	292

AGRICULTURAL RESEARCH AND RESEARCH EDUCATION

MONDAY, MARCH 21, 1977

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS,
OVERSIGHT, AND RESEARCH OF THE
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to notice, in room 1302, Longworth House Office Building, Hon. E de la Garza (chairman of the subcommittee) presiding.

Present: Representatives Brown, Skelton, Breckinridge, Hightower, English, Fithian, Thornton, Thone, Grassley, and Marlenee.

Also present: Representatives Poage, Weaver, Baldus, Panetta, Akaka, Volkmer, Whitley, Wampler, Hagedorn, and Coleman.

Staff present: Fowler C. West, staff director; Robert M. Bor and Hyde H. Murray, counsels; William A. Imhof, associate counsel; Christine D. Abram, clerk; Thomas E. Adams, Jr., Sharon Armann, Ann Cole, James A. Culver, Louis T. Easley, Gerald R. Jorgensen, Bert Pena, and Paul Theiss.

Mr. DE LA GARZA. The subcommittee will be in order.

We meet this morning to consider legislation related to agricultural research.

We have H.R. 4394 by Mr. Wampler, Mr. Foley, and other members of the committee, and H.R. 4863 by Mr. Thornton, Mr. Foley, and other members.

We have other related bills, as well.

I might advise those who are here that we would not necessarily hold your testimony to one or the other bills, but we would like you to testify about anything related to research which can be considered by the subcommittee.

Most probably, we will hopefully end up with one clear bill.

[The bills H.R. 4394 and H.R. 4863 and the correspondence from the U.S. Department of the Interior follow:]

95TH CONGRESS
1ST SESSION

H. R. 4394

IN THE HOUSE OF REPRESENTATIVES

MARCH 2, 1977

Mr. WAMPLER (for himself and Mr. FOLEY) introduced the following bill;
which was referred to the Committee on Agriculture

A BILL

To establish a National Agricultural Research, Extension, and
Teaching Policy Advisory Board, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

SHORT TITLE

4 SECTION 1. This Act may be cited as the "National Ag-
5 ricultural Research, Extension, and Teaching Policy Act of
6 1977".

FINDINGS, PURPOSES, AND DEFINITIONS

8 SEC. 2. (a) The Congress finds that—

9 (1) research, extension, and teaching in the food
10 and agricultural sciences are vital to the Nation's well-
11 being;

1 (2) projected increases in the population of the
2 United States and world-wide population expansion
3 place increasing demands for agricultural products on
4 the United States, United States agricultural production
5 and utilization, and the system for storing, transporting,
6 and distributing agricultural food, fiber, and wood
7 products;

8 (3) agriculture and agricultural productions are a
9 national resource and should be supported by a strong
10 system of research, extension, and manpower develop-
11 ment;

12 (4) more intensive programs oriented to the needs
13 of small farmers and their families are essential to the
14 preservation of the family farm system, a vital com-
15 ponent of the agricultural productive capacity of this
16 country;

17 (5) families are the most vital and fundamental
18 institutions of this Nation and it is essential that reason-
19 able efforts be made to develop the knowledge essential
20 to preventing and relieving pressures on families in our
21 present society and enable them to function more effi-
22 ciently as resource units intimately involved in the
23 utilization of food and agricultural products and
24 amenities;

1 (6) the utilization of agriculturally renewable re-
2 sources is vital to the economic security of the Nation;

3 (7) meeting the Nation's needs for forest and
4 range-land products and amenities, consistent with
5 multiple use and sustained yield principles, is essential
6 to the Nation's economy, environmental health, and
7 quality of life;

8 (8) the educational programs in forestry carried out
9 by the Cooperative Extension Service are essential to
10 meet the Nation's objectives in increasing timber pro-
11 ductivity on private lands, insuring multiple use benefits
12 from such lands (including timber production, wildlife,
13 water, and recreation), providing adequate returns to
14 landowners from forest products, and providing products
15 to consumers at reasonable prices;

16 (9) the production of healthy animals and plants
17 is essential to insure a safe food supply for the Nation;

18 (10) expanding exports of agricultural commodities
19 is essential for maintaining a positive balance of payments
20 in international trade and a successful export program
21 requires research support;

22 (11) the public wants plentiful supplies of safe and
23 nutritious foods and other products and amenities of our
24 lands and waters at reasonable prices;

1 (12) reduction of food, fiber, and wood products
2 losses is a significant way to increase the supply of these
3 products and to lower costs;

4 (13) agricultural research, extension, and teaching
5 costs have risen more rapidly than appropriations;

6 (14) energy, the weather, the environment, and
7 social, political, and economic considerations are essen-
8 tial and should be incorporated in planning for the food
9 and agricultural sciences;

10 (15) the level of Federal support for the food and
11 agricultural sciences, including research conducted by
12 the United States Department of Agriculture and re-
13 search, extension, and teaching conducted by the uni-
14 versities, should be substantially increased;

15 (16) it is important to assure that the results of
16 food and agricultural research be effectively communi-
17 cated and demonstrated to farmers, processors, handlers,
18 consumers and all other users who can benefit therefrom;
19 and

20 (17) this Nation has an opportunity and responsi-
21 bility to use its prominence in the food and agricultural
22 sciences to assist developing countries with chronic food
23 deficits to increase their own food production and use
24 for domestic purposes.

25 (b) The purposes of this Act are—

1 (1) to emphasize that research, extension and
2 teaching in the food and agricultural sciences are dis-
3 tinct missions of the United States Department of
4 Agriculture;

5 (2) to provide a mechanism for identifying the
6 priorities for food and agricultural research, extension,
7 and teaching to assure that these activities are effectively
8 planned, implemented, coordinated, and evaluated;

9 (3) to encourage and facilitate the development and
10 implementation of more efficient and environmentally
11 sound methods of producing, processing, marketing, and
12 utilizing food, fiber, other non-food agricultural products,
13 and forest and range land products and amenities;

14 (4) to facilitate cooperation and coordination in
15 the implementation of ongoing agricultural research
16 programs by Federal departments and agencies, States,
17 and private and educational entities engaged in such
18 research;

19 (5) to provide for research on human nutrition
20 and food consumption patterns in order to improve
21 the health and vitality of the people of the United
22 States;

23 (6) to insure the continuation of the vital work of
24 the existing agricultural research, extension and teach-
25 ing systems which now include the Department of

1 Agriculture, the land-grant colleges, and the State agri-
2 cultural experiment stations;

3 (7) to provide for a program of research to identify
4 and understand the problems, pressures and changes
5 faced by families, and to develop basic knowledge and
6 procedures that will strengthen families, reduce the
7 problems they face, and assist them in solving prob-
8 lems they encounter in an increasingly complex society;
9 and

10 (8) to provide for expanded programs of animal
11 disease research in order to improve the health and
12 productivity of domestic livestock, poultry, and other
13 animals so essential to the Nation's food supply and
14 the welfare of producers and consumers of animal prod-
15 ucts; to protect human health through control of animal
16 diseases transmissible to humans; and to improve the
17 health of horses and companion animals which support
18 an industry of major economic importance.

19 (c) For purposes of this Act—

20 (1) the term "food and agricultural sciences" shall
21 include research, extension, and teaching activities re-
22 lated to the problems of food and agriculture in their
23 broadest aspects, including the social, economic and
24 political considerations of—

25 (A) agriculture, including soil and water con-

1 servant and use, plant and animal production
2 and protection, and plant and animal health;

3 (B) the processing, distributing, marketing,
4 and utilization of food and agricultural products;

5 (C) forestry including range management, for-
6 est and range products, multiple-use of forest and
7 range lands, and urban forestry;

8 (D) aquaculture;

9 (E) home economics, including human nutri-
10 tion and family life;

11 (F) rural and community development;

12 (2) the terms "basic research", "applied re-
13 search", and "development research", when used for the
14 purpose of classifying research projects or grants, have
15 the following meanings:

16 (A) the term "basic research" means research
17 with the primary goal of gaining knowledge or
18 understanding of a subject;

19 (B) the term "applied research" means re-
20 search in which the primary goal is a practical ap-
21 plication of knowledge to be recognized as a need;
22 and

23 (C) the term "development research" means
24 a systematic use of research findings to produce use-
25 ful materials, devices, systems, or methods;

1 (3) the term "Secretary" means the Secretary of
2 Agriculture;

3 (4) the term "universities" means those colleges,
4 universities, or other legal entities in each State now
5 receiving, or which may hereafter receive, benefits un-
6 der the Act of July 2, 1862 (known as the First Morrill
7 Act), or the Act of August 30, 1890 (known as the
8 Second Morrill Act), and the Tuskegee Institute, which
9 are commonly known as "land-grant" colleges or uni-
10 versities; or the Act of October 10, 1962 (known as
11 the McIntire-Stennis Act); and other United States col-
12 leges and universities which the Secretary may deter-
13 mine—

14 (A) to have a demonstrable capacity in re-
15 search, extension, and teaching activities in the food
16 and agricultural sciences; and

17 (B) can contribute effectively to the attainment
18 of the purposes of this Act;

19 (5) the term "farmer" shall be considered to in-
20 clude persons culturing and harvesting food and fiber
21 resources from land and waters, including private forest
22 owners and public forest and range managers.

23 (6) the term "State" shall include Puerto Rico,
24 Guam, the District of Columbia, and the Virgin Islands;

25 (7) the term "State agricultural experiment station"

1 shall have the same meaning given that term in section
2 1 of the Hatch Act of March 2, 1887 (7 U.S.C. 361a) ;

3 (8) the term "family" refers to a group of two or
4 more persons related by blood, marriage, or adoption,
5 and residing together in a household ;

6 (9) the term "aquaculture" means the propagation
7 and rearing of aquatic species in controlled or selected
8 environments ;

9 (10) the term "aquatic species" means any species
10 of finfish, mollusk, or crustacean (or other invertebrate),
11 amphibian, reptile, or aquatic plant ;

12 (11) the term "extension" means the informal
13 education process conducted by university personnel to
14 extend information that will assist people in making in-
15 formed decisions, and to identify problems so that re-
16 search can be directed to finding solutions ;

17 (12) the term "teaching" means the formal class-
18 room and laboratory instruction conducted at universities
19 in the area of food and agricultural sciences leading to
20 baccalaureate and other recognized degrees ; and

21 (13) the term "users" means those who make direct
22 use of research or extension outputs as well as those who
23 are affected by such applications, including suppliers,
24 producers, processors, marketing firms, consumers, con-
25 servationists, labor unions, and scientists.

1 COORDINATION OF AGRICULTURAL RESEARCH, EXTENSION,
2 AND TEACHING

3 SEC. 3. (a) The Secretary shall—

4 (1) keep abreast of developments in, and the Na-
5 tion's need for, research, extension, education, and man-
6 power development in the sciences related to food and
7 agriculture and represent the needs for such in delibera-
8 tions within the United States Department of Agricul-
9 ture, elsewhere in the executive branch of the United
10 States Government, and with the several States and their
11 designated land-grant colleges and universities, other
12 public and private educational institutions, agricultural
13 and related industries, and other interested institutions
14 and groups;

15 (2) coordinate all research, extension, and teach-
16 ing activity in the food and agricultural sciences, con-
17 ducted or financed by the United States Department of
18 Agriculture and, to the maximum extent practicable,
19 after consultation, coordinate all such activity conducted
20 or financed by or affiliated with other agencies of the
21 executive branch of the United States Government; and
22 in cooperation with the several States, assist in estab-
23 lishing coordination of the various research, extension,
24 and teaching programs, funded in whole or in part by
25 the United States Department of Agriculture, in a given

1 State through the State's directors of agricultural re-
 2 search stations and cooperative extension services;

3 (3) insofar as it is practicable, consult the Board
 4 (as provided in section 4 of this Act) in the formula-
 5 tion of basic policy, procedures, and criteria for review,
 6 selection, and monitoring of proposals for research, ex-
 7 tension, and teaching in the food and agricultural
 8 sciences;

9 (4) review annually with appropriate agencies of
 10 the United States Department of Agriculture and other
 11 Federal departments and agencies, insofar as it is
 12 practicable, the agricultural research, extension, and
 13 teaching requirements of these agencies;

14 (5) report (as a part of the Department of Agricul-
 15 ture's annual budget submissions), to the committees of
 16 both Houses of the Congress which have jurisdiction
 17 over appropriations and over agriculture, action taken to
 18 support (through redirection of funds or use of research
 19 funds) the National Agricultural Research, Extension,
 20 and Teaching Policy Advisory Board's recommendations
 21 and other unfinanced or underfinanced agricultural re-
 22 search, extension, and teaching problem areas;

23 (6) establish appropriate review procedures to as-
 24 sure that research projects are timely and properly
 25 documented, that there is no unnecessary duplication of

1 effort or overlapping between research units (unless
 2 geographical, soils or climatic differences indicate other-
 3 wise), that research units cooperate fully in use of
 4 available resources and skills when necessary, and to
 5 develop and encourage quick response and team research
 6 on broad problem areas requiring a wide range of skills
 7 or resources;

8 (7) establish multidisciplinary research teams on
 9 major agricultural research problems with clearly defined
 10 leadership, budget responsibility, and research programs;

11 (8) establish an enlightened patent policy to assure
 12 that United States Department of Agriculture patents are
 13 developed to the point of practical application and use;

14 (9) disseminate information and the findings of
 15 food and agricultural research through the extension
 16 services of the several States, consulting as necessary
 17 with other Federal departments and agencies; and

18 (10) establish pursuant to the provisions of title
 19 5, United States Code, governing appointments in the
 20 competitive service, an appropriate staff to assist in
 21 carrying out the provisions of this Act and to provide
 22 such staff support for the Board (as provided in section
 23 4 of this Act) as deemed necessary; such staff shall
 24 include persons with training and background in pro-
 25 duction research, marketing and distribution research,

1 utilization and nutrition research, extension, and teach-
2 ing in the food and agricultural sciences.

3 (b) In addition to the Assistant Secretaries of Agri-
4 culture now provided by law, there shall be one additional
5 Assistant Secretary of Agriculture, who shall be appointed
6 by the President, by and with the advice and consent of
7 the Senate, who shall perform such duties as are necessary
8 to carry out the purposes of this Act, and who shall receive
9 compensation at the rate now or hereafter prescribed by
10 law for Assistant Secretaries of Agriculture.

11 (c) Paragraph (11) of section 5315 of title 5, United
12 States Code, is amended by striking the number which ap-
13 pears in parenthesis following "Assistant Secretaries of
14 Agriculture" and inserting the next higher number.

15 NATIONAL AGRICULTURAL RESEARCH, EXTENSION, AND
16 TEACHING POLICY ADVISORY BOARD

17 SEC. 4. (a) There is hereby established within the
18 United States Department of Agriculture a permanent Agri-
19 cultural Research, Extension, and Teaching Policy Advisory
20 Board (hereinafter referred to as the "Board"). The Board,
21 in assisting the Secretary in carrying out the provisions of
22 this Act, shall have advisory functions, including participa-
23 tion in the planning and development of, initiating recom-
24 mendations for, and monitoring of the activities described in
25 this Act and other Acts dealing with agricultural research,

1 teaching, or extension activities (including the Hatch Act,
2 the McIntire-Stennis Act, the Morrill-Nelson Act, the Bank-
3 head-Jones Act, Public Law 89-106, the Smith-Lever Act,
4 and the Rural Development Act of 1972), including the
5 activities assigned to existing advisory committees under
6 those Acts.

7 (b) The Board shall consist of thirty-two members
8 appointed by the Secretary as follows:

9 (1) five representatives from the United States
10 Department of Agriculture, including the Administrators
11 of the Agricultural Research Service, the Cooperative
12 State Research Service, the Extension Service, and the
13 Economic Research Service, and the Chief of the Forest
14 Service;

15 (2) six representatives selected from administrative
16 posts in United States universities (as defined in section
17 2(c) (4) of this Act) qualified in the food and agricul-
18 tural sciences; one member shall be director of an agri-
19 cultural experiment station and one member shall be
20 a director of a cooperative extension service;

21 (3) one representative, serving in an executive-
22 level position, from each of the following organizations
23 upon the recommendation of the head of such organiza-
24 tion—

25 (A) the National Academy of Science;

1 (B) the National Science Foundation;

2 (C) the Energy Research and Development

3 Administration;

4 (D) the Environmental Protection Agency;

5 (E) the Food and Drug Administration,

6 United States Department of Health, Education, and

7 Welfare;

8 (F) the Agency for International Develop-

9 ment; and

10 (G) the National Oceanic and Atmospheric

11 Administration.

12 (4) fourteen representatives from the following

13 types of organizations, as designated by the Secretary—

14 (A) two from national farm organizations;

15 (B) one from a national forestry organization;

16 (C) two from agricultural commodity associa-

17 tions;

18 (D) one from a national organization con-

19 cerned with food distribution (wholesale, retail, or

20 institutional);

21 (E) one from a national food or natural fiber

22 processing organization;

23 (F) one from a national organization primarily

24 concerned with transportation of food and agricul-

25 tural products to domestic or foreign markets;

1 (G) one from a national human nutrition
2 organization;

3 (H) one from a national environmental orga-
4 nization;

5 (I) one from a national veterinary medical
6 association;

7 (J) one from a national consumer organiza-
8 tion;

9 (K) one from a national labor organization
10 primarily concerned with the production, processing,
11 distribution, and transportation of food and agri-
12 cultural products; and

13 (L) one from a private sector organization
14 involved in development programs and issues in
15 developing countries.

16 (c) The Board shall be chaired jointly by the Assistant
17 Secretary of Agriculture provided by section 3 (b) of this
18 Act and a non-Federal employee member of the Board
19 elected by the Board.

20 (d) The Board's responsibilities shall include, but not
21 be limited to—

22 (1) analyzing and evaluating the economic, en-
23 vironmental, and social impacts of research, extension,
24 and teaching programs in the food and agricultural
25 sciences conducted in the United States;

1 (2) reviewing programs, policies, and goals of the
2 Department of Agriculture and of related programs in
3 other agencies and in the universities as they are related
4 to food and agricultural sciences;

5 (3) providing a forum for the exchange of informa-
6 tion on plans and programs of all Federal agencies spon-
7 soring or conducting research, extension, and teaching
8 programs related to food and agriculture, including
9 information to be provided through the Federal Coordin-
10 ating Council for Science, Engineering, and Tech-
11 nology;

12 (4) developing and recommending national policies,
13 priorities, and strategies for food and agricultural
14 research, extension, and teaching for both the short- and
15 the long-term for consideration by the Secretary, the
16 Board for International Food and Agricultural Develop-
17 ment, and other agencies and institutions conducting such
18 programs;

19 (5) assessing the adequacy and making recom-
20 mendations to the Secretary with regard to the allocation
21 of funds authorized under sections 8, 9, 10, 11, and 12
22 of this Act;

23 (6) reviewing and evaluating memorandums of
24 understanding or other documents that detail the terms
25 and conditions between the Secretary and the univer-

1 sities participating in programs under this Act and other
2 Acts dealing with agricultural research, extension, and
3 teaching;

4 (7) reviewing and evaluating agreements and
5 activities authorized by this Act and undertaken by
6 universities to assure compliance with the purposes of
7 this Act; and

8 (8) maintaining a current inventory of agricultural
9 research activities by statutory authorization and
10 budgeted outlay; by teaching category; by field of basic
11 and applied science; and, to the extent possible, by com-
12 modity and product category.

13 (e) In formulating its recommendations to the Secre-
14 tary, the Board may obtain the assistance of United States
15 Department of Agriculture employees, and to the maximum
16 extent practicable and after appropriate consultations, obtain
17 the assistance of employees of other Federal departments and
18 agencies conducting related research, extension, and teaching
19 programs, and of appropriate representatives of universities,
20 including State agricultural experiment stations, cooperative
21 extension services, and other non-Federal organizations con-
22 ducting significant programs in the food and agricultural
23 sciences.

24 (f) (1) While away from their homes or regular places
25 of business in the performance of services for the Board,

1 members of the Board shall be allowed travel expenses, in-
2 cluding per diem in lieu of subsistence, in the same manner as
3 persons employed intermittently in the Government service
4 are allowed expenses under section 5703 (b) of title 5,
5 United States Code.

6 (2) Members of the Board shall serve without compen-
7 sation from the Federal Government except for travel ex-
8 penses described in paragraph (2) and except that members
9 of the Board who are officers or employees of the United
10 States shall receive their normal pay for such employment.

11 (g) Terms for non-Federal members of the Board shall
12 be from one to four years, as determined at the time of
13 appointment by the Secretary, and vacancies in membership
14 to the Board, should they occur, shall be filled in the same
15 manner as provided in subsection (b) of this section.

16 (h) (1) To assist the Board in carrying out its day-to-
17 day responsibilities under this Act, the Secretary shall ap-
18 point, upon the recommendation of the co-chairmen of the
19 Board, the Steering Committee of the Agricultural Research,
20 Extension, and Teaching Policy Advisory Board, hereafter
21 referred to as the "Committee". The Committee shall con-
22 sist of fifteen members, including the co-chairmen of the
23 Board, who shall also be co-chairmen of the Committee,
24 six members from the Board representing administrative
25 posts in United States universities (one of whom shall be

1 director of an agricultural experiment station and one of
2 whom shall be a director of a cooperative extension service),
3 three from the Board members representing user groups as
4 defined in section 2 (b) (13), three from the Board rep-
5 resenting the United States Department of Agriculture, and
6 the Board representative from the Agency for International
7 Development.

8 (2) The Committee shall develop and prepare (after
9 thorough analysis, evaluation, and review) for the Board's
10 approval all studies, recommendations, and reports assigned
11 to the Board by this Act, including coordination with other
12 Federal agencies, State institutions and private organiza-
13 tions.

14 (3) The Committee is authorized to create not more
15 than two subcommittees, staffed with non-Board members,
16 to assist in meeting its responsibilities to the Board.

17 (4) To further assist the Committee in the performance
18 of its duties, the co-chairmen of the Board are authorized
19 to appoint, without regard to the provisions of title 5, United
20 States Code, governing appointments in the competitive
21 service, not to exceed twenty-five full-time professional staff
22 employees qualified in the food and agricultural sciences, for
23 a term of not to exceed four years, at a rate of compensa-
24 tion not lower than the annual rate of basic pay in effect for
25 grade GS-13 and not higher than such rate for grade GS-16;

1 except that not more than five members of such staff shall
2 receive the rate of pay for grade GS-16.

3 (5) The Secretary shall appoint an Executive Secretary
4 of the Board, who shall perform such administrative duties
5 as the co-chairmen of the Board may direct, and such person
6 shall receive compensation at the rate now or hereafter pre-
7 scribed by law for persons in level IV of the Executive
8 Schedule.

9 (6) No later than January 31 of each year, the Board
10 shall submit a report on all actions taken to meet its respon-
11 sibilities under this Act and on all activities which were
12 financed under this Act during the preceding fiscal year.
13 Such report shall be submitted to the President, the House
14 Committee on Agriculture, the House Committee on Appro-
15 priations, the Senate Committee on Agriculture, Nutrition,
16 and Forestry, and the Senate Committee on Appropriations,
17 The report may include the separate views of members of the
18 Board. The first report shall be due not later than January 31
19 following the first complete fiscal year after the enactment of
20 this Act. The second annual report shall include a plan for the
21 development and deployment of scientists and educators in
22 the food and agricultural sciences and a long-range plan for
23 agriculture research and extension, to be updated every five
24 years.

1 PROGRAM OF GRANTS FOR AGRICULTURAL RESEARCH,
2 EXTENSION, AND EDUCATION

3 SEC. 5. (a) The purpose of this section is to set forth
4 grants and allocations for existing and new agricultural re-
5 search, extension, and teaching programs for the food and
6 agricultural sciences to universities, State agricultural experi-
7 ment stations, agencies of the Department of Agriculture,
8 other Federal agencies, and other public and private research
9 institutions, organizations, and individuals.

10 (b) Section 3 (c) (4) of the Act of March 2, 1887, as
11 amended, is repealed.

12 (c) It is the intent of the Congress in enacting this Act
13 to augment, coordinate, and supplement the planning, initia-
14 tion, and conduct of existing food and agricultural science
15 research programs existing prior to the enactment of this Act.

16 (d) (1) In addition to any other grants made under
17 Federal law, the Secretary is further authorized to make
18 grants, for periods not to exceed five years, on a competi-
19 tive basis to State agricultural experiment stations, colleges,
20 universities, and other research institutions and organizations,
21 and to Federal and private organizations and individuals
22 for the purpose of carrying out basic and applied research
23 in the food and agricultural sciences for the Department of
24 Agriculture. These grants shall be made without regard to
25 matching funds by the States in which the recipients are

1 located. The Secretary shall limit allowable overhead costs
2 to those necessary to carry out the purposes of a grant.

3 (2) The first sentence of section 2 of Public Law 89-
4 106 (7 U.S.C. 450i) is amended by inserting a comma and
5 "Federal agencies," after "to Federal and private
6 organizations".

7 (3) In seeking proposals and awarding grants under
8 this subsection, the Secretary shall give priority to research
9 in those fields of basic and applied research science which
10 offer promise of yielding advances and breakthroughs in
11 new areas of knowledge which can be applicable to agricul-
12 ture and forestry. In the identification of such fields of re-
13 search science, the Secretary shall seek the advice and assist-
14 ance of the Agricultural Research, Extension, and Teaching
15 Policy Advisory Board.

16 (e) In addition to any other grants made under Federal
17 law, the Secretary is authorized to make grants for periods
18 not to exceed five years duration to land-grant colleges and
19 universities eligible for assistance under the Acts of July 2,
20 1862 (commonly known as the First Morrill Act), and of
21 August 30, 1890 (commonly known as the Second Morrill
22 Act), to the Tuskegee Institute, and to State agricultural
23 experiment stations eligible for assistance under the Act of
24 March 2, 1887 (commonly known as the Hatch Act), and
25 to all colleges and universities having demonstrable capacity

1 in agricultural research, as determined by the Secretary, to
2 carry out developmental (mission-oriented) agricultural
3 research which results from sudden breakthroughs in basic
4 or applied research programs in areas of the food and agri-
5 cultural sciences of importance to the Nation. Qualifying
6 institutions are limited to receiving one developmental re-
7 search grant annually, not to exceed the sum of \$100,000.
8 These grants shall be made without regard to matching funds
9 being provided by the States in which the recipients are
10 located. The Secretary shall limit allowable overhead costs
11 to those necessary to carry out the purposes of a grant.

12 (f) (1) A university, as defined in section 2 (b) (4) of
13 this Act, may receive grants for carrying out programs of
14 basic and applied research in human nutrition and issues re-
15 lating to families.

16 (2) To receive a grant under this subsection, a univer-
17 sity shall develop research proposals, in consultation with
18 the home economic administrator or equivalent, and submit
19 such proposals through the director of the State agricultural
20 experiment station to the Secretary. The proposal shall in-
21 clude provisions for the dissemination of information on
22 the results of the research to appropriate educational and
23 family-service agencies of the State and the Federal Gov-
24 ernment, including the Cooperative Extension Service.

25 (3) The areas of investigation shall include, but not be

1 limited to, studies on nutritive value, cost, composition,
2 quality, preservation, and safety of foods; human nutrition
3 requirements, metabolism, status and surveillance, dietary
4 practices and education, the nutritional impact of Federal
5 food programs, interrelationships between food intake and
6 nutrition and alcohol intake, environmental toxicants, mal-
7 absorption syndromes, familial or inherited errors in meta-
8 bolism or nutritional defects; food service systems, family
9 and household environments (including housing, equipment,
10 and furnishings), textile products and clothing, quantitative
11 and qualitative aspects of consumption levels, including fam-
12 ily resources management and utilization, intrafamily rela-
13 tionships, and family-community relations and support
14 systems.

15 (4) The Secretary shall establish appropriate criteria
16 for grant approval, and necessary rules and regulations per-
17 taining thereto.

18 (5) Each university submitting a research proposal
19 approved by the Secretary under this subsection shall be
20 entitled to a minimum annual grant of \$100,000.

21 (6) Supplemental grants may be awarded to land-grant
22 universities and other universities with research competence
23 in human nutrition and home economics if the applicant
24 agrees to finance, out of non-Federal funds, at least 20 per
25 centum of the cost of the research program for which the

1 grant is made and if the applicant agrees to comply with
2 such other requirements as the Secretary may prescribe in
3 order to insure that the purposes for which the grant is made
4 are effectively carried out.

5 (7) In determining the amount of non-Federal funds
6 expended by the recipient of any supplemental grant described
7 in paragraph (6) of this subsection, the reasonable value of
8 any services, supplies, facilities, and equipment determined
9 by the Secretary to have been expended in connection with
10 the authorized program shall be included.

11 (8) No university shall be eligible for funds under this
12 subsection in any fiscal year unless such university expends
13 in such fiscal year, on the same general type of research, an
14 amount of funds (excluding funds made available under
15 this Act) at least equal to the amount of funds such univer-
16 sity averaged spending in the preceding three calendar years.

17 (g) (1) Section 3 of the Act entitled "An Act to
18 assist the States to provide additional facilities for research
19 at the State agricultural experiment stations", approved
20 July 22, 1963 (7 U.S.C. 390b), as amended, is amended
21 by inserting the following after the second semicolon in para-
22 graph (2): "including the Connecticut Agricultural Ex-
23 periment Station at New Haven, Connecticut, and the Ohio
24 Agricultural Experiment Station at Wooster, Ohio;".

25 (2) Such Act is amended by striking out sections 4

1 through 8 (7 U.S.C. 390c-390g) and inserting in lieu
2 thereof the following new sections:

3 “SEC. 4. (a) There is authorized to be appropriated
4 for allocations to State agricultural experiment stations under
5 this Act for the purposes of section 2, \$15,000,000 for the
6 fiscal year ending September 30, 1978, \$19,000,000 for the
7 fiscal year ending September 30, 1979, \$23,000,000 for the
8 fiscal year ending September 30, 1980, \$27,000,000 for the
9 fiscal year ending September 30, 1981, and \$31,000,000 for
10 the fiscal year ending September 30, 1982, and not in excess
11 of such sums as may thereafter be authorized by law for any
12 subsequent fiscal year.

13 “(b) (1) The first \$4,000,000 appropriated for research
14 facilities pursuant to this section for any fiscal year shall be
15 apportioned equally among the State agricultural experiment
16 stations.

17 “(2) Any amount in excess of \$4,000,000 appropriated
18 under this section for any fiscal year shall be apportioned
19 among the State agricultural experiment stations as follows:
20 each such station shall receive an amount which bears the
21 same ratio to the total amount of the research funds au-
22 thorized by section 8 of the National Agricultural Research,
23 Extension, and Teaching Policy Act of 1977 and allocated in
24 such fiscal year as the amount received by such university
25 in the preceding year bears to the total amount received

1 from the Federal Government for ongoing agricultural
2 research programs by all such stations in such preceding
3 fiscal year; the amount received by universities in the pre-
4 ceding fiscal year shall be determined on the basis of the
5 research funds received and authorized under such section 8.

6 "SEC. 5. As a condition for receiving funds apportioned
7 under section 4, a State agricultural experiment station
8 shall submit, in such form as the Secretary may require,
9 specific proposals for planning, acquisition, construction, re-
10 pair, rehabilitation, renovation, or remodeling of buildings,
11 laboratories, and other capital facilities including the acquisi-
12 tion of fixtures and equipment which are to become part of
13 such buildings.

14 "SEC. 6. (a) No payment shall be made to any State
15 agricultural experiment station under this Act in any amount
16 greater than the amount made available by such station from
17 non-Federal funds for purposes for which payments are made
18 under section 4.

19 "(b) Any unused portion of the allotment to any State
20 agricultural experiment station for any fiscal year shall
21 remain available at the option of such station for payment
22 to such station for a period of not more than 2 fiscal years
23 following the fiscal year in which such allotment is first made
24 available.

1 “SEC. 7. With respect to multiple-purpose physical facili-
2 ties, the segment or portion thereof which is to be utilized for
3 food and agricultural research shall be the basis for deter-
4 mination of fund support under this Act.

5 “SEC. 8. For each fiscal year that funds are made
6 available for allocation to State agricultural experiment sta-
7 tions, the Secretary shall ascertain, at the earliest practicable
8 date during such year, the amount of the allocation to which
9 each such university is entitled and shall notify each such
10 university in writing promptly thereafter as to the amount
11 of such allocation.”

12 (h) The Secretary shall conduct a comprehensive study
13 of the effects of changing climate and weather on crop and
14 livestock productivity in the United States and, within
15 twelve months of the enactment of this Act, submit to the
16 President and the Congress a report, together with pertinent
17 recommendations, on this study. The study will include—

18 (1) a prompt assessment of what is occurring in this
19 Nation's climate and weather and the possible impact of
20 changes in this field on our total economy and on future
21 food and feed availability and prices;

22 (2) a review of Federal and State water allocation
23 policies; and

24 (3) a consideration of strategies and techniques for
25 dealing with water shortages in the United States that

1 could occur if current climate and weather conditions
2 continue or become more severe.

3 (i) The Secretary shall conduct a comprehensive study
4 into the feasibility of extending the Act of March 2, 1887
5 (known as the Hatch Act) or some similar permanent
6 funding arrangement for food and agricultural sciences re-
7 search to institutions receiving assistance under the Act
8 entitled "An Act donating public lands to the several States
9 and territories which may provide colleges for the benefit of
10 agriculture and the mechanical arts," approved August 30,
11 1890 (7 U.S.C. 321-325), and to the Tuskegee Institute.
12 Such study shall incorporate the views of the respective insti-
13 tutions and officials of the respective States for the coopera-
14 tive institution of such a program. A report of the findings
15 and recommendations under this section shall be submitted
16 to the President and the Congress within twelve months of
17 the date of enactment of this Act.

18 (j) (1) Under existing authorities provided by the
19 Smith-Lever Act and with such additional funds as may be
20 authorized under this Act, the Cooperative Extension Service
21 shall give increasing attention to education programs for—

22 (A) human nutrition, including food utilization for
23 all segments of society;

24 (B) energy conservation, including techniques to

1 accomplish such conservation and the need for such
 2 conservation on the part of individual citizens, house-
 3 holds, businesses, and agricultural and industrial firms;

4 (C) forestry and natural resources, including de-
 5 veloping, transferring, and seeking the application of
 6 scientific and technological information to improve forest
 7 and other renewable natural resources management;
 8 special emphasis shall be given to opportunities for im-
 9 proving the productivity of small private woodlands;
 10 to modernizing wood harvesting and utilization; to
 11 developing and disseminating reliable multiple-use re-
 12 source management information to all landowners and
 13 consumers, and the general public; to wildlife manage-
 14 ment, watershed management, and recreational man-
 15 agement; and to cultural practices, including reforesta-
 16 tion, protection, and related matters; and

17 (D) animal diseases, including nutrition and related
 18 areas.

19 (2) Those colleges and universities eligible for assistance
 20 under the Act of August 30, 1890 (known as the Second
 21 Morrill Act) and the Tuskegee Institute shall continue to
 22 receive funds appropriated under the Smith-Lever Act for
 23 use by these institutions, as prescribed by that Act, in each
 24 of the States affected. The Director of the Cooperative Exten-

1 sion Service shall be responsible for the coordination of the
2 extension program among the cooperating universities in
3 each State.

4 (3) By September 30, 1978, the Cooperative Extension
5 Service shall transmit to the Congress an evaluation of
6 the economic and social consequences of its major programs,
7 including those relating to agricultural production and dis-
8 tribution, home economics, community development and 4-H
9 youth programs. No less than \$1,500,000 and no more than
10 \$2,500,000 of the funds appropriated under this subsection
11 will be used for this evaluation.

12 (k) (1) The administration of funds authorized in sec-
13 tion 22 (7 U.S.C. 329) of the Bankhead-Jones Act of
14 June 29, 1935, as amended, is hereby transferred from the
15 Secretary of the Department of Health, Education, and
16 Welfare to the Secretary of Agriculture.

17 (2) It is the intent of the Congress in enacting this
18 section to augment, coordinate, and supplement the training
19 and education for the food and agricultural science educational
20 programs that existed prior to the enactment of this Act
21 under section 22 of the Bankhead-Jones Act of June 29,
22 1935, as amended.

23 (l) (1) In addition to any other grants made under
24 Federal law, the Secretary is further authorized to make
25 grants on a competitive basis, to universities, as defined in

1 section 2 (b) (4) of this Act, for the purpose of carrying
2 out undergraduate and graduate teaching in the food and
3 agricultural sciences. These grants shall be made without
4 regard to matching funds being provided by the States in
5 which the recipients are located.

6 (2) Funds authorized under this subsection shall be
7 available for, but not limited to, supporting teaching, for
8 instructional scientific equipment, specialized facilities, and
9 resources of demonstrable need to enhance quality of teach-
10 ing, for curricular analysis and modification, for staff devel-
11 opment, for programs for minority and disadvantaged
12 students, for traineeships and graduate assistantships, and for
13 supplementing instructional staff resources.

14 (3) The Secretary shall establish appropriate criteria for
15 grant approval and necessary rules and regulations pertain-
16 ing thereto.

17 (m) (1) The Secretary shall conduct a program of
18 graduate assistantships in the food and agricultural sciences
19 at universities, as defined in section 2 (b) (4) of this Act.
20 The purpose of this program shall be to provide training and
21 increased research capabilities in the food and agricultural
22 science areas of need as identified by each State. Graduate
23 assistantships, each for a period of up to three years, shall
24 be awarded to graduate students from each of the States,
25 provided the following criteria are satisfied—

1 (A) that the student is enrolled in a degree-granting
2 program in a college or university in the State awarding
3 the assistantship or another State designated at the time
4 of application;

5 (B) that the student intends to pursue or is pursuing
6 a course of study in the agricultural sciences which is
7 directly related to a food and agricultural science area
8 of need as identified by the Governor or Chief Executive
9 Officer of the same State; and

10 (C) that no more than five such assistantships in
11 any one year shall be awarded to students within each
12 State.

13 (3) These assistantships shall be awarded on the basis
14 of merit.

15 (4) The Secretary shall establish necessary rules and
16 implementing regulations for the administration of this sub-
17 section.

18 ANIMAL DISEASE RESEARCH

19 SEC. 6. (a) In order to carry out the purposes of this
20 section, the Secretary is hereby authorized to cooperate
21 with and assist the States in carrying out programs of animal
22 disease research at eligible institutions in the manner here-
23 inafter described in this section. Funds authorized under this
24 section shall be used to meet expenses of conducting research,
25 of publishing and disseminating the results of such research,

1 of contributing to retirement of employees subject to the
2 provisions of the Act approved March 4, 1940 (54 Stat.
3 39), of administrative planning and direction, and of pur-
4 chasing needed equipment and supplies.

5 (b) For purposes of this section—

6 (1) the term “eligible institution” includes those
7 institutions defined as universities in section 2 (b) (4)
8 and having an accredited college of veterinary medicine
9 or a department of veterinary science or animal pathol-
10 ogy, or similar unit conducting animal disease research;
11 and

12 (2) the term “animal disease research capacity”
13 shall mean the capacity of an eligible institution to con-
14 duct research on animal disease as measured by a for-
15 mula to be developed and applied by the Secretary with
16 the advice of the Board; the formula will provide a
17 figure for each eligible institution which will be used in
18 determining the institution’s relative capacity to per-
19 form such research as a percentage of the total national
20 capacity of all such institutions to conduct animal dis-
21 ease research.

22 (c) Funds appropriated under this section, except sub-
23 section (h), shall be apportioned and distributed as follows—

24 (1) 4 per centum shall be retained by the United
25 States Department of Agriculture for administration,

1 program assistance to the States, and for program coor-
2 dination;

3 (2) 48 per centum shall be apportioned by the Sec-
4 retary to States having eligible institutions in the propor-
5 tion that the value and income of domestic livestock and
6 poultry in such State bears to the total value and income
7 of domestic livestock and poultry in the United States;
8 the amount apportioned a State under this paragraph
9 shall be distributed by the Secretary to each eligible in-
10 stitution within such State in the proportion that the
11 animal disease research capacity of each eligible institu-
12 tion bears to the total animal disease research capacity
13 of all such eligible institutions in such State; the Secre-
14 tary will determine the total value and income of, and
15 the proportionate value and income of, domestic live-
16 stock and poultry for each State from the latest inven-
17 tory of all cattle, sheep, swine, horses, and poultry
18 published by the United States Department of Agri-
19 culture; and

20 (3) 48 per centum shall be apportioned and dis-
21 tributed by the Secretary to each eligible institution in the
22 proportion that the animal disease research capacity of
23 the institution bears to the total animal disease research
24 capacity of all such institutions, as determined by the
25 Secretary.

1 (d) When the amount available under this section for
2 allotment to any eligible institution on the basis of livestock
3 values and income exceeds the amount for which such insti-
4 tution is eligible on the basis of animal disease research ca-
5 pacity, the excess may be used for remodeling of old facilities,
6 construction of new facilities, or an increase in staffing pro-
7 portionate to the need for added research capacity at the
8 discretion of the Secretary.

9 (e) The sums distributed on the basis of proportionate
10 value and income of domestic livestock and poultry and pro-
11 portionate animal disease research capacity in the first ap-
12 propriation under this section and like sums appropriated in
13 subsequent years shall be based on the latest available data on
14 National and State livestock values and income and research
15 capacities, and any sums in addition to the initial appropria-
16 tion level appropriated in subsequent years shall be distrib-
17 uted on the basis of domestic livestock and poultry values
18 and income and animal disease research capacities in the
19 years those additional sums are first appropriated: *Provided,*
20 That sums available to an eligible institution will not be
21 decreased because of subsequent changes in the proportionate
22 distribution of domestic livestock and poultry values and
23 income and animal disease research capacities unless a State
24 has no such research capacity.

25 (f) In those States with accredited colleges of veterinary

1 medicine, the dean of the accredited college or colleges and
2 the director of the State agricultural experiment station shall
3 develop a comprehensive animal disease research program
4 based on the animal disease research capacity of each eligi-
5 ble institution, which shall be submitted to the Secretary by
6 the State agricultural experiment station director for ap-
7 proval. Project proposals will be jointly prepared for re-
8 search on priority problems of animal disease and submitted
9 by the directors of the State agricultural stations to assure
10 compliance with the purposes of this section and with the
11 Secretary's general guidelines. The director of the State
12 agricultural experiment stations will be responsible for over-
13 all coordination of research programs among the cooperating
14 institutions in each State, including making provisions for
15 inclusion of all animal disease research projects in the Co-
16 operative Research Information System. An annual report
17 of the accomplishment and costs of each project will be
18 provided to the Secretary by the State agricultural experi-
19 ment station director.

20 (h) (1) To assist those States in which there is no
21 accredited college of veterinary medicine, the Secretary is
22 authorized to conduct a program of grants, based on a match-
23 ing formula of 80 per centum Federal and 20 per centum
24 State funding. Funds from such grants shall be used in meet-
25 ing the costs of construction, employment of faculty, ac-

1 quiring equipment, and taking such other action relating to
2 the initial establishment and initial operation of a school of
3 veterinary medicine.

4 (2) States desiring to establish a school of veterinary
5 medicine under this subsection shall file, with their applica-
6 tion for funds under this section, supportive assurances satis-
7 factory to the Secretary that—

8 (A) the State has established regional veterinary
9 medical training programs with one or more States with-
10 out colleges of veterinary medicine which consist of
11 cooperative programs providing for a sharing of cur-
12 riculum and costs by the individual States; and

13 (B) the clinical training of the school to be estab-
14 lished shall emphasize care and preventive medical pro-
15 grams for food-producing animals.

16 (3) Funds appropriated under this subsection for any
17 fiscal year shall be apportioned and distributed by the Secre-
18 tary as follows:

19 (A) Four per centum shall be retained by the
20 United States Department of Agriculture for adminis-
21 tration, program assistance, and program coordination.

22 (B) The remainder shall be distributed to those
23 eligible States desiring to establish a college of veterinary
24 medicine in the proportion that the value of and income
25 to producers from domestic livestock and poultry in such

1 a State bears to the total value of and income to pro-
 2 ducers from domestic livestock and poultry in those
 3 States which are eligible to receive assistance under this
 4 subsection. The Secretary shall determine the total value
 5 of and income from domestic livestock and poultry for
 6 each State on the most current inventory of all cattle,
 7 sheep, swine, and poultry which is published by the
 8 United States Department of Agriculture.

9 (i) The Secretary shall establish necessary rules and
 10 implementing regulations for administration, including
 11 reporting requirements by institutions on the expenditure of
 12 Federal funds under this section.

13 CONTRACT STUDIES WITH NATIONAL ACADEMY OF
 14 SCIENCES

15 SEC. 7. (a) The Secretary is authorized to contract with
 16 the National Academy of Sciences to conduct studies to assist
 17 the Secretary in his evaluation of the programs of research,
 18 extension, and teaching in the fields of food and agricultural
 19 sciences required under this Act. In the event the National
 20 Academy of Sciences is unable to conduct these studies, the
 21 Secretary is authorized to enter into contract arrangements
 22 with an appropriate nonprofit group or association. Reports
 23 of studies under this section shall be made periodically and
 24 not later than February 15 of each year to the Secretary and
 25 chairmen of the Committee on Agriculture, Nutrition, and

1 Forestry of the Senate and the Committee on Agriculture of
2 the House of Representatives.

3 (b) The Secretary is authorized to expend out of funds
4 available to the Secretary from appropriations made after
5 the date of enactment of this Act not to exceed \$250,000
6 annually for the actual expenses incurred for the support
7 of studies authorized by this section.

8 AUTHORIZATION FOR APPROPRIATIONS OF ONGOING
9 AGRICULTURAL RESEARCH PROGRAMS

10 SEC. 8. (a) Notwithstanding any authorization for ap-
11 propriations for food and agricultural science research in any
12 Act existing prior to the date of enactment of this Act, there
13 is authorized to be appropriated for the purposes of carrying
14 out the provisions of sections 3, 4, and 5 (c) of this Act,
15 except as provided in subsection (b), \$490,000,000 for the
16 fiscal year ending September 30, 1978, \$550,000,000 for
17 the fiscal year ending September 30, 1979, \$600,000,000
18 for the fiscal year ending September 30, 1980, \$650,000,-
19 000 for the fiscal year ending September 30, 1981, and
20 \$700,000,000 for the fiscal year ending September 30, 1982,
21 and not in excess of such sums as may thereafter be author-
22 ized by law for any subsequent fiscal year.

23 (b) There is authorized to be appropriated for the pur-
24 pose of conducting food and agricultural science research at
25 State agricultural experiment stations under the Act of

1 March 2, 1887 (commonly known as the Hatch Act) and
 2 carrying out the provisions of section 5(c) of this Act,
 3 \$150,000,000 for the fiscal year ending September 30, 1978,
 4 \$200,000,000 for the fiscal year ending September 30, 1979,
 5 \$250,000,000 for the fiscal year ending September 30, 1980,
 6 \$300,000,000 for the fiscal year ending September 30, 1981,
 7 and \$350,000,000 for the fiscal year ending September 30,
 8 1982, and not in excess of such sums as may thereafter be
 9 authorized by law for any subsequent fiscal year.

10 AUTHORIZATIONS FOR APPROPRIATION OF NEW

11 AGRICULTURAL RESEARCH PROGRAMS

12 SEC. 9. (a) There is authorized to be appropriated for
 13 the purpose of carrying out the provisions of section 5(d) of
 14 this Act \$27,600,000 for the fiscal year ending Septem-
 15 ber 30, 1978, \$30,600,000 for the fiscal year ending Sep-
 16 tember 30, 1979, \$30,600,000 for the fiscal year ending
 17 September 30, 1980, \$30,600,000 for the fiscal year ending
 18 September 30, 1981, and \$30,600,000 for the fiscal year
 19 ending September 30, 1982, and not in excess of such sums
 20 as may thereafter be authorized by law for any subsequent
 21 fiscal year.

22 (b) There is authorized to be appropriated for the pur-
 23 poses of carrying out the provisions of section 5(e) of this
 24 Act \$10,000,000 for the fiscal year ending September 30,
 25 1978, \$12,500,000 for the fiscal year ending September 30,

1 1979, \$15,000,000 for the fiscal year ending September 30,
 2 1980, \$17,500,000 for the fiscal year ending September 30,
 3 1981, and \$20,000,000 for the fiscal year ending September
 4 30, 1982, and not in excess of such sums as may thereafter
 5 be authorized by law for any subsequent fiscal year.

6 (c) There is authorized to be appropriated for the pro-
 7 visions of section 5 (f) of this Act \$5,000,000 for the fiscal
 8 year ending September 30, 1978, \$7,500,000 for the fiscal
 9 year ending September 30, 1979, \$10,000,000 for the fiscal
 10 year ending September 30, 1980, \$12,500,000 for the fiscal
 11 year ending September 30, 1981, and \$15,000,000 for the
 12 fiscal year ending September 30, 1982, and not in excess of
 13 such sums as may thereafter be authorized by law for any
 14 subsequent fiscal year.

15 AUTHORIZATIONS FOR APPROPRIATIONS FOR EXTENSION
 16 EDUCATION

17 SEC. 10. Notwithstanding any authorization for appro-
 18 priations for the Cooperative Extension Service in any Act
 19 existing prior to the date of enactment of this Act, there is
 20 authorized to be appropriated for the purposes of carrying
 21 out the provisions of section 5 (j) of this Act \$290,000,000
 22 for the fiscal year ending September 30, 1978, \$330,000,000
 23 for the fiscal year ending September 30, 1979, \$370,000,000
 24 for the fiscal year ending September 30, 1980, \$410,000,000
 25 for the fiscal year ending September 30, 1981, and \$450,-

1 000,000 for the fiscal year ending September 30, 1982, and
2 not in excess of such sums as may thereafter be authorized
3 by law for any subsequent fiscal year.

4 AUTHORIZATIONS FOR APPROPRIATIONS FOR TEACHING IN
5 FOOD AND AGRICULTURAL SCIENCES

6 SEC. 11. (a) There is authorized to be appropriated
7 for the purposes of carrying out the provisions of section
8 5(k) of this Act \$15,000,000 for the fiscal year ending
9 September 30, 1978, \$20,000,000 for the fiscal year ending
10 September 30, 1979, \$25,000,000 for the fiscal year ending
11 September 30, 1980, \$30,000,000 for the fiscal year ending
12 September 30, 1981, and \$35,000,000 for the fiscal year
13 ending September 30, 1982, and not in excess of such sums
14 as may thereafter be authorized by law for any subsequent
15 fiscal year.

16 (b) There is authorized to be appropriated for the pur-
17 poses of carrying out the provisions of section 5(l) of this
18 Act \$15,000,000 for the fiscal year ending September 30,
19 1978, \$15,500,000 for the fiscal year ending September 30,
20 1979, \$16,000,000 for the fiscal year ending September 30,
21 1980, \$16,500,000 for the fiscal year ending September 30,
22 1981, and \$17,000,000 for the fiscal year ending Septem-
23 ber 30, 1982, and not in excess of such sums as may be
24 thereafter be authorized by law for any subsequent fiscal
25 year.

1 (c) There is authorized to be appropriated for the pur-
 2 poses of carrying out the provisions of section 5 (m) of this
 3 Act \$2,500,000 for the fiscal year ending September 30,
 4 1978, \$3,000,000 for the fiscal year ending September 30,
 5 1979, \$3,500,000 for the fiscal year ending September 30,
 6 1980, \$4,000,000 for the fiscal year ending September 30,
 7 1981, and \$4,500,000 for the fiscal year ending Septem-
 8 ber 30, 1982, and not in excess of such sums as may there-
 9 after be authorized by law for any subsequent fiscal year.

10 AUTHORIZATIONS FOR APPROPRIATIONS FOR CONDUCTING
 11 ANIMAL DISEASE RESEARCH

12 SEC. 12. (a) There is authorized to be appropriated for
 13 the purposes of carrying out the provisions of section 6 (a) ,
 14 (b) , (c) , (d) , (e) , (f) , and (g) of this Act \$20,000,000
 15 for the fiscal year ending September 30, 1978, \$24,000,000
 16 for the fiscal year ending September 30, 1979, \$28,000,000
 17 for the fiscal year ending September 30, 1980, \$32,000,000
 18 for the fiscal year ending September 30, 1981, and \$36,000,-
 19 000 for the fiscal year ending September 30, 1982, and not
 20 in excess of such sums as may thereafter be authorized by
 21 law for any subsequent fiscal year.

22 (b) There is authorized to be appropriated for the pur-
 23 poses of carrying out the provisions of section 6 (h) of this
 24 Act \$15,000,000 for the fiscal year ending September 30,
 25 1978, \$16,000,000 for the fiscal year ending September 30,

- 1 1979, \$17,000,000 for the fiscal year ending September 30,
- 2 1980, \$18,000,000 for the fiscal year ending September 30,
- 3 1981, and \$19,000,000 for the fiscal year ending Septem-
- 4 ber 30, 1982, and not in excess of such sums as may there-
- 5 after be authorized by law for any subsequent fiscal year.

95TH CONGRESS
1ST SESSION

H. R. 4863

IN THE HOUSE OF REPRESENTATIVES

MARCH 10, 1977

Mr. THORNTON (for himself, Mr. FOLEY, and Mr. TEAGUE) introduced the following bill; which was referred to the Committee on Agriculture

A BILL

To strengthen United States agricultural research and research education, to improve the policy formulation and coordination for agricultural research and education activities, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That this Act may be cited as the "Agricultural Research
4 Act of 1977".

FINDINGS AND PURPOSES

5
6 SEC. 2. (a) The Congress finds that—

7 (1) agricultural research, which includes research
8 on all aspects of the production and use of food, fiber,
9 forest products and on human nutrition, aquaculture,

1 agriculture, and rural life, has made an indispensable
2 contribution to agricultural productivity in the United
3 States;

4 (2) the existing agricultural research system con-
5 sisting of the Federal Government, the land-grant col-
6 leges, other colleges and universities engaged in agri-
7 cultural research, the agricultural experiment stations,
8 and the private sector constitute an essential national
9 resource which must serve as the foundation for any
10 further strengthening of agricultural research in the
11 United States;

12 (3) agricultural scientists working with the Na-
13 tion's farmers have made possible past advances in
14 agricultural productivity, and such highly trained sci-
15 entists and engineers will be needed in increasing num-
16 bers in the future;

17 (4) the peoples of the world are now facing serious
18 nutrition deficiencies and food shortages due to short-
19 term, localized, and adverse climatic conditions and due
20 to the long-term, steady growth of populations; these
21 problems will become more severe, and the resulting
22 demand for increased food production will have to be
23 met chiefly through the application of scientific and
24 technological advances from agricultural research;

25 (5) to obtain the full benefits of agriculture and

1 aquaculture, human nutrition and food consumption be-
2 havior must be better understood through long-term,
3 comprehensive nutrition research;

4 (6) the demand for fiber and wood products to
5 clothe and house the Nation will continue to climb and
6 must be met through increased production and inno-
7 vative uses of fiber and wood products, and associated
8 waste materials;

9 (7) more intensive efforts are required to develop
10 technologies which will enable smaller farm units to
11 remain competitive with large-scale production units;

12 (8) advances in the current state of the art in
13 agricultural science and technology have become in-
14 creasingly limited by the concentration upon the thor-
15 ough development and exploitation of currently known
16 scientific principles and technological approaches at
17 the expense of more fundamental research needed to
18 meet the needs of future generations for agricultural
19 production;

20 (9) a strong research effort in the basic sciences,
21 including biology, chemistry, and physics, will offer op-
22 portunities for breakthroughs in knowledge that can
23 result in new varieties and substantial increases in
24 productivity;

1 (10) a strong applied research effort, aimed at the
2 development of new and innovative agricultural technol-
3 ogy and new crops and animals for use in both the
4 United States and in subtropical, tropical, and arid
5 climates, offers promise of further increases in agricul-
6 tural productivity;

7 (11) as the agricultural research of the Federal
8 Government is expanded, there is a need for strengthen-
9 ing the planning, coordination, and conduct of Fed-
10 eral agricultural research; and

11 (12) the United States Department of Agriculture
12 is and should continue to serve as the lead agency in the
13 executive branch for agricultural research.

14 (b) The purposes of this Act are to—

15 (1) encourage and facilitate the development and
16 maintenance of a unified national agricultural research
17 policy upon which the overall Federal research effort
18 can be based;

19 (2) provide a mechanism for identifying the Na-
20 tion's priorities for agricultural research and education to
21 assure that high-priority research is funded and that all
22 research related to agriculture is effectively planned, co-
23 ordinated, and evaluated;

24 (3) facilitate cooperation and coordination in the
25 implementation of ongoing research programs by Fed-

1 eral and State departments and agencies and by private
2 and educational entities engaged in such research;

3 (4) assure the continuation of the vital work of
4 the existing agricultural research and educational system
5 which now includes the Department of Agriculture, the
6 land-grant colleges, and the State experiment stations;

7 (5) establish a new program of research grants
8 to be awarded on the basis of scientific competition
9 from among the widest groups of scientific research
10 workers and institutions with the aim of encouraging
11 high-priority basic and applied research and promoting
12 excellence in agricultural research;

13 (6) establish a new program of education grants
14 and fellowships to be awarded on the basis of competi-
15 tion to strengthen training and research programs in the
16 agricultural sciences;

17 (7) provide for research on human nutrition and
18 food consumption patterns in order to improve the health
19 and vitality of the people of the United States;

20 (8) provide for expanded programs of animal
21 health care, research, and associated research in the pro-
22 ductive use of animal waste products, in order to im-
23 prove the health and productivity of domestic livestock,
24 poultry, and other animals essential to the Nation's food
25 supply;

1 (9) strengthen research into the cultivation of
2 fiber and forest plants and into their processing and
3 use; and

4 (10) provide for programs of new crop research
5 in order to expand our use of varied soils and increase
6 the choice of nutritional and economically viable crops
7 that are appropriate for various soil conditions.

8 TITLE I—AGRICULTURAL RESEARCH POLICY,
9 RESEARCH, AND EDUCATION

10 AGRICULTURAL RESEARCH AND EDUCATION POLICY

11 ADVISORY COMMITTEE

12 SEC. 101. (a) There is hereby established in the United
13 States Department of Agriculture a permanent Agricul-
14 tural Research and Education Policy Advisory Committee.
15 The Committee shall have the function of advising the Sec-
16 retary with respect to national agricultural research and
17 education policies, including but not limited to priorities for
18 basic and applied agricultural research, the administration
19 of agricultural research, and policies for education and train-
20 ing in agricultural research.

21 (b) The Committee shall be composed of twenty-one
22 members appointed by the Secretary, within ninety days
23 from the date of enactment of this Act, for such terms as he
24 shall designate. The membership shall include—

25 (1) the Assistant Secretary of Agriculture with

1 responsibility for research and education, who shall serve
2 as Chairman;

3 (2) four additional members from the Department
4 including the Administrators for the Agricultural Re-
5 search Service and the Cooperative State Research
6 Service, and the Chief of the Forest Service;

7 (3) an individual serving in an executive level
8 position in the Department of Health, Education, and
9 Welfare, and designated by the Secretary of that
10 Department;

11 (4) an individual serving in an executive level posi-
12 tion in the Department of State and designated by the
13 Secretary of that Department;

14 (5) an individual serving in an executive level posi-
15 tion in the Energy Research and Development Admin-
16 istration and designated by the Administrator of that
17 agency;

18 (6) an individual serving in an executive level posi-
19 tion in the National Science Foundation and designated
20 by the Director of that agency;

21 (7) an individual serving in an executive level posi-
22 tion in the Environmental Protection Agency and design-
23 ated by the Administrator of that agency;

24 (8) the Chairman of the Animal Health Science
25 Research Advisory Board established by section 203;

1 (9) two representatives of the land-grant colleges;

2 (10) two representatives of the State experiment
3 stations; and

4 (11) six individuals selected by the Secretary to
5 represent private research institutions, the interest of
6 the public and of consumers, and public or private edu-
7 cational institutions and foundations other than the in-
8 stitutions referred to in paragraphs (9) and (10) of
9 this subsection.

10 (c) The Committee may establish such subcommit-
11 tees as it deems appropriate to develop information, re-
12 ports, advice, and recommendations for use of the Com-
13 mittee concerning specialized areas of agricultural research
14 policy, including but not limited to subcommittees to review
15 disciplinary and commodity research priorities, funding and
16 administrative questions, and individual questions of research,
17 education and training. Members of such subcommittees
18 may include members of the Committee, individuals from
19 the Department and other departments and agencies of the
20 Federal Government, and individuals from the private sec-
21 tor who have expertise in the subject to be examined by
22 the subcommittee on which such individual serves.

23 (d) (1) While away from their homes or regular place
24 of business in the performance of services for the Committee,
25 members of the Committee shall be allowed travel expenses,

1 including per diem in lieu of subsistence, in accordance with
2 applicable laws.

3 (2) Members of the Committee shall serve without
4 compensation, except as provided in paragraph (1) of this
5 subsection and except that employees of the Federal Gov-
6 ernment shall receive their normal pay for time served in
7 the performance of duties for the Committee.

8 (e) The Committee shall prepare and submit to the
9 Secretary by November 15, 1978, and annually thereafter,
10 a draft of the annual report required by section 109.

11 (f) (1) The Secretary shall establish within the De-
12 partment a permanent Agricultural Research Policy Anal-
13 ysis Institute. It shall be the function of the Institute, in
14 support of the activities of the Committee, to conduct re-
15 search on matters of policy regarding all aspects of agricul-
16 tural research and related matters.

17 (2) The Committee shall serve as the Board of Di-
18 rectors of the Institute.

19 (3) The Institute shall be headed by a Director ap-
20 pointed by the Committee with the concurrence of the
21 Secretary.

22 (4) The Secretary may, on the recommendation of the
23 Director and after consultation with the Committee, appoint
24 not to exceed twenty professional members of the Institute.

1 Professional members of the Institute shall serve full time
2 and subject to the supervision and direction of the Director.
3 The Director and the professional members of the Institute
4 may be appointed from outside the Federal Government sub-
5 ject to section 3109 of title 5 of the United States Code, and
6 from the staff of the Department or from other departments
7 and agencies of the Federal Government for fixed terms
8 designated by the Secretary.

9 (5) The Institute shall perform such studies as may be
10 requested by the Committee, and the Director may, subject
11 to the availability of the necessary resources, initiate and
12 submit to the Committee proposals for such studies as he
13 deems appropriate.

14 (6) The Department shall provide supportive personnel
15 and administrative services to the Institute.

16 COORDINATION OF AGRICULTURAL RESEARCH

17 SEC. 102. (a) The Secretary shall insure that the agri-
18 cultural research program which is conducted and funded by
19 the Department is coordinated within the Department and
20 with agricultural research activities in other Federal de-
21 partments and agencies, at the land-grant colleges, at the
22 State agricultural experiment stations, at the State cooper-
23 ative extension services, and in the private sector. For this
24 purpose—

1 (1) the Department is designated as the lead agency
2 of the Federal Government for agricultural research;

3 (2) the Secretary may delegate to the appropriate
4 Assistant Secretary of Agriculture such coordinating
5 functions under this section as he deems appropriate, and
6 may form such departmental committees and other
7 bodies as he deems appropriate; and

8 (3) in the exercise of the responsibility for coordi-
9 nation with other departments and agencies of the Fed-
10 eral Government, the Secretary shall, in consultation
11 with the Office of Science and Technology Policy and
12 the Office of Management and Budget, utilize the Fed-
13 eral Coordinating Council for Science, Engineering, and
14 Technology and such other mechanisms as he deems
15 appropriate.

16 (b) Section 401 (h) of the National Science and Tech-
17 nology Policy, Organization and Priorities Act of 1976 (42
18 U.S.C. 6651 (h)) is amended by adding at the end thereof
19 the following: "Among such standing subcommittees and
20 panels of the Council shall be the Subcommittee on Food and
21 Renewable Resources. The purpose of this subcommittee shall
22 be to review Federal research and development programs
23 relevant to world food and fiber production and distribution,
24 to promote planning and coordination of this research in the

1 Federal Government, and to recommend policies and other
2 measures concerning food and agricultural science for the
3 consideration of the Council. The subcommittee shall be
4 composed of the representatives of each of the following
5 departments or agencies: Department of Agriculture, De-
6 partment of State, Department of Defense, Department of
7 Interior, Department of Health, Education, and Welfare, the
8 National Oceanic and Atmospheric Administration, the En-
9 ergy Research and Development Administration, the Na-
10 tional Science Foundation, the Environmental Protection
11 Agency, and the Tennessee Valley Authority. The repre-
12 sentative of the Department of Agriculture shall serve as the
13 chairperson of the subcommittee.”

14 (c) In order to promote the coordination of agricultural
15 research by the Department, the Secretary shall conduct a
16 continuing inventory of ongoing and completed research
17 projects being conducted within or funded by the
18 Department.

19 CONTINUATION OF EXISTING AGRICULTURAL RESEARCH

20 PROGRAMS

21 SEC. 103. It is the intent of the Congress in enacting this
22 Act to augment, coordinate, and supplement the planning,
23 initiation, and conduct of agricultural research and extension
24 programs in existence on the date of enactment of this Act.

1 PROGRAM OF COMPETITIVE GRANTS FOR AGRICULTURAL
2 RESEARCH

3 SEC. 104. (a) The Secretary shall establish a program
4 of competitive grants for agricultural research.

5 (b) Grants made under this section shall be made in
6 the following categories to individual scientists and to institu-
7 tions or groups of institutions based upon research proposals
8 from individual scientists—

9 (1) for the purpose of conducting basic research
10 aimed at the discovery of new scientific principles and
11 techniques that may be applicable in agriculture and
12 forestry;

13 (2) for the purpose of conducting applied research
14 aimed at the development of new and innovative prod-
15 ucts, methods, and technology in such fields as biological
16 nitrogen fixation and photosynthesis that will improve
17 and increase the productivity of agriculture and forestry
18 resources;

19 (3) for the purpose of conducting basic and applied
20 research in the field of human nutrition; and

21 (4) for the purpose of conducting research, de-
22 velopment, and demonstration of new crops, including
23 guayule and jojoba.

24 (c) In seeking proposals and awarding research grants

1 authorized under this section, the Secretary shall give priority
2 to research in those fields of basic and applied science which
3 offer promise of yielding advances and breakthroughs in new
4 areas of knowledge which can be applicable to agriculture,
5 human nutrition, aquaculture and forestry. In the identifica-
6 tion of such fields of science, the Secretary shall seek the
7 advice and assistance of the Committee.

8 (d) In seeking research proposals and in performing
9 evaluations of such proposals under this section, the Secre-
10 tary shall seek the widest participation of qualified scientists
11 within Government, in State and private universities, in
12 State agricultural experiment stations, and in the private
13 sector.

14 (e) Not to exceed 5 percent of the funds awarded
15 under this section in any fiscal year may be granted to
16 support research conducted outside the United States which
17 the Secretary determines to be of exceptional promise or
18 quality or which, due to climatic or geographic conditions,
19 can only be performed abroad.

20 (f) Research grants made under this section to institu-
21 tions or groups of institutions may, upon the determination of
22 the Secretary, be made with a requirement for matching
23 funds from the recipient of such grant, *Provided*, That such
24 requirement is applied uniformly with respect to the type of
25 grant and the recipients involved.

(g) The Secretary shall limit the amount of each grant which may be used for overhead costs, as defined by the Secretary, and such amount shall be used only for such costs which the Secretary determines are necessary to carry out the purposes of such grant.

GRANTS AND FELLOWSHIPS FOR AGRICULTURAL SCIENCE AND EDUCATION

Sec. 105. (a) The Secretary shall conduct a program of grants to institutions of higher education for the purpose of furthering education in the agricultural sciences. These grants shall be made in the following two categories:

(1) Grants to strengthen programs of training and research for scientists at the graduate and postdoctoral levels at institutions of higher education. Awards in this category may include support for exploratory research by such scientists, for the acquisition of instruments, equipment, and facilities for research and training, and for other programs and activities aimed at meeting departmental, interdepartmental, or institutionwide training and research needs, or a combination thereof. Awards shall be made on a competitive basis and may cover periods not to exceed four years. Competition for such grants shall be open to institutions of higher education in the United States which have a capacity for teaching, research, and the dissemination of research

1 results or which are establishing such programs in the
2 agricultural sciences.

3 (2) Grants to strengthen undergraduate programs
4 in the agricultural sciences at institutions of higher
5 education. Awards in this category may be made with
6 respect to any approach designed to improve such under-
7 graduate programs through traditional or nontraditional
8 courses, curriculums, or teaching modes. Awards shall
9 be made on a competitive basis and may cover periods
10 not to exceed two years. Competition for such grants
11 shall be open to institutions of higher education or to
12 groups of such institutions which individually or collec-
13 tively have a capacity for teaching, research, and the
14 dissemination of research results or which are establish-
15 ing such programs in the agricultural sciences.

16 (b) The Secretary shall conduct a program of predoc-
17 toral and postdoctoral fellowships in the agricultural sciences.
18 These fellowships shall be made in the following two
19 categories:

20 (1) Predoctoral fellowships, each for a period of up to
21 four years. The purpose of these fellowships is to provide
22 training and increase research capabilities in areas of need
23 as identified by each State. These fellowships shall be
24 awarded on the basis of merit, as determined by ad hoc
25 review panels established annually by the Secretary, to

1 graduate students from each of the States, provided the fol-
2 lowing criteria are satisfied:

3 (A) that the student is enrolled in a graduate
4 degree program in a college or university;

5 (B) that the student intends to pursue or is pur-
6 suing a course of study in the agricultural sciences which
7 is directly related to an area of need as identified by the
8 Governor or chief executive officer of the State; and

9 (C) that at least three such fellowships shall be
10 awarded to students from each State in every year.

11 (2) Postdoctoral fellowships, each for a period of from
12 one to five years. The purpose of these fellowships is to
13 attract highly promising investigators to research careers
14 in basic sciences underlying agriculture and to provide
15 stipends and/or research support for their training and estab-
16 lishment as independent investigators. In making awards
17 under this program, the Secretary shall give priority to
18 individuals doing basic research at private or public institu-
19 tions of higher education.

20 (c) The administration of funds authorized in section
21 22 of the Act entitled "An Act to provide for research
22 into basic laws and principles relating to agriculture and to
23 work for the further development of cooperative agricultural
24 extension work and the more complete endowment and
25 support of land-grant colleges", approved June 29, 1935

1 (7 U.S.C. 329; 49 Stat. 439, as amended), as amended, is
2 hereby transferred from the Secretary of the Department of
3 Health, Education, and Welfare to the Secretary of
4 Agriculture.

5 NATIONAL AGRICULTURAL RESEARCH AWARD

6 SEC. 106. (a) The Secretary shall establish the Na-
7 tional Agricultural Research Award for research or advanced
8 studies in the agricultural sciences. Two such awards, one
9 for each of the categories described in subsection (c), shall
10 be made in each fiscal year.

11 (b) The awards authorized by this section shall consist
12 of a grant not to exceed \$50,000 per year for a period of not
13 to exceed three years to support research or study by the
14 recipient.

15 (c) Awards under this section shall be made in each
16 fiscal year in two categories as follows:

17 (1) to a scientist in recognition of outstanding con-
18 tributions to the advancement of agricultural science.
19 and

20 (2) to a graduate student or postdoctoral research
21 worker in recognition of demonstrated capability and
22 promise of significant future achievement in the agricul-
23 tural sciences.

24 (d) The Secretary may establish such nominating and
25 selection committees, to consist of scientists and others, to

1 receive nominations and make recommendations for awards
2 under this section, as he deems appropriate.

3 AUDITING, REPORTING, AND BOOKKEEPING REQUIREMENTS

4 SEC. 107. (a) Assistance provided under section 104,
5 105, or 106 shall be subject to the recordkeeping and audit
6 provisions of section 2 of the Act entitled "An Act to facili-
7 tate the work of the Department of Agriculture, and for
8 other purposes", approved August 4, 1965 (7 U.S.C. 450i;
9 79 Stat. 431).

10 (b) The Secretary shall provide that each recipient of
11 assistance under section 104, 105, or 106 shall submit an
12 annual report, at such times and on such forms as the Secre-
13 tary shall prescribe, stating the accomplishments of research
14 projects (on a project-by-project basis) for which such
15 assistance was used and accounting for the use of all such
16 assistance. If the Secretary determines that any portion of
17 funds made available under section 104, 105, or 106 has
18 been lost or applied in a manner inconsistent with the provi-
19 sions of this title or regulations issued thereunder, the
20 recipient of such funds shall reimburse the Federal Govern-
21 ment for the funds lost or so applied, and the Secretary shall
22 not make available to such recipient any additional funds
23 under this title until the recipient has so reimbursed the
24 Federal Government.

1 AGRICULTURAL RESEARCH FACILITIES STUDY

2 SEC. 108. (a) The Secretary shall conduct a compre-
3 hensive study of the status and future needs of agricultural
4 research facilities and, within fourteen months from the date
5 of enactment of this Act, submit to the President and the
6 Congress a report on this study.

7 (b) To assist him in the preparation of this report, the
8 Secretary may appoint a Committee on Agricultural Re-
9 search Facilities. Such Committee shall consist of not to
10 exceed thirteen persons who have demonstrated significant
11 knowledge about the subject of the study, and the Secretary
12 shall designate the Chairman and Vice Chairman of the
13 Committee.

14 (c) (1) The report shall cover agricultural research
15 materials and facilities, including but not limited to facilities
16 and materials such as buildings and farms, plant, seed, genetic
17 stock, insect, virus and animal collections, as well as lease
18 and purchase items such as computers, laboratory instru-
19 ments, and related equipment.

20 (2) The report shall include an analysis of the operation
21 and impact of the Act entitled "An Act to assist the States
22 to provide additional facilities for research at the State experi-
23 ment stations", approved July 22, 1963 (7 U.S.C. 390-
24 390k; 77 Stat. 90), and other relevant Federal statutes
25 concerning research facilities acquisition and support pro-

1 grams, including those for forestry, plant, and veterinary
2 research, food and fiber processing, and other agricultural
3 related research.

4 (3) The report shall include recommendations for a
5 program designed to provide the United States with the most
6 modern and efficient system of research facilities needed to
7 advance agricultural research in all fields.

8 (d) While away from their homes or regular place of
9 business in the performance of services for the Committee
10 which the Secretary may establish under subsection (b),
11 members of such Committee shall be reimbursed for travel
12 expenses, including per diem in lieu of subsistence, in ac-
13 cordance with applicable laws.

14 ANNUAL REPORT

15 SEC. 109. The Secretary shall submit to the President
16 and to the Congress by December 31 of each year a report
17 on the Nation's agricultural research activities. The annual
18 report shall include—

19 (1) a five-year national agricultural research plan
20 which shall be updated annually and which shall cover
21 all phases of agricultural research and shall indicate
22 overall present and future agricultural research priori-
23 ties which take into account both domestic and inter-
24 national agricultural needs;

25 (2) a review of progress being made toward ac-

1 accomplishment of the planned goals contained in the
2 agricultural research plan provided under paragraph
3 (1) ; and

(3) a review, covering the following three categories, of the agricultural research activities of the Department and their relationship to the agricultural research activities of other departments and agencies of the Federal Government, the States, and the private sector:

10 (A) a current inventory of such activities
11 organized by statutory authorization and budgeted
12 outlay;

(B) a current inventory of such activities or-
ganized by field of basic and applied science; and

(C) a current inventory of such activities organized by commodity and product category.

17 MISCELLANEOUS

18 SEC. 110. Section 3 (c) (4) of the Act entitled "an
19 Act to establish agricultural experiment stations in connec-
20 tion with the colleges established in the several States under
21 the provisions of an Act approved July second, eighteen
22 hundred and sixty-two, and of Acts supplementary thereto",
23 approved March 2, 1887, as amended (7 U.S.C. 361c (c)
24 (4) ; 24 Stat. 441, as amended) is repealed.

DEFINITIONS

SEC. 111. As used in this title—

(1) the term “agricultural research” means research in the fields of agriculture, forestry, aquaculture, and products or waste materials derived therefrom or used therein, and including related research concerning weather, climate, energy, water and soil resources, human nutrition, and animal health;

(2) the term “agricultural sciences” includes the disciplines in science and engineering related to agricultural research;

(3) the term “Secretary” means the Secretary of Agriculture of the United States, or his designee;

(4) the terms “Department” and “Department of Agriculture” mean the United States Department of Agriculture;

(5) the term “Committee” means the Agricultural Research and Education Policy Advisory Committee established by section 101;

(6) the term “Institute” means the Agricultural Research Policy Analysis Institute authorized by section 101;

(7) the term “State agricultural experiment station” means any institution eligible to receive funds

1 under the Act entitled "An Act to establish agricultural
 2 experiment stations in connection with the colleges
 3 established in the several States under the provisions of
 4 an Act approved July second, eighteen hundred and
 5 sixty-two, and of Acts supplementary thereto", approved
 6 March 2, 1887, as amended (24 Stat. 440, as amended;
 7 7 U.S.C. 361a-361i), and the Act entitled "An Act
 8 to assist the States to provide additional facilities for
 9 research at the State agricultural experiment stations",
 10 approved July 22, 1963 (77 Stat. 90; 7 U.S.C. 390-
 11 390k) ;

12 (8) the term "land-grant college" means any insti-
 13 tution eligible to receive funds under the Act entitled
 14 "An Act donating Public Lands to the several States and
 15 Territories which may provide Colleges for the Benefit
 16 of Agriculture and the Mechanic Arts", approved
 17 July 2, 1862, as amended (12 Stat. 503, as amended;
 18 7 U.S.C. 301-305, 307, and 308), or the Act entitled
 19 "An Act to apply a portion of the proceeds of the public
 20 lands to the more complete endowment and support of
 21 the colleges for the benefit of agriculture and the
 22 mechanic arts established under the provisions of an Act
 23 of Congress approved July second, eighteen hundred
 24 and sixty-two", approved August 30, 1890, as amended

1 (26 Stat. 417, as amended; 7 U.S.C. 321-326), in-
2 cluding the Tuskegee Institute;

3 (9) the term "State" means any one of the fifty
4 States, the District of Columbia, the Commonwealth of
5 Puerto Rico, Guam, the Virgin Islands, or any other
6 territory or possession of the United States; and

7 (10) the term "institution of higher education"
8 means an educational institution in any State which (A)
9 admits as regular students only persons having a cer-
10 tificate of graduation from a school providing secondary
11 education, or the recognized equivalent of such a cer-
12 tificate, (B) is legally authorized within such State to
13 provide a program of education beyond secondary edu-
14 cation, (C) provides an educational program for which
15 it awards a bachelor's degree or provides not less than a
16 two-year program which is acceptable for full credit
17 toward such a degree, (D) is a public or other nonprofit
18 institution, and (E) is accredited by a nationally recog-
19 nized accrediting agency or association.

20 AUTHORIZATION OF APPROPRIATIONS

21 SEC. 112. (a) There is authorized to be appropriated,
22 for the purposes of carrying out section 101 (f) of this Act,
23 \$750,000 for the fiscal year ending September 30, 1978,
24 \$875,000 for the fiscal year ending September 30, 1979,

1 \$1,000,000 for the fiscal year ending September 30, 1980,
2 \$1,000,000 for the fiscal year ending September 30, 1981,
3 and \$1,000,000 for the fiscal year ending September 30,
4 1982; and not in excess of such sums as may thereafter be
5 authorized by law for any subsequent fiscal year.

6 (b) There is authorized to be appropriated, for
7 the purposes of carrying out the provisions of section
8 104 (b) (1) of this Act, \$30,000,000 for the fiscal year end-
9 ing September 30, 1978, \$40,000,000 for the fiscal year
10 ending September 30, 1979, \$50,000,000 for the fiscal year
11 ending September 30, 1980, \$60,000,000 for the fiscal year
12 ending September 30, 1981, and \$70,000,000 for the fiscal
13 year ending September 30, 1982; and there is authorized to
14 be appropriated, for the purposes of carrying out the pro-
15 visions of section 104 (b) (2) of this Act, \$30,000,000 for
16 the fiscal year ending September 30, 1978, \$40,000,000 for
17 the fiscal year ending September 30, 1979, \$50,000,000 for
18 the fiscal year ending September 30, 1980, \$60,000,000 for
19 the fiscal year ending September 30, 1981, and \$70,000,000
20 for the fiscal year ending September 30, 1982; and there is
21 authorized to be appropriated, for the purpose of carrying
22 out of the provisions of section 104 (b) (3) of this Act,
23 \$5,000,000 for the fiscal year ending September 30, 1978,
24 \$7,500,000 for the fiscal year ending September 30, 1979,
25 \$10,000,000 for the fiscal year ending September 30, 1980,

1 \$12,500,000 for the fiscal year ending September 30, 1981,
2 and \$15,000,000 for the fiscal year ending September 30,
3 1982; and there is authorized to be appropriated, for the pur-
4 pose of carrying out the provisions of section 104 (b) (4) of
5 this Act, \$25,000,000 for the fiscal year ending Septem-
6 ber 30, 1978, \$25,000,000 for the fiscal year ending Sep-
7 tember 30, 1979, \$30,000,000 for the fiscal year ending
8 September 30, 1980, \$30,000,000 for the fiscal year ending
9 September 30, 1981, and \$35,000,000 for the fiscal year
10 ending September 30, 1982; and not in excess of such sums
11 as may thereafter be authorized by law for any subsequent
12 fiscal year.

13 (c) There is authorized to be appropriated for the
14 purposes of carrying out the provisions of section 105 (a) (1)
15 of this Act, \$5,000,000 for the fiscal year ending Septem-
16 ber 30, 1978, \$5,400,000 for the fiscal year ending Sep-
17 tember 30, 1979, \$6,000,000 for the fiscal year ending
18 September 30, 1980, \$7,000,000 for the fiscal year ending
19 September 30, 1981, and \$8,000,000 for the fiscal year
20 ending September 30, 1982; and for the purposes of carry-
21 ing out the provisions of section 105 (a) (2) of this Act,
22 \$15,000,000 for the fiscal year ending September 30, 1978,
23 \$16,000,000 for the fiscal year ending September 30, 1979,
24 \$17,000,000 for the fiscal year ending September 30, 1980,
25 \$18,000,000 for the fiscal year ending September 30, 1981,

1 and \$19,000,000 for the fiscal year ending September 30,
2 1982; and for the purpose of carrying out the provisions
3 of section 105 (b) (1) of this Act, \$2,500,000 for the
4 fiscal year ending September 30, 1978, \$5,000,000 for
5 the fiscal year ending September 30, 1979, \$7,500,000
6 for the fiscal year ending September 30, 1980, \$7,500,000
7 for the fiscal year ending September 30, 1981, and \$7,500,-
8 000 for the fiscal year ending September 30, 1982; and for
9 the purpose of carrying out the provisions of section 105
10 (b) (2) of this Act, \$500,000 for the fiscal year ending
11 September 30, 1978, \$1,000,000 for the fiscal year end-
12 ing September 30, 1979, \$1,500,000 for the fiscal year
13 ending September 30, 1980, \$2,000,000 for the fiscal
14 year ending September 30, 1981, and \$2,500,000 for the
15 fiscal year ending September 30, 1982; and not in excess
16 of such sums as may thereafter be authorized by law for
17 any subsequent fiscal year.

18 (d) There is authorized to be appropriated for the pur-
19 poses of carrying out the provisions of section 106 of this
20 Act, \$100,000 for the fiscal year ending September 30,
21 1978, \$200,000 for the fiscal year ending September 30,
22 1979, \$300,000 for the fiscal year ending September 30,
23 1980, \$300,000 for the fiscal year ending September 30,
24 1981, and \$300,000 for the fiscal year ending September 30,
25 1982; and not in excess of such sums as may thereafter be
26 authorized by law for any subsequent fiscal year.

1 (e) There is authorized to be appropriated for the pur-
 2 poses of carrying out section 108 of this Act \$350,000 for
 3 the fiscal year ending September 30, 1978.

4 AUTHORIZATION FOR OTHER PROGRAMS

5 SEC. 113. Notwithstanding any authorization for ap-
 6 propriations for agricultural research in any Act existing
 7 prior to the date of enactment of this Act, there is authorized
 8 to be appropriated for the fiscal year ending September 30,
 9 1978, a total of \$675,000,000; for the fiscal year ending
 10 September 30, 1979, a total of \$725,000,000; for the fiscal
 11 year ending September 30, 1980, a total of \$800,000,000;
 12 for the fiscal year ending September 30, 1981, a total of
 13 \$850,000,000; and for the fiscal year ending September 30,
 14 1982, a total of \$900,000,000, for those agricultural re-
 15 search programs existing prior to the enactment of this Act
 16 and not in excess of such sums as may thereafter be author-
 17 ized by law for any subsequent fiscal year.

18 TITLE II—ANIMAL HEALTH CARE AND
 19 RESEARCH

20 PURPOSES

21 SEC. 201. (a) The purposes of this title are to—

22 (1) promote the general welfare through improved
 23 health and productivity of fish and shellfish, domestic
 24 livestock, poultry, and other income-producing animals
 25 which are essential to the Nation's food supply and to

1 the welfare of producers and consumers of animal
2 products;

3 (2) facilitate the effective treatment of and, where
4 possible, prevent animal and poultry disease that, if not
5 controlled, would have significant adverse effects on
6 the United States livestock and poultry industries and
7 endanger our food supply;

8 (3) minimize livestock and poultry losses due to
9 transportation and handling;

10 (4) protect human health through control of ani-
11 mal diseases transmissible to humans; and

12 (5) otherwise promote the general welfare through
13 expanded programs of research to improve animal
14 health.

15 (b) It is the sense of the Congress that the total ani-
16 mal health research effort of the colleges and universities,
17 including the veterinary medical colleges and the State agri-
18 cultural experiment stations, and of the Federal Government
19 would be more effective if there were close coordination of
20 research activities among such colleges, universities, and
21 Government.

22 COOPERATION WITH STATES

23 SEC. 202. In order to carry out the purposes of this
24 title, the Secretary of Agriculture shall cooperate with, en-
25 courage, and assist the States in carrying out programs of

1 animal health research at eligible institutions, in the manner
2 hereinafter described.

3 ANIMAL HEALTH SCIENCE RESEARCH ADVISORY BOARD

4 SEC. 203. (a) The Secretary shall establish a perma-
5 nent Animal Health Science Research Advisory Board, com-
6 posed of eleven members who shall be appointed, within
7 ninety days after the date of enactment of this Act, as pre-
8 scribed in subsection (c).

9 (b) The Advisory Board shall provide consultation and
10 advice to the Secretary in administering this title,
11 as provided herein; but the Advisory Board and members
12 thereof shall have no Federal powers, duties, authorizations,
13 rights, or benefits under this or other law of the United
14 States, by reason of the formation of the Advisory Board or
15 appointment of members thereto, other than as described
16 herein.

17 (c) The Board shall be composed of—

18 (1) the Administrator of the Agricultural Research
19 Service of the Department of Agriculture;

20 (2) the Administrator of the Cooperative State
21 Research Service of the Department of Agriculture;

22 (3) the Administrator of the Animal and Plant
23 Health Inspection Service of the Department of
24 Agriculture;

25 (4) the Director of the Bureau of Veterinary Medi-

1 cine of the Food and Drug Administration of the De-
2 partment of Health, Education, and Welfare;

3 (5) the following seven members appointed by the
4 Secretary—

5 (A) two persons representing accredited col-
6 leges of veterinary medicine;

7 (B) two persons representing State agricultural
8 experiment stations; and

9 (C) three persons representing national live-
10 stock and poultry organizations.

11 (d) (1) The Advisory Board shall meet at the call of
12 the Secretary but at least once annually to advise the Sec-
13 retary with respect to administration and implementation of
14 this title and to recommend priorities for the conduct of
15 research programs authorized under this title. Any such
16 meeting shall be conducted pursuant to rules and procedures
17 for conducting business as the Secretary shall, in his discre-
18 tion, prescribe.

19 (2) Members of the Advisory Board appointed under
20 paragraph (5) of subsection (c) shall be appointed for
21 terms of three years; except that, of the first such members
22 appointed, three shall be appointed for a term of one year,
23 two shall be appointed for a term of two years, and two shall
24 be appointed for a term of three years.

25 (e) (1) The Advisory Board shall elect a Chairman

1 from its membership, and each such Chairman shall serve
2 for a term of one year.

3 (2) The Chairman of the Advisory Board shall serve
4 as a member of the Agricultural Research and Education
5 Policy Advisory Committee established in section 101.

6 (f) (1) While away from their homes or regular place
7 of business in the performance of services for the Advisory
8 Board, members of the Advisory Board shall be allowed
9 travel expenses, including per diem in lieu of subsistence,
10 in accordance with applicable laws.

11 (2) Members of the Board shall serve without com-
12 pensation, except as provided in paragraph (1) of this sub-
13 section and except that employees of the Federal Govern-
14 ment shall receive their normal pay for time served in the
15 performance of duties for the Committee.

16 FUNDS FOR ANIMAL HEALTH RESEARCH

17 SEC. 204. (a) To support continuing animal health
18 research programs at eligible institutions, the Secretary may
19 provide funds to such institutions to be used to meet expenses
20 of conducting animal health research, publishing and dis-
21 seminating the results of such research, contributing to the
22 retirement of employees subject to the provisions of the Act
23 entitled "An Act to aid the States and Territories in making
24 provisions for the retirement of employees of the land-grant
25 colleges", approved on March 4, 1940, as amended (54

1 Stat. 39, as amended; 7 U.S.C. 331), administrative plan-
2 ning and direction, purchasing equipment and supplies, and
3 altering or renovating buildings necessary for conducting
4 such research.

5 (b) Funds appropriated under this section for any
6 fiscal year shall be apportioned and distributed as follows:

7 (1) Four percent shall be retained by the De-
8 partment for administration, program assistance to the
9 eligible institutions, and program coordination.

10 (2) Forty-eight percent shall be apportioned by
11 the Secretary to each State in the proportion that the
12 value of and income to producers from domestic livestock
13 and poultry in the State bears to the total value of and
14 income to producers from domestic livestock and poultry
15 in the United States. The amount apportioned a State
16 under this subsection shall be distributed by the Secre-
17 tary among eligible institutions within such State in the
18 proportion that the animal health research capacity of
19 the eligible institution bears to the total animal health
20 research capacity of all such eligible institutions in such
21 State, as determined by the Secretary. The Secretary
22 shall determine the total value of and income from and
23 the proportionate value of and income from domestic
24 livestock and poultry for each State, based on the most

1 current inventory of all cattle, sheep, swine, and poul-
2 try, published by the Department.

3 (3) Forty-eight percent shall be apportioned
4 and distributed by the Secretary among eligible insti-
5 tutions in the proportion that the animal health re-
6 search capacity of the eligible institution bears to the
7 total animal health research capacity of all such eligible
8 institutions in the United States. The Secretary shall
9 determine, with the advice of the Advisory Board, the
10 animal health research capacity of an eligible institution.

11 (c) The amount paid by the Secretary to any eligible
12 institution for assistance under this section during any fiscal
13 year shall be—

14 (1) an amount not to exceed \$100,000, plus

15 (2) an amount not to exceed the amount available
16 to and budgeted for expenditure by such institution dur-
17 ing the same fiscal year for animal health research from
18 non-Federal sources.

19 The Secretary may not pay any such institution any funds
20 which require a matching amount from the institution pur-
21 suant to paragraph (2) until the Secretary receives a certifi-
22 cation (stating that such matching funds will be timely pro-
23 vided) from the appropriate official of the institution who
24 is responsible for the animal health research for which

1 the funds are provided. If any eligible institution fails to make
 2 available and budget for expenditure for animal health
 3 research in any fiscal year sums at least as much as the
 4 amount for which it would be eligible for such year (exclud-
 5 ing the \$100,000 for which such institution is eligible under
 6 paragraph (1) without regard to matching funds) under
 7 this section, the difference between the Federal funds avail-
 8 able and the funds made available and budgeted for expendi-
 9 ture by the institution shall be reapportioned by the Secre-
 10 tary to other participating eligible institutions of the same
 11 State, if any, and if there is none, the Secretary shall re-
 12 apportion such difference to the participating eligible institu-
 13 tions of other States.

14 FUNDS FOR RESEARCH ON SPECIFIC NATIONAL OR
 15 REGIONAL ANIMAL HEALTH PROBLEMS

16 SEC. 205. (a) To further support animal health re-
 17 search, the Secretary may provide funds to eligible institu-
 18 tions to support research on specific national or regional
 19 animal health problems. Funds appropriated under this sec-
 20 tion shall be used to pay costs of conducting research on
 21 specific national or regional animal health problems and to
 22 pay expenses which are related to such research and which
 23 are described in section 204 (a) .

24 (b) Funds appropriated under this section shall be al-
 25 located to eligible institutions for research as mutually agreed
 26 upon between the Secretary and eligible institutions. In de-

1 veloping plans for the use of these funds, the Secretary shall
 2 consult the Advisory Board.

3 REVIEW OF RESEARCH PROJECTS

4 SEC. 206. The dean or director of each eligible institu-
 5 tion to which funds are allotted under section 204 or 205
 6 shall cause to be prepared and shall review proposals for
 7 research projects on priority problems of animal health
 8 to be performed at such institution with funds received
 9 under such sections. Review of such proposals shall be for the
 10 purpose of assuring that such projects will comply with the
 11 purposes of this title, the provisions for use of funds specified
 12 in section 204 (a) or section 205, as the case may be, and
 13 with general guidelines for project eligibility to be provided
 14 by the Secretary with the advice of the Advisory Board.
 15 Research proposals that are approved by such dean or
 16 director shall be submitted to the Secretary prior to assign-
 17 ment of funds thereto with a brief summary showing com-
 18 pliance with the purposes of this title, the provisions of sec-
 19 tions 204 (a) or 205, as the case may be, and the Secretary's
 20 general guidelines.

21 GRANTS TO ESTABLISH SCHOOLS OF VETERINARY

22 MEDICINE

23 SEC. 207. (a) To assist those States in which there is
 24 no accredited college of veterinary medicine, the Secretary
 25 shall conduct a program of grants to such States for the

1 purposes of meeting the costs of construction, employing
2 faculty, acquiring equipment, and taking other action relating
3 to the initial establishment and initial operation of a school
4 of veterinary medicine, as determined by the Secretary by
5 regulations.

6 (b) Funds appropriated under this section for any fiscal
7 year shall be apportioned and distributed as follows:

8 (1) Four percent shall be retained by the Depart-
9 ment for administration, program assistance to eligible
10 States, and program coordination.

11 (2) The remainder shall be apportioned and dis-
12 tributed by the Secretary to those States in which there
13 is no accredited college of veterinary medicine and
14 which applied to the Secretary for funds to establish a
15 college of veterinary medicine; such remainder of funds
16 shall be distributed by the Secretary to each such State
17 in the proportion that the value of and income to pro-
18 ducers from domestic livestock and poultry in such State,
19 bears to the total value of income to producers from
20 domestic livestock and poultry in those States which are
21 eligible to receive assistance under this section. The Sec-
22 retary shall determine the total value of and income from
23 domestic livestock and poultry for each State, based on
24 the most current inventory of all cattle, sheep, swine,
25 and poultry, published by the Department.

PAYMENT OF FUNDS

1

2 SEC. 208. Funds available for allotment under this
3 title shall be paid to each eligible institution or State
4 at such times and in such amounts as shall be determined
5 by the Secretary. Such funds shall remain available for pay-
6 ment of unliquidated obligations for one additional fiscal
7 year following the year of appropriation.

8

WITHHOLDING OF FUNDS

9 SEC. 209. If the Secretary determines that an eligible
10 institution or State is not entitled to receive its allotment of
11 the annual appropriation because of a failure to satisfy re-
12 quirements of this title or regulations issued under it, the
13 Secretary shall withhold such amounts, the facts and reasons
14 concerning the determination and withholding shall be re-
15 ported to the President, and the amount involved shall be
16 deposited in the miscellaneous receipts of the Treasury.

17 AUDITING, REPORTING, AND BOOKKEEPING REQUIREMENTS

18 SEC. 210. (a) Assistance provided under section 204,
19 205, or 207 shall be subject to the recordkeeping and audit
20 provisions of section 2 of the Act entitled "An Act to fa-
21 cilitate the work of the Department of Agriculture, and for
22 other purposes", approved August 4, 1965 (7 U.S.C. 450i;
23 79 Stat. 431).

24 (b) The Secretary shall provide that each recipient of
25 assistance under section 204, 205, or 207 shall submit an

1 annual report, at such times and on such forms as the Secre-
 2 tary shall prescribe, stating the accomplishments of projects
 3 (on a project-by-project basis) for which such assistance
 4 was used and accounting for the use of all such assistance.
 5 If the Secretary determines that any portion of funds made
 6 available under section 204, 205, or 207 has been lost or
 7 applied in a manner inconsistent with the provisions of this
 8 title or regulations issued thereunder, the recipient of such
 9 funds shall reimburse the Federal Government for the funds
 10 lost or so applied, and the Secretary shall not make available
 11 to such recipient any additional funds under this title until
 12 the recipient has so reimbursed the Federal Government.

13 DEFINITIONS

14 SEC. 211. As used in this title—

15 (1) the term "eligible institution" means all (A)
 16 accredited colleges of veterinary medicine, and (B)
 17 agricultural experiment stations eligible to receive assist-
 18 ance under the Act entitled "An Act to establish agri-
 19 cultural experiment stations in connection with the
 20 colleges established in the several States under the
 21 provisions of an Act approved July second, eighteen
 22 hundred and sixty-two, and of Acts supplementary
 23 thereto", approved March 2, 1887, as amended (24
 24 Stat. 440, as amended; 7 U.S.C. 361a-361i);

1 (2) the term "dean" means the dean of a college
2 of veterinary medicine;

3 (3) the term "director" means the director of a
4 State agricultural experiment station;

5 (4) the term "State" means any one of the fifty
6 States, the District of Columbia, the Commonwealth of
7 Puerto Rico, Guam, the Virgin Islands, or any other
8 territory or possession of the United States;

9 (5) the term "Secretary" means the Secretary of
10 Agriculture;

11 (6) the term "Advisory Board" means the Animal
12 Health Science Research Advisory Board established
13 in section 203;

14 (7) the term "animal health research capacity"
15 means the capacity of an eligible institution to conduct
16 research on animal health, as determined by the
17 Secretary; and

18 (8) the term "Department" means the United
19 States Department of Agriculture.

20 AUTHORIZATION OF APPROPRIATIONS

21 SEC. 212. There is authorized to be appropriated for the
22 purpose of carrying out the provisions of section 204 of this
23 title, \$20,000,000 for the fiscal year ending September 30,
24 1978, \$24,000,000 for the fiscal year ending September 30,

1 1979, \$28,000,000 for the fiscal year ending September 30,
2 1980, \$32,000,000 for the fiscal year ending September 30,
3 1981, and \$36,000,000 for the fiscal year ending September
4 30, 1982; and for the purpose of carrying out the provisions
5 of section 205 of this title, \$15,000,000 for the fiscal year
6 ending September 30, 1978, \$16,000,000 for the fiscal year
7 ending September 30, 1979, \$17,000,000 for the fiscal year
8 ending September 30, 1980, \$18,000,000 for the fiscal year
9 ending September 30, 1981, and \$19,000,000 for the fiscal
10 year ending September 30, 1982; and for the purpose of
11 carrying out the provision of section 207 of this title,
12 \$15,000,000 for the fiscal year ending September 30, 1978,
13 \$16,000,000 for the fiscal year ending September 30, 1979,
14 \$17,000,000 for the fiscal year ending September 30, 1980,
15 \$18,000,000 for the fiscal year ending September 30, 1981,
16 and \$19,000,000 for the fiscal year ending September 30,
17 1982; and not in excess of such sums as may thereafter be
18 authorized by law for any subsequent fiscal year.



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

MAR 18 1977

Honorable Thomas S. Foley
Chairman, Committee on
Agriculture
U.S. House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

This will respond to your letter of March 17, 1977, requesting the Department to expedite a report on H.R. 4394, a bill "To establish a National Agricultural Research, Extension, and Teaching Policy Advisory Board, and for other purposes," for hearings on Monday, March 21, 1977. We regret that time will not permit the formulation of an Administration position by March 21. However, we will expedite our review of this legislation and transmit our comments on H.R. 4394 as soon as possible.

Further, it is our understanding that Mr. William Miller, an employee of the Bureau of Indian Affairs, has been asked by a member of the Subcommittee to testify on H.R. 4394 on March 21. Mr. Miller has agreed to appear and provide comments on his own behalf. You will understand, I am sure, that his views do not necessarily represent those of this Department or the Administration.

Sincerely yours,

Gary Catron

Gary Catron
Assistant to the Secretary for
Congressional and Legislative
Affairs





United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

March 30, 1977

Honorable Thomas S. Foley
Chairman, Committee on
Agriculture
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

The Secretary of the Interior has received your request for the views of this Department on the legislative measures listed below. This communication will acknowledge receipt of the request and advise you that we will begin review in the Department. Reports will be submitted to your Committee at the earliest possible date.

Sincerely yours,

John M. Powell
(Type)

Acting Legislative Counsel

Bill Number

H.R. 4863

H.R. 4394

Introduced by

Ray Thornton

William C. Wampler



Mr. DE LA GARZA. Our first witness this morning is our colleague and the ranking minority member of this committee, and one of the leaders in the proposed legislation concerning much needed coordination and expansion of the research activities of the Department of Agriculture.

I am happy to recognize, at this time, the Honorable William C. Wampler, our colleague from Virginia.

[The prepared statement submitted by Mr. Wampler follows:]

STATEMENT OF HON. WILLIAM C. WAMPLER
A REPRESENTATIVE IN CONGRESS FROM THE STATE OF VIRGINIA

MR. WAMPLER. Mr. Chairman, I thank you very much for scheduling these hearings and for allowing me to testify before your Subcommittee on this important legislation. I am also appreciative that you have co-sponsored H.R. 78 and 79, as have 29 other Members of the full Committee, Mr. Teague of Texas, and Mr. Pressler of South Dakota.

As you will recall Mr. Chairman, H.R. 78 is identical to my bill, H.R. 11743, which was considered and reported unanimously by our full Committee and passed by the House by a vote of 373 ayes to 7 nays during the last Congress. Unfortunately, that measure died in the Senate at the close of the Ninety-Fourth Congress. I hasten to add that this lack of action by the Senate last year in no way indicates a lack of interest on the part of the other Body, inasmuch as the Chairman of the Senate Committee on Agriculture, Forestry and Nutrition has included a comprehensive Agricultural Research Title in his General Farm Bill, S. 275. Mr. Dole and Mr. McGovern have also introduced a separate bill in the Senate embodying the provisions of H.R. 78. Moreover, Mr. Chairman, my good friend the distinguished gentleman from Arkansas, a Member of this Subcommittee, has introduced two very thoughtful and well-designed bills which we are also considering today.

Last fall, after it became apparent that the Senate was not going to act on the House bill H.R. 11743, and after a series of discussions and talks with the leaders of the National Association of State Universities and Land Grant Colleges, individual Directors of State Agricultural Experiment Stations and State Cooperative Extension Services, Home Economists, leaders in the agricultural teaching profession, organizations from the farm community, consumer groups, associations representing commodity groups, suppliers, transporters of farm goods, veterinary groups, and individuals in the Department of Agriculture, in Washington and around the country, it was evident that our original endeavor was good in concept, but that modifications were necessary if our government was really going to devote sufficient priorities, emphasis, and efforts in agricultural research to provide for an expansion in food, fiber and forestry productivity and distributive capabilities to meet the needs of our own expanding population and to concurrently help to meet the needs of an exploding world population. As a result of these discussions I sought the assistance of these groups and individuals, particularly the National Association of State Universities and Land Grant Colleges, NASULGC, to help me improve the bill passed by the House in the last session. In late December, a concept redraft was presented to me by NASULGC, which had expanded the bill to add Extension and Teaching to the research bill, provisions incorporating the Animal Health bill also passed by Congress but vetoed in the last Congress, provisions for incorporating

improvements for research facilities, and a much-needed change to more adequately provide additional Federal funding for our State Experiment Stations over a longer time-frame than had been provided in H.R. 11743.

Since the bill was still in draft form and an overall consensus had not been obtained from individual land-grant institutions, state agricultural experiment stations and others on the new draft, I decided to reintroduce my original bill on the opening day of this Congress as a base bill.

About the end of February a general agreement was arrived at on the update of H.R. 78. On March 2, I introduced H.R. 4394, short title "National Agricultural Research, Extension and Teaching Policy Act of 1977," with Chairman Foley as Co-sponsor.

Before I give you a detailed discussion of my bill, I would like to express my sincere appreciation to the many fine Deans of Agriculture, Directors of state experiment stations, and state cooperative extension services, heads of Veterinary Medical colleges, other representatives of our land-grant institutions, representatives of the 1890 land-grant institutions, representatives from the American Association of University Agricultural Administrators, representatives of our farmers, commodity groups, suppliers, distributors and individuals from within and without our Federal Government, all of whom have spent long hours in assisting me and others I might add on this Committee to bring forward the meaningful legislation we are considering today. These individuals

serve on the front line of America's biggest industry -- agriculture -- an industry that has assets of over \$600 billion and employs 14 to 17 million people in growing, harvesting, distributing, and selling our food, fiber and forest products. These representatives of American agriculture, I submit, are those our people must look to, to perform the bulk of our research, disseminate the research findings to our farmers, processors, suppliers, marketing firms, transporters, workers, consumers, and to train young scientists in the food and agricultural sciences. These are the people we must rely on to reduce the cost of farming to the small farmer to allow him to make a decent living and at the same time to produce safer, more nutritive and more economical food products or to produce more useful and abundant fiber and forest products. These are the people, not the environmental scientists or lawyers, that are going to feed, clothe and house the multitudes of this and the next world at a cost to our people and our environment that is both safe and adequate. They have a tremendous job to do, we can only see that we establish a sound policy to accomplish these ends and provide such Federal tools and funds as are necessary to accomplish the job.

Last year in testifying before the full Committee on my earlier bill, I made a statement and quoted from Dr. T. W. Edminster, Administrator of the Agricultural Research Service, USDA. This information in the face of our hold-overs in corn and wheat, is, I believe, appropriate to this occasion:

"The question may arise, why, during a period of history when this Nation virtually fulfills the

mythological dream of a land of cornucopia, are we considering means and ways to increase agricultural productivity? " Dr. Edminster said,

"In the not-too-distant past, the high productivity of U.S. agricultural research was taken for granted. As agricultural researchers, we feel that in spite of the dramatic events of 1973 and 1974, this tendency may be recurring. U.S. agricultural projections, which estimate that past rates of increased production will continue to the year 2000, lean heavily on the assumption that new technology will be coming on stream at rates similar to those since World War II.

Such projections are an expression of faith in the creative ability of the research community and in the foresight of administrators and legislators to commit the necessary resources.

Although in the past 20 years, U.S. yield increases may have given us the equivalent of a second Corn Belt, the same dramatic achievement will be needed over the next 20 years. This will take concerted effort on the part of the entire Agricultural research community."

I do not know of any means we can take to provide our Nation and the rapidly expanding world's population with more food, other than by obtaining more production through research, unless we drastically reduce the world's population.

In this regard, I know few if any Members in this Congress who want to take on this politically dangerous proposition.

My bill, H.R. 4394, the National Agricultural Research, Extension, and Teaching Policy Act of 1977, is designed to assure that this Nation will be provided with adequate National goals and policies in food, fiber and forestry product production and distribution research, human nutrition research, and protection against animal and plant diseases through research to meet the future requirements of our own economy and to place our Country in a position where it can assist in solving the predicted problems of diminishing supplies of food and other agricultural products in many other countries in the world.

This revised bill expands on H.R. 78, by adding Extension, Teaching and Animal Disease Research to the general concept of that measure. The inclusion of these new provisions strengthens the earlier proposal which concentrated on production research, by recognizing more formally the fact that research of itself is of little value unless the knowledge gained can be disseminated to the users of that information and young scientists and agriculturalists are trained to assist in expanding the base from which that knowledge and effort is derived. Additionally, production research is expanded to include distribution research.

The bill seeks to accomplish these goals and policies by providing the Secretary of Agriculture with four major management

tools to better emphasize, coordinate, and plan the Federal, State and private role in agricultural research, as follows:

- (1) the bill assigns to the Secretary of Agriculture new authority to coordinate all research, extension, and teaching activities in the food and agricultural sciences in USDA and other Federal agencies, and in consultation with the officials of the States, all such activities conducted or financed in whole or in part by Federal funds; directs him to disseminate all research information through the Extension Service of USDA and the State Cooperative Extension Service to all interested users of such information; and it transfers back to his jurisdiction, from the Secretary of Health, Education and Welfare, the education and teaching functions in the food and agricultural sciences at the State land-grant Universities. The Secretary is further provided with an additional Assistant Secretary of Agriculture and a staff to assist him in carrying out these newly assigned functions, as well as those already existing in the Department of Agriculture, with respect to research, extension and teaching in the agricultural sciences.
- (2) the bill establishes a permanent, new National Agricultural Research, Extension and Teaching Policy Advisory Board, composed of 33 members from USDA and concerned Federal departments and agencies, the academic and scientific community, the agricultural production and distribution community and the public (specifically

designated in the legislation), to advise and assist the Secretary of Agriculture in carrying out the provisions of the bill. In order to carry out the day-to-day responsibilities of the Board, a 15-member Steering Committee from the Board's membership is also established to develop and prepare (after thorough analysis, evaluation and review) for the Board's approval all studies, recommendations, and reports assigned to the Board by the legislation. A professional staff of 25 is authorized to be assigned to the Committee to assist in the preparation of the Committee's work for the Board.

E X P L A I N

C H A R T

The Board's purpose is to advise and assist the Secretary by:

- (a) facilitating the coordination of interagency, intergovernmental, and State and private sector research, extension and teaching in the food and agricultural sciences;
- (b) evaluating, developing and recommending national policies, goals, priorities, and strategies in research, extension, and teaching in the food and agricultural sciences;
- (c) recommending the allocation of funds for research, extension and teaching in the food and agricultural sciences;

(d) providing for the exchange of information with agencies in the other Federal departments relating to research, extension and teaching in the food and agricultural sciences;

(e) recommending a plan for the development and deployment of scientists in the food and agricultural sciences and a long-range plan for agricultural research and extension to be updated every five years; and

(f) submission of an annual report of its activities to the President and to the Committees of the Congress responsible for agriculture and agricultural appropriations.

(3) The bill aims at enhancing agriculture in four ways: First, by expanding the support for fundamental research; second, by broadening the scope of scientific participation in solving the problems of food, fiber and forest production and distribution, human nutrition research and education, and animal and plant disease research; third, by making the knowledge obtained from research available to users through an extension of the agricultural extension service; and fourth, by enhancing and improving the training of young scientists in the food and agricultural sciences.

(4) To accomplish these ends, the bill provides new grants and increases authorizations for existing research, extension and teaching by each fiscal year beginning fiscal year 1978 through a five-year program, as follows:

(a) the Hatch Act, which funds agricultural research at State agricultural experiment stations, is reprogrammed as a separate annual authorization for 5 years, notwithstanding existing law, at \$150 million for FY 78, \$200 million for FY 79, \$250 million for FY 80, \$300 million for FY 81, and \$350 million for FY 82 (no change is made in existing law for dispersing these funds);

(b) establishes a new competitive nutrition and family research grant for 5 years at \$5 million for FY 78, \$7.5 million for FY 79, \$10 million for FY 80, \$12.5 million for FY 81, and \$15 million for FY 82;

(c) creates a new competitive grant program for basic and applied agricultural research open to colleges, government agencies, research institutions and individuals over 5 years at \$27.6 million for FY 78, \$30.6 million for FY's 79, 80, 81 and 82;

(d) existing USDA research programs (except Hatch) in ARS, ERS, CSRS, STS, Forest Service and Farmers Cooperative Service are reprogrammed over a 5-year period at \$490 million for FY 78, \$550 million for FY 79, \$600 million for FY 80, \$650 million for FY 81, and \$700 million for FY 82;

(e) creates a Special Developmental Research Grant to be used by the Secretary to initiate quick developmental research resulting from breakthroughs in basic and

applied research over a 5-year period at \$10 million for FY 78, \$12.5 million for FY 79, \$15 million for FY 80, \$17.5 million for FY 81, and \$20 million for FY 82;

(f) revises and reauthorizes existing legislation for Federal assistance for construction of facilities at state agricultural experiment stations in a new 5-year program at \$15 million for FY 78, \$19 million for FY 79, \$23 million for FY 80, \$27 million for FY 81 and \$31 million for FY 82;

(g) requires the Secretary of Agriculture to prepare and report on a study on the effects of weather and water resources on the production of crops and the Nation's economy and another study on the feasibility of bringing the 1890 black land-grant colleges under the Hatch Act or some similar funding arrangement;

(h) notwithstanding existing law for authorizing funds for the Extension Service, establishes a new 5-year authorization program for the Extension Service at \$290 million for FY 78, \$330 million for FY 79, \$370 million for FY 80, \$410 million for FY 81 and \$450 million for FY 82;

(i) Establishes within USDA three 5-year teaching programs utilizing Competitive grants and straight grants to train undergraduates, graduate students and research assistants in the food and agricultural sciences at \$32.5 million for FY 78, \$38.5 million for FY 79, \$44.5 million for FY 80, \$50.5 million for FY 81, and \$55.5 million for FY 82; and

(j) establishes a 5-year program for research and training in animal disease research (formerly called animal health) at existing and new veterinary schools, except that new schools would be required to match 80% Federal funds with 20% State funds and establish their institution in cooperation with at least one other state at the authorizing level of \$35 million for FY 78, \$40 million for FY 79, \$45 million for FY 80, \$50 million for FY 81, \$55 million for FY 82.

The bill also authorizes the Secretary of Agriculture to enter into annual contract arrangements with the National Academy of Sciences to conduct special studies in the food and agricultural sciences for the Secretary.

Since this bill has been introduced there have been some minor technical modifications recommended. I am studying them and at the present time see no reason why they cannot be included in an amendment at the time of mark-up. I am not altogether happy with the language used in my bill to apportion and distribute funds to veterinary schools, nor the language for apportionment providing funds for improving research facilities, long neglected by our Federal Government at the various agricultural schools. We will shortly get the parties involved with legislative counsel and resolve these technical difficulties. Additionally, it has been pointed out to me by Dr. Dennis Rouse, Dean of Agriculture and Director of the State Experiment Station at Auburn University, that the limitation of \$100,000 on grants which the Secretary

can award in any given year to a recipient institution under the Development Grant program, is too low; he sees this particular provision as one of the most important provisions in the bill. We are currently reviewing this with the view of substantially increasing the amount of the individual grant to a school, thereby reducing this restriction.

At this point, I want to again thank my colleague, Mr. Thornton, for his valuable contributions to this legislation. I have always considered this legislation as a bi-partisan effort by this Committee to produce the best possible bill. I look forward to working with him and any other Members of the Committee, so that we will succeed in carrying agricultural research into the future.

Mr. DE LA GARZA. Thank you very much.

Are there any questions of Mr. Wampler?

Mr. Thornton?

Mr. THORNTON. Mr. Chairman, I would like to congratulate Mr. Wampler, you have given an excellent presentation. The work that you have done in the field of agricultural research has been most meaningful.

I am delighted to see the work and the testimony which you have presented here today.

Mr. WAMPLER. You are very kind. Thank you.

Mr. DE LA GARZA. We thank you very much. We look forward to working with you as we mark up the several bills.

Our next witness is our colleague and a member of this committee, the Hon. Ray Thornton, a Member of Congress from Arkansas.

STATEMENT OF HON. RAY THORNTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ARKANSAS

Mr. THORNTON. Thank you, Mr. Chairman.

As a new member of this subcommittee and as a sponsor of one of the bills and cosponsor of another which are the subject of these hearings, I am delighted that our Chairman, Mr. de la Garza, has scheduled these hearings on agricultural research legislation.

My interest in agricultural research arises first out of the fact that my own State of Arkansas has an agriculturally based economy, involving both food and fiber. Second, during the last session of Congress, Representative Jim Symington and I held joint hearings of our two subcommittees of the Committee on Science and Technology on the subject of agricultural research.

This review was initiated out of our concern that American agricultural research should be brought to bear on future United States and world food needs. In opening those hearings, I pointed out that, in today's world, agricultural research is taking on new significance due to a number of factors.

The increased demand for agricultural products has meant that future world requirements can no longer be met by bringing idle land under cultivation. Rather, increased harvests must be sought through increased productivity, and that means applying the results of research to all aspects of food production.

The export of agricultural products is a major contributor to the maintenance of a favorable U.S. balance of trade. I need only mention that, in 1974, the export of agricultural products was enough to pay for four-fifths of our oil imports that year.

Agricultural exports also serve to maintain a precarious world food balance. Some have suggested that a crop failure in North America would leave the world in extremely serious condition.

The U.S. agricultural research system has no present equal and has served the country well in helping to meet domestic and international food needs. These successes are evidence that the system is basically sound.

However, today we find this system, which has served us so well, being questioned and subjected to new stresses of requirements for

additional research. I am concerned that the system may not be adequately prepared to meet these new challenges.

Our past pool of technology from which we have drawn for so many years is becoming shallower, and we cannot afford to exhaust it further.

You are all aware of the 5 to 10-year lag between the point at which a new development occurs and the time it becomes accepted in the field. The interval between discoveries in basic research and practical application is often longer. It may be as much as 30 years, or even longer, before a basic research discovery is applied.

With increased emphasis upon ecological and consumer protection, that time lag is undoubtedly increasing. We should be placing the highest priority at the Federal level on stepping up agricultural research and development.

Today we stand at a crossroads. We see our own national per capita food consumption rising along with that of the entire world. Simultaneously, we see that the American population will probably reach the 300 million mark by the year 2000—the population of the world increases at a rate of 80 million per year.

In our country and all the other developed countries, demands for recreational areas are increasing constantly, right along with demands for more and more food. It is a two-edged problem, then.

We have to feed more people on the same or perhaps less land. That will require research leading to improved photosynthesis, better biological nitrogen fixation, and higher protein levels.

There is room for tremendous improvement here. The most efficient plants use only about 2 percent of available solar energy for photosynthesis, and the major cereal grains use 1 percent or less.

About half the nitrogen fertilizer and 70 percent of the phosphate fertilizers applied are not used by the plant and leach into our water along with pesticides, herbicides, fungicides, and other applied substances. This, of course, creates an array of problems in itself.

There are ways of addressing these environmental questions. We are seeking and must continue to seek development of plant varieties with allelopathic traits, plants which, in their own chemistry, contain elements which resist pests such as fungi, mold, and weeds, as well as insects.

We must broaden our genetic base so that we find new varieties which give us an edge over existing pest strains. We need to develop plants which make better use of the fertilizers, so that what is applied reaps benefits.

A significant problem which ought to be given more consideration is that of crop loss through contamination, or waste after harvesting. I have seen information which indicates that as much as one-third of the total crop output in this Nation is lost to pests—most of it in the storage and processing stages.

We need to continue efforts to improve the efficiency of livestock conversion of plant protein into animal protein.

Congressman Symington and I received strong staff support and encouragement from this committee during the conduct of our hearings, and we were accompanied by Agriculture Committee staff during our field hearings in Missouri, Arkansas, and Texas.

The report and recommendations of that series of hearings was complimentary to the fine work being done by this committee, and this committee reported out a good agricultural research bill last session.

Congressman Wampler has done an outstanding job of marshalling support for agricultural research. I would like to further congratulate Congressman Wampler because the new legislation which he has now introduced does carry forward many of the broad goals and objectives which, I think, are complimentary to the purposes of the agricultural research bill which was before this committee last year.

I am confident that this year we can develop, and pass, legislation to improve and expand the Nation's resources for agricultural research.

As you know, I have developed an alternative bill for consideration by the subcommittee, an alternative that contains some new ideas to supplement those that had been discussed and debated within this committee and on the House floor last year.

The purpose of my legislation is to continue and expand existing agricultural research programs, to strengthen those elements of the existing system which will produce increases in the quality of the system's output.

New emphasis should be added to those areas of research which have not received the attention they deserve.

Mr. Chairman, there are some technical differences in the organizational structure of the two bills. I would be pleased to outline some of those differences. They do not run to the heart of the purpose of the bill, but rather to the structure.

For example, instead of a 33-member advisory board, my bill provides for a 21-member committee. There is no new Assistant Secretary of Agriculture, but an existing officer would act as chairman of that committee.

The effort is to try to simplify the institutional structure while providing a means to carry forward the broad objectives of the agricultural research legislation. Those broad objectives emphasized by my proposal include basic research and research on biological processes, such as photosynthesis, nitrogen fixation, and genetic improvement. The benefits of this type of research are significant, and my bill identifies both basic and applied research as separate categories for competitive grant money.

Emphasis in the competitive grants section is also given to basic and applied research in human nutrition, and for research, development, and demonstration of new crops.

The bill provides that some of these moneys may also be used for research conducted outside the United States.

Although formula funding is necessary for the maintenance of a strong system of agricultural research, productive research efforts above and beyond this base are encouraged by open competition for these research grants.

Mr. Chairman, competition for grants in this area would be totally open under my proposal. Individual scientists, institutions, or groups of institutions—which includes land-grant and non-land-grant public universities and colleges, as well as private universities and colleges, private research institutes, and other research organizations—would be eligible for these funds.

In addition, these competitive research grant proposals will be subject to peer review, a procedure that has received strong support in other research communities and which I think should be a part of a competitive grants program in agricultural research.

Unlike legislation which was considered last year, bills I have introduced also include within their scope research education and training. Mr. Chairman, all of us are aware of the tremendous contributions of the Nation's schools and colleges of agriculture, both to agricultural research and to education in the agricultural sciences.

It is clearly in the best interests of the Nation to attract the most talented students to the agricultural sciences, and to strengthen the undergraduate and graduate training of these students.

Both H.R. 2223 and H.R. 4863 make a concerted effort to reach these objectives.

Grants to strengthen undergraduate programs in the agricultural sciences will help to insure that the courses, curricula, and teaching methods used in teaching the agricultural sciences are the most up to date and of the highest quality available.

These grants are not necessarily intended to increase the numbers of students enrolled in courses in the agricultural sciences, although it might be expected that high-quality courses will attract an increased number of students.

To provide the best training for scientists who choose to go on to do graduate work in the agricultural sciences, a program of grants to improve these programs would also be established.

The research experiences which are presented to graduate students and postdoctoral assistants at these early points in their professional careers are especially important in determining their future career directions.

In order to attract the most motivated and qualified graduate students into further studies in the agricultural sciences, there would be established a program of predoctoral fellowships.

These fellowships would be awarded on the basis of merit to at least three students from each State who are pursuing, or would like to pursue, courses of study in the agricultural sciences which are directly related to areas of need in their individual State.

It is felt that the training provided to these students would, in the future, help to solve some of the important local or regional problems in agriculture.

Finally, in order to attract outstanding, promising scientists to careers in basic sciences underlying agriculture, a program of postdoctoral fellowships is established. These fellowships would offer not only training support, but also provide a good start toward a career as an independent investigator.

I would like to mention, Mr. Chairman, the provision in H.R. 2223 and H.R. 4863 which establishes a National Agricultural Research Award. In our oversight hearings in science and technology, we found that the agricultural scientist does not seem to receive the recognition or be held in as high esteem by other scientists and society as he should be.

Whatever the reason for this, it is felt that the success of agricultural research and the accomplishments of individual scientists

should be made known to the broader scientific community and to the public. The annual awards established in my legislation are intended to move toward accomplishing those objectives.

One last point, Mr. Chairman, is the inclusion of a separate title on animal health research. Similar legislation passed both Houses of Congress during the 93rd Congress, only to be among the first of many vetoes by President Ford.

I have included, in legislation I have introduced this year, substantially the same measure that received the support of this committee 3 years ago.

I feel that, in our consideration of agricultural research legislation, we should include and direct our attention to the needs of animal health research. Again, the work that has been done in this area has been outstanding, but animal health research, too, needs coordination and additional funding to provide adequate support for research which is vital to improving the health and environment not only of animals, but also of mankind.

In concluding, I would like to stress again that the intent of my legislation is to improve this Nation's capacity for agricultural research and to provide a framework for coordinating and formulating policy and decisions.

The thrust of the bill is not to detract from the present agricultural research system, but to coordinate all research in this area and to offer new programs of competitive grants which will bring into agricultural research the widest possible variety of scientists and research institutions.

Mr. Chairman, a number of the specific features which have been previously described by Mr. Wampler are also comparably included within the legislation which I have proposed.

I would be pleased to try to respond to any questions which may be addressed to me.

Mr. DE LA GARZA. Thank you very much.

Are there any questions?

Mr. Brown?

Mr. BROWN. Mr. Chairman, I apologize for being late.

I am acquainted with Mr. Thornton's initiative in this field. I want to compliment him on the excellent work that he has done on this bill and the work that he did last year to improve research and development in agriculture.

I have been concerned myself and have introduced some legislation concerned with the problem of speeding up the process by which research actually gets to the working farmer and is incorporated in the methods of the agriculture community.

I have thought that possibly a system of demonstration farms throughout the United States, particularly in the more heavily agricultural States, would assist in the transmission of research results to the working farmer.

I wonder if the gentlemen could give some consideration to this. I wonder what your comments might be.

Mr. THORNTON. In response to that, I would like to say that the demonstration of the practicality of improved yields and farming methods through actual demonstration projects is certainly a very

valid objective, and I support the concept which you have described.

We have a very good and strong Extension Service in the Department of Agriculture. My intention in this legislation was to make certain that that service would continue to operate, and that it would have the flexibility to undertake such new ideas as might be appropriate in extending agricultural information to the farms.

It was not my intention to limit the extension services by prescribing a particular role or a limitation upon funds which were authorized for that purpose.

Mr. BROWN. I thank the gentleman.

Mr. DE LA GARZA. Our next witness is Dr. Robert H. Burris, department of biochemistry of the University of Wisconsin.

Dr. Burris, we are happy to have you present your statement, but I would like to make an announcement before you begin.

I will say that it is customary in this committee to hear all of the witnesses, deferring questions in order that we might question all of the witnesses together at the end of the session. We make exception for Members of Congress and members of the executive branch because they are involved in other activities.

With your permission, we would like to return to the custom, now, and ask our other witnesses to testify and please be kind enough to remain for questions at the end of the session.

I have received requests from Representatives Grassley and Thone that their statements on the subject of this hearing be included in this record.

Without objection, it is so ordered.

[The prepared statements of Mr. Grassley and Mr. Thone follow:]

STATEMENT OF HON. CHARLES E. GRASSLEY, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF IOWA

On July 26 of last year, the House approved an agricultural research bill the Committee had dealt with earlier. Agricultural research is clearly in the long-term interests of the agricultural sector of our economy, as well as the economy as a whole, so it is unfortunate that the Senate did not adopt the bill we passed.

In 1940, agricultural research and development took up about 40% of the nation's total research and development effort for all areas. Today, agricultural research and development makes up only about 2% of our research budget. This kind of drop, if it were allowed to continue, could only mean disaster for the United States, and the world. The United States is the world's leading food producer and, as such, must produce for many poorer nations, and less developed countries which are unable to raise enough to feed themselves. The production of 1 out of every 3 acres of farmland in this country goes to export, which represents about \$23 billion worth of goods. Not only do exports provide jobs for over a million Americans, they also provide a solid base for our balance of payments position, to offset losses in other sectors.

If agriculture is to continue to be such an important source of strength for the American economy, and if it is to continue to provide the least expensive food in the world for our own consumers, efforts to increase the efficiency of food production must not be stifled.

Another major reason why increased research efforts are vital is that the Federal government is increasingly becoming involved in the regulation of farming. As the Environmental Protection Agency restricts the use of commonly-used pesticides and herbicides, thereby eliminating successful production techniques that have been used for decades, it is important that we find new strains of crops which can resist natural predators without violating regulations laid down by the EPA.

I am pleased to be sponsoring with Representative Wampler legislation to improve and rationalize this nation's agricultural research efforts. I commend the Chairman of this subcommittee for getting hearings underway so promptly on a matter as crucial as this to the nation's economy:

STATEMENT OF HON. CHARLES THONE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEBRASKA

Mr. Chairman, I would like to take this opportunity to indicate my interest in getting comprehensive agricultural research legislation passed early in this Session of the 95th Congress.

Last year I co-sponsored legislation on this same subject, and, as you will remember, the House approved the National Research Policy Act of 1976 by an overwhelming vote of 373 to 7. Unfortunately, the press of business prevented the Senate from consideration of the legislation.

In January of this year I again co-sponsored the legislation, H.R. 78, the National Agricultural Research Policy Act of 1977, introduced by Congressman Wampler.

Several other similar bills have since been introduced—all attempting to place increased emphasis on agricultural research so that our Nation's food and fiber needs will be met in the future.

We all know what strides agricultural research has made in the past, but we must not live in the past but must look to the future, and I believe it is time to place increased emphasis on agriculture research. It seems to me that we must coordinate our activities in a much better fashion, and, at the same time, we should also increase the funding available for research.

I look forward to having the testimony of this distinguished list of witnesses and to working with the members of this Subcommittee and the parent Committee to develop legislation which will meet the needs of our agricultural community as they continue their superb efforts to feed not only our Nation but a great percentage of the world.

Thank you, Mr. Chairman.

MR. DE LA GARZA. We welcome you, Dr. Burris. Without objection, we will insert your prepared statement in the record.

[The prepared statement of Dr. Burris follows:]

STATEMENT OF ROBERT H. BURRIS
PROFESSOR OF BIOCHEMISTRY
COLLEGE OF AGRICULTURAL AND LIFE SCIENCES
UNIVERSITY OF WISCONSIN

Mr. Chairman and Members of the Committee on Agriculture:

I wish to speak in support of the Thornton Bill HR2223, a bill to strengthen agricultural research and education. I am Robert H. Burris, Professor of Biochemistry, College of Agricultural and Life Sciences, University of Wisconsin-Madison. My chief research interest for over 40 years has been biological nitrogen fixation.

As a group concerned with agriculture, you are well aware that there are difficult problems in supplying food to the world's population. Millions of people are undernourished today, and all projections promise a rapid rise in population that will increase our food problems. Population growth is being brought under control here, in Japan and in several European countries, but the most heavily populated countries still have high birth rates. It is apparent that world food production must be increased.

Agriculture in the United States has been spectacularly successful, and this success has been based not only upon our inherently productive soils but also upon effective application of the findings of agricultural research. However, periodic evaluation of our agricultural research establishment has indicated that it has neglected important areas of basic research.

The fact that we all must eat to stay alive and that we all have an absolute dependence on green plants is a concept with little popular appeal. Millions die yearly from malnutrition, but these deaths attract less attention than 26 deaths worldwide attributable to vinyl chloride-induced cancer. Over 200 million U.S. citizens depend daily on photosynthesis to nourish them, but the whole USDA budget is comparable to that invested in research on one disease--cancer.

Although the photosynthetic reactions and the reactions of biological nitrogen fixation are among the most important sets of reactions for maintaining life on earth, the USDA puts very limited research funds into basic studies of these processes. At one time the NIH supported photosynthetic research by default. This was inappropriate, and the NIH no longer supports such work. As they withdrew support the NSF picked up the load, but the NSF is

expected to support the whole spectrum of physical and biological science from a budget approximately that devoted only to cancer. Our research funding is out of balance, and it often reflects emotional rather than rational decisions.

I am happy to say that HR2223 represents a well-conceived program to improve the balance of research spending. It asks for a relatively modest \$30 million for basic research and \$30 million for applied agricultural research in its first year plus additional funds for training grants, improved undergraduate training, fellowships, studies of human nutrition, development of new crops, research facilities, support of Veterinary Science and a National Agricultural Research Award. All the provisions are important, but I am particularly interested in the support of education and basic research in agriculture.

Proper education at the undergraduate and graduate level is fundamental to sustaining a productive research program. Unless the flow of capable research workers is sustained, the productivity of our research establishment will cease. The Thornton Bill 2223 provides for improvement of undergraduate agricultural education, and it will support a graduate training grant and fellowship program. Training grants are especially appropriate for schools with substantial graduate programs, and the fellowship program can aid schools with only one or two trainees in a department. Graduate students not only receive training, but this bright, hardworking group of young people is the source of a surprisingly large percentage of the new research ideas.

After receiving a Ph.D. and perhaps some postdoctoral experience, these talented young scientists are eager to attack important research problems. But there often are constraints on funding their grant proposals in the plant sciences, and they may defect to the generously supported medical sciences. It is a great disappointment to a young scientist to receive a letter saying "your proposal was approved but not funded".

The reservoir of basic research needs continuous renewal. It is constantly tapped for ideas to apply to practical problems. So basic and applied research go hand in hand, and unless they are kept in balance, the reservoir of basic information is depleted and applied research languishes.

What are the most important basic problems in agricultural research? Each person has his prejudices on this matter, but the recent report from the National Academy of Sciences requested by President Ford placed photosynthesis and biological nitrogen fixation in the first positions, and this assignment is generally accepted as valid.

The green plant takes carbon dioxide from the air, and with the energy from sunlight reduces the carbon dioxide to sugars, proteins, fats and other products we use directly as food. Alternatively, the plants may be fed to animals for conversion to meat and dairy products. The green plants are at the bottom of the food chain, and everything above is dependent upon them.

Photosynthesis is a remarkable process. Chlorophyll molecules capture radiant energy from the sun, funnel the energy to a reaction center, and with this energy the plant changes carbon dioxide to food products. Simultaneously, the photosynthetic reaction produces oxygen. Our bodies do the opposite. They burn the sugars or other photosynthetic products back to carbon dioxide and water, and in the process they capture the life-sustaining chemical energy that originated in the sun and was captured by plants. The oxidant in the body is the oxygen produced by plants.

Photosynthesis is remarkable, but there are potential ways to improve its efficiency. Basic research has told us that so-called C_4 plants, such as corn and sugar cane, are more efficient than most plants, because they can function at a lower concentration of carbon dioxide than the usual C_3 plants. The C_4 plants also have a lower rate of photorespiration, a process that dissipates energy. A current challenge is to make C_3 plants perform like C_4 plants. A handful of people are working on this basic problem, but it should attract more research attention.

Biological nitrogen fixation accounts for over two-thirds of the nitrogen supplied to crops, despite the fact that chemical nitrogen fixation is one of our largest chemical industries. In the United States we use about 12 million metric tons of chemically fixed fertilizer nitrogen per year; this has a value of about \$2.4 billion at \$180 per ton or \$200 per metric ton, the approximate current price. The value of nitrogen fixed biologically in the

United States approaches \$5 billion annually. 1% of the value of the chemically fixed nitrogen is \$24 million. A computer printout from NSF records last week indicated that the NSF was investing in nitrogen fixation research \$1.163 million and the RANN division of NSF \$0.423 million for a total of \$1.586 million in 1976 plus the transition quarter. That is 0.065% of the value of the chemically fixed fertilizer nitrogen used annually. A large percentage of the basic research on nitrogen fixation in the United States is funded by the NSF; an additional \$3 million per year would approximately triple that program.

Is it worth working on biological nitrogen fixation? Chemical fixation of nitrogen uses large quantities of our precious natural gas as a feedstock. When an excessive amount of fertilizer nitrogen is added to the soil, nitrate is leached into our streams, lakes and water supplies, and in some areas the nitrate concentration in water supplies approaches toxic levels. In contrast, biological nitrogen fixation utilizes sunlight as an energy source rather than fossil fuels. The plants fix the nitrogen they need, and the nitrogen in the plant residues is tightly held so that little leaches from the soil. I am not decrying the use of fertilizers; they are a key element in our agricultural technology, but I am suggesting that nitrogenous fertilizers can be replaced more extensively with biological nitrogen fixation than they have been in the past.

Basic research is giving us new insight into the biochemical mechanism of nitrogen fixation; genetic manipulation holds promise for future improvement in our biological nitrogen fixation agents, and applied research is giving us hints of new nitrogen-fixing plant and bacterial associations that we should be exploiting. There is a surge of interest in research on biological nitrogen fixation, but funding is minimal. We should capitalize on the current interest in shifting nitrogen fixation from the chemical industry to the green plant with its capability of tapping the almost inexhaustible energy of the sun.

In my opinion, the concept of research grants based on open, competitive, peer review, as described in the Thornton Bill HR2223, can provide an excellent mechanism for utilizing the research capabilities of our emerging scientists. It has the enthusiastic support of the agricultural research community, and I hope that it receives your support as well.

Thank you

Mr. DE LA GARZA. Thank you very much. We invite you to stay to hear the other witnesses, and then be available for questions.

Our next witness will be introduced by Mr. Fithian. Mr. Fithian?

Mr. FITHIAN. Thank you, Mr. Chairman.

Before he went astray, Chancellor Robinson was the provost of our fine university at Purdue. At the time that I was there, before we both went our separate ways, we had some meaningful times at Purdue.

I am sure that Purdue's loss is western Carolina's gain. I am not sure I could say the same thing for the history department and the Congress, but we are glad to have you with us this morning.

[The prepared statement of Mr. Robinson follows:]

STATEMENT OF HAROLD F. ROBINSON
CHAIRMAN OF THE COMMITTEE ON AGRICULTURE
AMERICAN ASSOCIATION OF STATE COLLEGES AND UNIVERSITIES

Chairman de la Garza and other members of the Subcommittee, I want to express my thanks for the opportunity of appearing before your subcommittee as a representative of the American Association of State Colleges and Universities (AASCU). I serve as Chairman of the Committee on Agriculture of this Association, and in this capacity I work closely with the American Association of University Agricultural Administrators (AAUAA), which is an organization of agricultural deans of the AASCU institutions and other non-land-grant colleges and universities. The AAUAA organization is chaired by Dean James Dollahon of the University of Wisconsin at River Falls, and he will follow me in the appearance before your Committee.

I welcome this opportunity to come to your Committee for the express purpose of speaking in support of this very important legislation under consideration, which is designed to strengthen the agricultural research and education of this nation. I am particularly concerned that this legislation and any modifications of it be so written as to allow for the appropriate involvement of and the participation of the vast number of well-qualified individuals at the non-land-grant state colleges and universities of our nation.

I want to make some brief statements about the institutions represented in AASCU and indicate the competencies of individuals involved at these institutions who I think can be most helpful in solving the agricultural research and education problems of this nation and contribute to the solution of the world food problems. Dean Dollahon will indicate to you in more detail the ways H.R. 2223 and H.R. 4394 should, in our opinions, be modified.

Our Association is composed of 323 state colleges and universities operating in 50 states, and contained within these institutions are more than 50 departments or schools of agriculture. These agricultural organizations do excellent jobs in representing and serving the needs of their particular regions of the various states and in preparing our young men and women for careers in agriculture and related disciplines. The institutions of the American Association of State Colleges and Universities, known as AASCU, are the regional universities throughout this nation providing higher education opportunities to our young people that would not otherwise be available if we had to depend upon the land-grant colleges and universities for the total training in a wide range of disciplines, including agriculture. Our institutions are, for the most part, heavily involved in service areas since they are providing for community services and regional development in the areas surrounding these institutions throughout the country.

Chairman de la Garza, I know that you are fully aware that these institutions are represented in your own state by the well-known and highly respected names such as Texas A & I at Kingsville, and Texas Tech University, and in other states by Northern Arizona University, Virginia Commonwealth University, Radford College of

Virginia, Eastern Washington State College and Western Washington State at Bellingham. In my own state, North Carolina, in addition to Western Carolina University we have such institutions as Appalachian State University, the University of North Carolina at Charlotte, East Carolina University, North Carolina Central University, Fayetteville State University, just to mention a few of the AASCU members.

Contained within these institutions you will find a wide range of highly-qualified talent interested in and quite capable of participating in agricultural research and education, both at the national and international level. These institutions and individuals represented on their faculty in the agriculture and related disciplines will, in my opinion, often very readily understand the rural people and their problems, because of their regional orientation. I make this statement from personal experience and because the role and scope of the AASCU institutions have resulted in development of a faculty oriented to the needs of the people on a regional and community basis. These faculty of AASCU institutions have had to develop techniques in the search for solutions to problems that are often highly useful and effective in applications in developing countries, which is an expertise being sought after with increasing frequency among the agricultural experts.

I do speak with some experience here, and pardon the personal reference, but I think that it would be appropriate to give a brief description of my own background which you will find repeated in many institutions and which will indicate the nature of the competencies available to contribute to international agriculture development. I spent more than 25 years at N.C. State University, one of our distinguished members of the land-grant institutions, where I worked in the area of population and quantitative genetics and served as a consultant to the Rockefeller Foundation, helping establish many of our international agricultural research programs and centers through the world. I had the opportunity of serving as Executive Director of the President's Science Advisory Committee Panel on the World Food Supply under President Johnson, and I have since served on three panels organized by the National Science Foundation and the National Academy of Sciences on the subject of food, population, and nutrition. The latest effort led to a report developed jointly by the National Academy of Sciences and the National Science Foundation on the subject of World Food and Nutrition which has just been submitted to the White House for publication.

Following service in Georgia and Purdue University I came to Western Carolina University where I have served for nearly three years. At Western Carolina University we have a program for Jamaica in which we have been largely responsible for the education of

counselors and advisors for the faculties of all of the high schools of that small nation. I have just received a letter from the Minister of Education, Mr. Eric Bell, asking me to organize a study team of experts to come to that nation to make a study of the Jamaican School of Agriculture and prepare plans for upgrading of the education of agricultural personnel, as well as the agricultural research of that country. Such talents in the AASCU institutions should not be eliminated from participating in and providing for the advancement of programs that would be supported by the legislation such as H.R. 2223 and H.R. 4394, whose principal sponsors are Representative Thornton and Representative Wampler, respectively.

Permit me to illustrate briefly with a few examples from my own region of the country, individuals who have obtained at least a part of their education at AASCU institutions and who have made significant contributions in research and education in the fields of agriculture and related areas. For example, in the state of Georgia I cite the fact that President Carter, a farmer, and Mrs. Carter both attended Georgia Southwestern College, a member of AASCU. Mr. F.M. Staley, a Georgian, attended Savannah State College, another AASCU member, and served for many years as Dean of Agriculture at South Carolina State College. He has made outstanding contributions in agricultural education, particularly among the minorities. Mr. Augustus T. Hill, who for many years headed the black section of the Georgia Cooperative Agricultural Extension Service, was recognized as one of the leaders in cooperative extension work until he recently retired.

Mr. William (Bill) Robinson, a leading dairy farmer in Tennessee, obtained his education at East Tennessee State University, a member of AASCU. He is President of Dairymen's, Incorporated, which is the largest organization of dairy processors east of the Mississippi. He is a member of the Tennessee State Legislature and received the Progressive Farmer's Award as Farmer of the Year about three years ago.

Appalachian State University, an AASCU member, proudly lists among its graduates:

1. Sarah Hardin Parker, formerly Chief Dietitian at West Point, and now transferred to Seattle;
2. Lynn Kinhead Engstrand, with Dawson Mills, Dawson Minnesota, an originator of soybean research and a consultant to the Shah of Iran and heads of state in other Middle Eastern, European, and Far Eastern countries regarding the use of soybeans as a protein in diet;
3. Dr. Sarah Crawford Wilson, Head, Home Economics Department, Iowa State University.

Western Carolina University has had many to serve in agriculture and related areas and we cite only a few:

1. Dr. Garrett Smathers is Senior Scientist at the Denver Science Center with the National Park Service;
2. Dr. Henry L. Cox of Clearwater, Florida, retired General Manager of the Chemical Division and Vice President of Corn Products Refining Company, and it was he who, I believe, received major credit for developing Prestone;
3. Mr. Lamar Beasley is the Environmental Coordinator for Programs and Legislation of the U.S. Forest Service in Washington, D. C.; and
4. Dr. Carol Miller was Plant Pathologist with the University of Florida from 1964 to 1972 and is presently Director of Tobacco Research and Production of the Coker Pedigreed Seed Company of Hartsville, S. C.

These, ladies and gentlemen, serve only as examples of the type of persons in our AASCU institutions who are capable of major contributions and who should be allowed to participate in the programs to be supported with the funds provided from legislation such as H.R. 2223 and H.R. 4394.

Earlier I did allude briefly to the point that I felt that the institutions which I represent are closely attuned to the needs of the people since our institutions are regional in nature and are highly committed to providing community and regional service. Let me illustrate with an example or two from my own institution, the kind of services being rendered to the communities in meeting their needs. Our Economic Development Center, more recently expanded into our total community service operation known as the Center for Improvement of Mountain Living, has done a range of projects suggested by interests outside the institution.

Our Center has, since 1969, assisted some 212 business firms in the Appalachian counties of southwestern North Carolina. In this total, there were 18 agro-business firms with technical services including financial analysis, market and management plans and projections, inventory control studies, and the preparation of full-blown business plans.

Expand, if you will, these illustrations of only a fraction of our services to the communities to 322 other state-supported non-land-grant colleges and universities across the nation and you will obtain some idea of the service orientation and contributions of our institutions to the basic needs of the people.

We ask that care be taken in the final drafting of your subcommittee's bill to insure that all possible talents represented in the institutions of higher learning, particularly those in the American Association of State Colleges and Universities, not only be allowed to participate but that they be solicited. We also ask that the resources provided by this legislation be made available to those individuals and those institutions where there is talent that can be utilized to insure that your objectives be realized in expanding the effectiveness of our agricultural research and education.

Before closing I would like to comment on an issue that Representative Thornton raised with me in a recent letter concerning H.R. 2223. The Congressman noted that he was considering reorganizing the bill so that the existing Section 104, entitled "Continuation of Existing Agricultural Research Programs," does not appear between the two programs proposed in Sections 103, the agricultural research competitive grants program, and Section 105, the agricultural science and engineering education program. I think this is a good modification.

Finally, Chairman de la Garza, I want to thank you and the members of your subcommittee for this opportunity of being here today. I will be glad to answer any questions which you may have, and I will be available in the future to assist you and your subcommittee and other members of the House Agriculture Committee in any way that I can with your extremely important work.

Mr. DE LA GARZA. Thank you very much. We invite you to listen to the other witnesses and return for questioning.

Before I introduce the next witness, I would like to mention that I may be breaching protocol. I do not know if this has been made public or not, but President Carter has invited five honest-to-goodness farmers to have lunch with him today to celebrate Agricultural Day.

I am happy to announce that one of these genuine honest-to-goodness farmers happens to be from my congressional district. He is visiting here briefly with us on his way to the White House.

Without objection from the Members, I would like to introduce Mr. Jose C. Hinojosa from Edcouch, Tex.

[Applause.]

Mr. DE LA GARZA. Mr. Hinojosa farms grain, cotton, some vegetables. Not being able to make it—as most farmers cannot—he has expanded and done a little contract work.

We are happy and proud that he was one of those selected to represent the honest-to-goodness from the land farmer.

Mr. THONE. We think you have a fine honest-to-goodness Congressman here, sir. [Laughter.]

Mr. DE LA GARZA Our next witness is Dean Dollahon from the College of Agriculture at the University of Wisconsin.

[The prepared statement of Mr. Dollahon follows:]

J.C. Dollahon, Dean
College of Agriculture
University of Wisconsin--River Falls

Chairman de la Garza and members of the Subcommittee, I wish to express my thanks for being provided the opportunity to appear before your Subcommittee as a representative of the American Association of University Agricultural Administrators (AAUAA). This is a comparatively new organization, having been organized in October 1973. AAUAA was developed to represent approximately 50 non-land-grant, four-year, state supported universities which offer baccalaureate degrees in the agricultural sciences and/or renewable natural resources. In the fall of the 1976-77 academic year this group of universities had 29,365 students enrolled in undergraduate agricultural and natural resource programs and 1387 students pursuing graduate degrees in the same areas. A survey of available statistics indicates that collectively 4599 bachelor's degrees and 479 graduate degrees were awarded during the 1975-76 academic year.

A total of approximately 1000 faculty members trained in the agricultural sciences are employed by AAUAA member and potential member institutions, of which 96 percent hold advanced degrees. About 665 or 66 percent have completed the doctorate. This group of dedicated faculty members are vitally concerned with the future of the agricultural industry and the importance of insuring an adequate supply of food and fiber for this nation. In addition, our affiliate organization, the American Association of State Colleges and Universities (AASCU), has a grave concern as addressed by Chancellor H. F. Robinson.

I am appearing today in support of the basic concepts of the two pieces of pending legislation related to agricultural research, extension and teaching, H.R. 2223 and H.R. 4394. In reviewing drafts of both bills we are concerned with some of the administrative procedures proposed and I would like to ask for clarification pertaining to certain points.

First, AAUAA is fully aware of the significant contributions made by the land grant colleges and universities authorized under the Morrill Acts and the role of the state agricultural experiment stations created by the Hatch Act. To help promote additional research so very necessary for the maintenance of the agricultural industry, AAUAA strongly endorses the concept of additional funding for this worthy cause. Granted, the ultimate goal of agricultural research is to develop the knowledge and technology to insure an abundance of high quality agricultural products, maintain a permanent and viable agricultural industry, improve the nutritional well-being of the American people, improve the management and use of the nation's natural and renewable resources, and promote improved standards of living in rural America. To fulfill this goal, in our opinion, it will be necessary to utilize all of the nation's agricultural resources.

The first point of concern relates to Sec. 3(a)2 in the "National Agricultural Research, Extension, and Teaching Policy Act of 1977". The directors of agricultural research stations and cooperative extension services have been designated as the coordinators of the various research, extension, and teaching programs, funded in whole or in part by the United States Department of Agriculture in a given state. If the role of the director is to be one of coordination only it is our feeling that this provision is justified. However, a grave concern is registered if the intent of this section includes the channelling of grant applications for research and teaching through the directors.

A second concern relates to the structure in that bill of the National Agricultural Research, Extension, and Teaching Policy Advisory Board. A provision has been included for six representatives from administrative posts in United States universities qualified in the food and agricultural sciences, to serve on this board. It has been designated that one member shall be a director of an agricultural experiment station and one member shall be a director of a cooperative extension service. To prevent this board from becoming a "closed shop", AAUAA asked that consideration be given to the possibility of designating that a minimum of one of the remaining slots be filled by a representative from an AAUAA-AASCU institution. The same concern relates to

the Steering Committee of the Agricultural Research, Extension, and Teaching Policy Advisor Board. This request is based upon the previous experience of AAUAA institutions who have attempted to secure contracts or special funding from USDA.

It is our opinion that the USDA, including the Agricultural Research Service and the Cooperative State Research Service, in conjunction with the National Association of State Universities and Land Grant Colleges and some of its individual members, have systematically and deliberately excluded the non-land grant colleges and universities from involvement in agricultural research and extension. As structured, the potentially important pool of talent available for research and extension in the AAUAA institutions would not be represented nor used to effectively serve American agriculture. Since both bills deal with teaching, which is the primary mission of AAUAA-AASCU institutions, it would appear that representation would be appropriate.

A similar concern is registered with regard to Sec. 102(a) of the Agricultural Research Act of 1977. This section implies that other state supported colleges and universities would not be eligible for funding through USDA. It is recommended that the phrase "other public educational institutions" be inserted after the cooperative state extension service. This would clarify the intent of the section and remove the possible implication that other colleges and universities are not eligible for funding from USDA.

An additional point in both bills, which in our opinion needs clarification, relates to the restricting of teaching grants to those colleges and universities with a demonstrable capacity in research, teaching and extension. Most of the AAUAA institutions have strong teaching programs and could qualify under the definition of extension as described in the House Rept. 94-434 on Title XII of P.L. 94-161. However, their research efforts may be extremely limited since funding from state and federal sources has not been available. Granted, involvement in research should enhance the quality of instruction. However, if an institution has not had the necessary resources to develop a research thrust, funding for the improvement of undergraduate instruction should not be denied.

The Morrill Acts and the Hatch Act were implemented during a period when most AAUAA colleges and universities were nonexistent or in a stage of infancy. Subsequently the amendments and new legislation which have been passed do not recognize the changes which have taken place in the field of agricultural education. Today AAUAA universities are training approximately 25 percent of the graduates entering the field of agriculture at the B.S. level. Since these agricultural programs are oriented along traditional lines, a higher percentage of the graduates select careers directly related to agricultural production and distribution. The majority of these types of institutions do not offer majors in biochemistry, genetics, and other specialized areas. Most emphasize agricultural economics, animal and dairy science, plant science (agronomy), horticulture, soils, agricultural engineering technology or agricultural mechanization, and related areas. As an example of the placement of graduates from a typical AAUAA college of agriculture, a breakdown of the graduating class of May 1976 from the University of Wisconsin-River Falls is provided.

<u>Occupational Areas</u>	<u>No. Employed</u>	<u>Percent</u>
Agricultural Business	46	40
Agricultural Credit (PCA, Federal Land Banks, FHA, and private banks)	8	7
Agricultural Education	13	11
Graduate School	11	9
Federal Service (SCS, Statistical Reporting Service, ASCS, etc.)	7	6
Production Agriculture & Farm Management	18	16
State Service (DNR, Extension, etc.)	4	3
Other	9	8
Total:	116	100

As may be noted, a large percentage of the graduates are employed by agricultural business firms. The majority of these young men and women provide technical information and service for those engaged in production agriculture.

A brief history of the positions held by graduates from the three campuses in Wisconsin indicates that 54 percent of the high school teachers of agriculture in Wisconsin have been trained at the University of Wisconsin-River Falls, 32 percent at the University of Wisconsin-Platteville, 11 percent at the University of Wisconsin-Madison (the land grant campus), and 3 percent in other states. A review of agricultural credit agencies such as the Production Credit Association, Federal Land Banks, Farmers Home Administration, and others in Wisconsin reveals that about 94 percent of the employees with college degrees in the agricultural sciences have been trained on the Platteville and River Falls campuses. A similar pattern may be observed by reviewing the employees of the Soil Conservation Service, farm supply cooperatives and other agricultural business firms in the state. It is also important to note that over the last decade 10 percent of the graduates from the River Falls campus have continued their education at most of the major graduate training institutions in the United States. These data have been presented to provide the committee with an idea of how the non-land grant colleges serve agriculture through the training of young men and women.

The AAUAA colleges of agriculture are for the most part located in prime agricultural areas and are in an excellent position to assist those engaged in small and intermediate scale agriculture. Production agriculture in the United States today has been described as large scale, mechanized farming and it has frequently been a contention on the part of many that the present agricultural research system supports and encourages this type of production by its selection of research projects.

Faculty at the AAUAA universities are attuned to the needs and problems of those engaged in the agricultural industry in the areas in which they are located. Due to this fact they are in the best possible position to implement research and extension activities which are directly related to unique problems of a local and regional nature.

If the family farm is to be preserved, research must be conducted which would benefit the small and medium sized, independent farmers. In the opinion of many this type of operation is the foundation of American agriculture.

Further, there is a greater ability to develop multidiscipline research programs in those universities because the smaller size brings the professionals from all agricultural disciplines into daily contact. This in turn allows for an efficient use of research dollars through the maximizing of input into the problem solving process.

In order to meet the objectives of conducting research on regional problems of a unique nature and to implement specific programs designed to benefit the small and medium scale farmer, different avenues must be constructed. The AAUAA universities are probably in the best position to fulfill these needs, but in order to do so, these universities must have access to federal funding, not on a handout basis, but on the basis of the merits of proposed research. Therefore, with these objectives in mind and a possible solution at hand, it is recommended that a special funding provision be included in current legislation which would provide a base from which this group of institutions could work.

A number of states have created from state resources universities other than land grant colleges for the purpose of providing education and public service in the field of agriculture. The major thrust or objective of these universities has been undergraduate education. However, during the past 10 to 15 years the scope of the agricultural programs in a number of the AAUAA institutions has expanded to a point where many have developed graduate programs and a viable research thrust. Most of the progress in the development at these institutions has been accomplished with little or no support from federal sources. The Department of Health, Education and Welfare and other federal agencies have assumed that the responsibility for

the support of agricultural programs rests with USDA and have not for the most part looked favorably upon requests for program support. On the other hand, USDA has not made an attempt to extend its realm of responsibility beyond the needs of the land grant system and the state agriculture experiment stations. Due to a lack of understanding, the AAUAA universities, through no fault of their own, have been placed in a "no man's land", leaving their full potential undeveloped.

AAUAA and AASCU applauds the efforts of the authors of the bills discussed here today. Both Congressmen Thornton and Wampler are to be congratulated for having recognized that agriculture research, teaching, and extension in this nation have outgrown legislation which was enacted into law in the nineteenth century. We are pleased to see that an attempt has been made to remove a part of the roadblock which has been used effectively to exclude qualified non-land-grant universities from established programs as well as new programs which have recently been developed.

At this time, when many of the nation's non-renewable resources are rapidly dwindling, a new and positive approach must be developed. It is important that this nation continue to excel in the production of food and fiber both from the standpoint of its own citizens and that of the world community. The existing energy crisis will be solved. However, an adequate supply of energy alone will not provide the raw material in a sufficient supply to keep the industrial portion of our country in balance. As has been the case during times of crisis the nation will again turn to agriculture to provide the balance of payment.

Many of the AAUAA colleges and universities presently have human and physical resources which could be more fully utilized. The majority of the faculty members are employed for 9 months of the year and could be moved into meaningful employment in research and public service activities during the period when they are not teaching, if funds were available. In comparison to the potential return, the investment would be minimal.

During the next decade and beyond a severe shortage of qualified personnel to meet the needs of the various aspects of the agricultural industry will develop. To meet the challenge, which is the responsibility of the institutions of higher learning, additional resources will be required. AAUAA colleges and universities have faculty, facilities, and laboratory farms which, with the addition of minimal funding, could be utilized effectively in expanded programs in teaching, extension, and research. These institutions are in a unique position, in that the expansion of programs could be accomplished in an expedient and economical manner.

A model for the involvement of non-land grant agricultural faculty in research has been provided in my home state of Wisconsin. The state legislature five years ago recognized the potential which existed and provided a modest appropriation for cooperative research between the land grant campus located at Madison and the two non-land grant campuses located at Platteville and River Falls. To date a total of 31 cooperative research projects have been funded. The faculties and resources of three campuses are currently being used to conduct research and promote the cause of agriculture within the State of Wisconsin. In addition, the cooperative aspect has expanded to areas other than research. The faculty members on the three campuses, through a common bond, have a better knowledge of the difficulties within the field of agriculture and collectively are working diligently toward solutions to many of the problems which presently exist.

Since a highly productive working model has been developed, I strongly recommend that you, as members of Congress, give serious thought to the adoption of a similar model for this nation. Consider for a moment the vast potential in states such as California (with five non-land grant campuses), Louisiana (seven non-land grant campuses), Illinois (three non-land grant campuses), Missouri (five non-land grant campuses), Texas (nine non-land grant campuses), Tennessee (three non-land grant campuses), Kentucky (four non-land grant campuses), and Wisconsin (three non-land grant campuses).

In summary, the only request that the non-land grant colleges have is that they be allowed to compete on a fair basis for research and teaching funds. They feel that they can make unique and significant contributions to agricultural research, education in the agricultural sciences and to the nation. To ignore this fact in any legislation is not wise or consistent with American tradition.

Again, on behalf of AAUAA and AASCU I would like to once again thank the committee for the opportunity to express our concerns. It is our sincere hope that this committee will be able to draft a final version of these two bills which will resolve or clarify the concerns I have expressed here today.

Mr. DE LA GARZA. Thank you very much. We appreciate your contribution. We invite you to remain for our question and answer period.

Our next witness is Mr. William P. Miller.
Mr. Miller?

**STATEMENT OF WILLIAM P. MILLER, DEVELOPMENT SPECIALIST,
BUREAU OF INDIAN AFFAIRS, U.S. DEPARTMENT OF THE
INTERIOR**

Mr. MILLER. Mr. Chairman and members of the committee, my name is William P. Miller. I am Special Projects Officer for the Office of Tribal Resources Development in the Bureau of Indian Affairs.

I am currently the staff director of an ad hoc scientific committee which is assisting the Bureau of Indian Affairs in the development of a comprehensive plan for the establishment of cultivated acres of jojoba on Indian lands in the Sonoran Desert region of the Southwest.

I thank the committee for permitting me to discuss the proposed Agricultural Research Act of 1977; that is, both the Thornton and the Wampler bills.

Mr. DE LA GARZA. Mr. Miller, please forgive me for interrupting. Did you provide a copy of your statement to us?

Mr. MILLER. No, I wish to speak extemporaneously. The statements that I am going to make here are independent statements and they will not reflect policy positions of the Bureau of Indian Affairs.

The reason for this is that the Department of Interior, Bureau of Indian Affairs, received the two bills on Friday the 18th and therefore, the Bureau did not have time to prepare a report on H.R. 4394 and H.R. 4863. However, the Bureau has approved my coming here to discuss the importance of these bills in terms of a program field operations person who has been involved in trying to assist Indian tribes in developing jojoba agriculture over the last 7 years.

Mr. DE LA GARZA. I ask because we are going to be running somewhat short of time for questions. If you had a prepared text, we would, without objection, insert it in the record in full. We could then allow you to make comments as you saw fit for about 10 minutes.

In that way, we would have time for questions. Would that be satisfactory?

Mr. MILLER. You mean if I had a prepared text?

Mr. DE LA GARZA. You have none?

Mr. MILLER. No I do not, but what I have to say should only take about 5 minutes.

Mr. DE LA GARZA. That would be fine. You may proceed.

Mr. MILLER. Thank you very much.

Although I will be speaking extemporaneously, I have, however, prepared one document which I would like to have inserted in the record because it includes a mailgram addressed to me by Mr. Ned Anderson, manager of the Apache Marketing Cooperative Association, Inc., the San Carlos Apache Tribe, San Carlos, Ariz.

I would like to submit this for the record because Mr. Anderson states, in his mailgram, that the Apache Marketing Cooperative Association, Inc. of the San Carlos Apache Tribe has reviewed H.R. 2223, specifically Section 103: Program of Competitive Grants for Agriculture Research, and recommends that language be proposed that would make Indian tribes eligible for grants under this section. I concur with Mr. Anderson's view and I urge the committee to respond favorably to this request.

Mr. DE LA GARZA. Without objection, a copy of that mailgram will be inserted in the record at this point.

[The mailgram submitted by Mr. Miller follows:]

[Mailgram]

SAN CARLOS, ARIZ., *March 16, 1977.*

WILLIAM MILLER,
Bethesda, Md.

The Apache Marketing Cooperative Association, Inc., of the San Carlos Apache Tribe has reviewed H.R. 2223 specifically 103 and title program of competitive grants for agricultural research and recommends that language be proposed that would make Indian tribes eligible to compete for grants under this section.

NED ANDERSON,
Manager.

Mr. MILLER. Thank you very much.

Briefly, I would like to state a little bit of my background in order to lay a foundation for what I will say. I have spent approximately 12 years in the developing countries of the Far East working with less-developed nations in the development of their economies.

After I returned to the United States, in 1968, I joined the Office of Economic Opportunity (OEO). In June of 1970, Dr. Noel Vietmeyer of the National Academy of Sciences came to me and said that he was researching a plant which had potential, he thought, of being domesticated and felt that it could possibly be an economical crop for Indian tribes to cultivate in the years to come.

After first consulting with jojoba research scientists in the U.S. and Israel, OEO launched a research and development program in jojoba agriculture to determine whether or not it was feasible to commercially develop jojoba. After 6 years of jojoba R. & D. and a \$1.7 million investment, provided by the Office of Economic Opportunity and the Office of Native American Programs, in 1975 the National Academy of Sciences published a study which, in part, concluded that the jojoba plant had the biological characteristics and market potential to be domesticated and developed as a commercial crop.

Subsequently, the Office of Native American Programs has seen fit, relative to achieving its basic jojoba research mission, to terminate its financial support of the project. Therefore, funds to implement the applied and development research goals for cultivating jojoba are not now available. The purpose of Mr. Ned Anderson's telegram was to bring to the attention of this committee this situation and the fact that Indian tribes which are now receiving agricultural research and development funds, from the Office of Native American Programs, will no longer have them after May 30 of this year.

On June 1, 1977, the Indian jojoba development project will be transferred to the Bureau of Indian Affairs. The Bureau at this time, does not have the funds to take over this program. However, we are working with an ad hoc committee made up of some top jojoba research scientists from Israel, Mexico, and the United States to develop a comprehensive plan for the development of jojoba as a cash crop for Indian tribes in the Sonoran Desert, of the Southwest. Funding for this plan could be made available by the benefits provided in Section 104(4) of H.R. 4863.

The various problems that we went through in order to fund the jojoba R. & D. development project to date, has led me to conclude that the two bills—here the Wampler bill and the Thornton bill—are extremely and vitally important for the continuation of the jojoba development research project and for other kinds of agriculture research and development assistance that Indian tribes need in order to develop specifically the arid Southwest land areas of many Indian reservations. Much of this land is not productive land, but it could be made productive by cultivating economically promising zerophytic plants and provided that a coordinated, well thought-out, well-planned effort was made between the various educational institutions and Government agencies delivering agricultural services to Indian tribes. The Department of Agriculture should take the lead in providing this assistance to Indians.

Presently, there is no Indian agricultural development program or administrative mechanism within Government, either in the Department of Agriculture or the Bureau of Indian Affairs to address itself to this particular problem. However, I do see—within the Wampler bill and the Thornton bill—several possible legislative provisions to change this situation—specifically those sections which are designed to broaden the base in new crops research and to improve the programs of the Cooperative Extension Service.

As some of you very well know, the Department of the Interior, Bureau of Indian Affairs, has had, since 1956, an interagency agreement with the Department of Agriculture's Cooperative Extension Service to provide agricultural assistance to Indian tribes. The amount of this program, where the Bureau of Indian Affairs funds are transferred to the Extension Service, is \$2.5 million.

However, when we look at the record of this program, i.e., in terms of what the Indian tribes are doing in development agriculture vis-a-vis the utilization of their land and water resources, which they have, and that they could put to good agricultural use, we find that agriculture acreage, the productive acreage, has gone down and not up.

The problems of instituting modern agriculture development practices on Indian Reservations are complex and the lack of success so far is due to the lack of programs specifically designed to provide technical assistance and to educate and train Indian tribes in the utilization of modern agricultural techniques.

In view of this, I would like to state that the two bills, which we are now discussing, have the potential of correcting the particular deficiencies in the Government's agriculture assistance programs for Indians. I hope that when Interior/BIA has thoroughly reviewed

these two bills they will come up with concrete recommendations that would dovetail with your national policy recommendations to improve agriculture research, education and extension in order to make it possible for the Indian tribes to benefit by this much-needed piece of legislation. Especially, to assure that the Bureau's jojoba development plan is funded.

Thank you.

MR. DE LA GARZA. Thank you very much. We appreciate your contribution. We hope that we might be able to have you available for cooperation during the markup of the legislation in the weeks to come.

MR. MILLER. If there is anything at all that we can do, we will be more than happy to do it.

MR. DE LA GARZA. Please remain with us for the questioning period.

Our next two witnesses are Dr. Noel Vietmeyer and Dr. Reed Rollins. Please come up together. We will be happy to hear from both of you.

I might say that I have looked at the prepared statements and am excited by the possibilities of the guayule and jojoba. It was grown, in my area of south Texas, during World War II with some degree of success, I might add.

MR. VIETMEYER. I brought a little bit along to show the committee.

I would like to demonstrate that it does produce rubber. Here is a ball made of it. It bounces. [Demonstrated.]

[The prepared statements submitted by Mr. Vietmeyer and Mr. Rollins follow:]

STATEMENT OF NOEL D. VIETMEYER,
 PROFESSIONAL ASSOCIATE,
 NATIONAL ACADEMY OF SCIENCES

I am delighted to be with you this morning, and to discuss the importance of SEC. 103 (a)(4) of the Bill. This farsighted section proposes competitive grants "for the purpose of conducting research, development, and demonstration of new crops, including guayule and jojoba."

At the National Academy of Sciences we are engaged in a series of studies to select and publicize little-known plants that have the merit to become important crops of the future. So far 9 studies have been completed or initiated. These have incorporated the ideas and wisdom of over 500 plant scientists, and about 100 distinguished researchers have been members of the study panels convened to date. I have been staff officer for these studies which include both guayule and jojoba.

To investigate new crops has never been more important to the nation. In past decades we have not been concerned over the supply of industrial raw materials and agricultural research has overwhelmingly emphasized food crops. But as non-renewable resources become difficult and expensive to obtain we have to turn increasingly to plant-derived (renewable) resources to supply our industry and maintain our national productivity. We have to urgently begin research on new crops such as jojoba and guayule that can guarantee the nation's industry domestic supplies of organic raw materials.

Furthermore this winter's weather has shown that water shortages threaten to limit the future agricultural expansion in western and southwestern states. I see an urgent need to research and develop crops that use water efficiently and produce needed commodities with a minimum of irrigation. Guayule and jojoba both grow wild in desert regions of the southwest. Their native habitats sometimes receive no rainfall from one year to the next. Those are not the conditions one would want to grow them commercially, but it is clear that they require far less moisture than crops such as cotton, alfalfa, vegetables, and sorghum that are now grown in the southwest. Conventional crops are poorly adapted to a semi-arid environment and vast quantities of irrigation water are needed to nurture them through most of the summer growing-season. On the other hand jojoba and guayule are adapted to the southwest's climate and environment. Jojoba bushes for example need no moisture during the summer when water is most scarce; they need moisture only in the late winter/early spring when the seeds (that contain the plant's industrially important oil) form and grow. Guayule is adapted to the sporadic nature of desert rainfall: given moisture it grows leaves, stems and roots, but with the onset of drought its biochemistry switches over to making the rubber. Though fatal to conventional crops the very intermittancy of the natural rainfall is an advantage to guayule because it is grown for the rubber it produces.

Dr. Rollins has told you the findings of the National Academy of Sciences Panel on Guayule, so I will contain the remainder of my remarks to jojoba.

Jojoba *Simmondsia chinensis* is a small green bush that grows wild over an extensive arid area in the Sonoran Desert that covers parts of Arizona, California, and Mexico. Jojoba's brown seeds are about the size of small olives and they contain an oily liquid with unusual properties that is commonly referred to as jojoba oil. Chemically the oil is a liquid wax, and jojoba is the only plant known to produce a liquid wax. This type of compound is difficult to synthesize commercially, and the only other natural source is the sperm whale, an endangered species.

In 1975 the National Academy of Sciences completed a 2-year study of jojoba oil's promise as a raw industrial material. The Chairman of the study panel was Dr. Milton Harris, President of Harris Research Laboratories and former Director of Research for the Gillette Company. He has asked me to pass on to you his sincere regret at not being able to testify at these hearings. He wants you to know that he fervently believes that jojoba is important to the nation's future and that he is prepared to meet with committee members or staff, when he returns to Washington in a few days.

The jojoba panel was composed mainly of leaders of industrial research laboratories. The study they made was thus far from being an academic exercise. The panel reviewed the chemical structure and properties of jojoba oil and concluded that it has important commercial potential and that markets already exist for both the oil and its hydrogenated product. A liquid wax like jojoba oil would be important to many industries producing a wide variety of products including lubricants, paper coatings, polishes, electrical insulation, textiles, leather, precision castings, cosmetics and pharmaceuticals. Its hydrogenated product--a hard, solid wax--resembles carnauba wax, beeswax and spermaceti and would be purchased by industries that use waxes of various kinds.

The panel further concluded that jojoba's chemical structure is so close to that of sperm oil "that it can probably be used as a sperm-oil substitute for the complete range of uses, without requiring major reformulations." To all of us concerned over the plight of whales this is a very important finding. More sperm whales are killed than any other type of whale; one is harpooned every 50 minutes. Sperm whale meat is inedible, so it is only oil that the whalers are after. The agricultural research funds authorized by SEC 103 (a)(4) of the bill would bring jojoba oil to the world's markets thereby relieving pressure on the sperm whale.

The NAS panel also concluded that "jojoba can increase the productivity of arid lands not suitable for conventional crops." The Government of Israel agrees. Late in 1976 it invested \$4 million from its own scarce funds in a large jojoba plantation in the Negev Desert. This is a commercial,

profit-making plantation that will produce jojoba oil for lubricants needed by the Israeli military, and for export to industries in Europe. To Israel, jojoba's ability to thrive in desert heat, marginal soils, and where water is scarce, was a major benefit. But their researchers have also found that the plant (which they imported from Arizona and southern California) will grow even in barren, saline and alkaline soils, - also that it can be irrigated with saline water, which is often abundant in semi-arid areas, but which is fatal to other crops. Thus, with careful management, jojoba may be able to make marginal areas productive--not only Israel's, but ours too.

Finally I would like to point out that jojoba cultivation could be an important help to relieving poverty on some Indian reservations in the southwest. Indians of the Sonoran Desert are among the most impoverished people in the United States. Unemployment is widespread on the reservations, and welfare rolls are long. There are few economic incentives to remain on the reservation. A jojoba-based industry would allow Indians to help themselves toward economic self-sufficiency by using local labor to grow and process jojoba. It is estimated that 17 reservations in California and 9 in Arizona could grow jojoba. My good friend and colleague William P. Miller who follows me in these hearings will tell you more about the importance of this.

Thus, you can see that SEC 103(a)(4) of H.E. 2223 provides for programs that have crucial significance to our nation's present and future. Many other new crops may be proposed to you for inclusion in this section, but I'm certain that none will offer the range of benefits nor the immediacy of opportunity to improve the country's productivity and well-being.

Thank you.

STATEMENT OF REED C. ROLLINS,
CHAIRMAN,
NATIONAL ACADEMY OF SCIENCES PANEL ON GUAYULE,
DIRECTOR AND ASA GRAY PROFESSOR,
GRAY HERBARIUM,
HARVARD UNIVERSITY

It is very good to be with you this morning and to have this opportunity to discuss guayule, a plant that is almost unheard of today, but that promises to be a major contributor to the nation's productivity and well-being in the near future.

It is heartening to me to see that the "Agricultural Research Act of 1977" specifically designates funds "for the purpose of conducting research, development, and demonstration of new crops..." We are fast coming to the realization that our underground resources of fuels and minerals are not unlimited. Never before has mankind faced such a need for renewable resources. It is crucial to the nation's long-term health and survival that we begin intensive research into the wealth of plants that we could cultivate to produce the raw materials we'll need in our future.

Guayule (pronounced wy-oo-lee) is one of these. It is a small shrub that looks like sagebrush, and is native to desert-like regions of southwestern Texas and contiguous areas of Mexico. It produces rubber, indeed in some varieties rubber comprises one quarter the weight of the stems and roots.

Over a year ago the National Academy of Sciences established a panel of distinguished botanists, agronomists, engineers, chemists, rubber technologists, and a rubber economist to investigate the modern potential of this exciting plant. I am Chairman of that panel and our findings are being published in a booklet that will be available in a few days, and which we will deliver to all members of the Committee at that time.

I can, however, tell you the panel's conclusions and when you see the booklet you'll realize that we have done a thorough job of investigating the chemistry and quality of guayule rubber and that it is a very high grade natural rubber indeed.

Many uninformed people have the impression that with synthetic rubber available from our industry we have no need for natural rubber. This is not true. Virtually every tire in the country contains natural rubber: Automobile tires average 20 percent, the new radials about twice that; truck and bus tires are at least 40 percent; and large tires on aircraft, tractors, and earthmoving vehicles are virtually 100 percent natural rubber. Natural rubber is used in the carcass of the tire because it runs cooler than synthetic tire-rubbers and therefore degrades less, which ensures that our tires have fewer body breaks and longer lifetimes.

Although early this century U.S. corporations produced a large fraction of the nation's rubber from guayule bushes growing in Texas and Mexico, today

our natural rubber comes from Southeast Asia and Africa, and is produced entirely from the rubber tree Hevea brasiliensis. The world's demand for natural rubber is increasing so fast that economists are predicting that the rubber tree plantations cannot produce enough, and that natural rubber shortages will soon occur. From model calculations the Malaysian Rubber Research and Development Board concludes that annual natural-rubber demand will outstrip supply by about 1 million tons in 1980, and by about 2 million tons in 1985. As a result the World Bank expects prices "to increase (in current US dollars terms) to about 60US¢ per lb in 1980 and 78US¢ per lb in 1985". The current price is 39US¢ per lb so that the nation's consumers are going to have to pay substantially more for their tires and rubber goods. The virtual doubling in price will also effect our balance of payments; even at today's prices we spend each year about \$500 million importing natural rubber.

During our investigation, the NAS panel subjected guayule rubber samples to the most modern and sensitive tools of chemical structure elucidation. From the results we conclude that guayule rubber and hevea rubber (the type from the rubber tree) have chemical and physical properties that are virtually identical. Both guayule rubber and hevea rubber are hydrocarbons, both are polymers of isoprene, both have double bonds with a *cis* configuration (this gives the rubber its "bounce"), both are approximately the same in molecular length and weight. Both have very similar, or identical, microstructure: studies have not detected any differences even with techniques that can detect as little as 0.5 percent of structural difference.

With the quality of the rubber assured the panel addressed the question of the economics of its production. Here, with its limited budget the panel couldn't draw detailed conclusions. You see the last time guayule was cultivated was decades ago. It was under wartime conditions and preceded the discovery of many of our most powerful agricultural tools. So making economic projections from the old data is essentially meaningless. For example, controlling weeds was a major expense in the early 1940s; it was largely done by hand. Today we have organic herbicides that cut such expense enormously. Nonetheless, the panel could find no excessively costly step in producing guayule rubber. A guayule plantation is planted, cultivated, and harvested with machinery used widely with our conventional crops. To extract the rubber may be expensive but not excessively so. Guayule rubber sold competitively with hevea rubber during the first half of the century, and now with modern technology, extraction efficiency and costs should, if anything, be less than before.

Thus the panel concludes that not only is there a market for guayule rubber, but that it can probably be filled while providing profit to the farmer and processor.

But this will happen only if we apply to guayule-production the knowledge that science has gained during the last 30 years. In that time we have made major advances in plant genetics, agricultural technology (pest control,

weed control, mechanization, etc.), chemical instrumentation, chemical engineering, and rubber technology. There are now techniques, unknown when guayule was last produced three decades ago, that could revolutionize its production. I think you can see that guayule research as proposed by H.R. 2223 Sec. 103 (a)(4) is fully warranted, if not long overdue.

The research needed is in guayule production--in the agricultural and process-engineering sciences. The rubber companies are not agricultural researchers and cannot be expected to do this. But the rubber industry is keenly interested in the idea of a domestic source of natural rubber. Based on our contacts with the industry the panel considers that a market exists for all the guayule rubber that could be produced at a competitive price.

There is no other rubber-producing plant that is as good a candidate for producing U.S.-grown rubber. And guayule can be grown in the semi-arid southwestern states. In 1942 the Forest Service classified 5 million acres in Texas, New Mexico, Arizona and California as suitable for guayule culture. Because the plant is native to a desert environment where rainfall or irrigation supplies are unreliable. Some panel members point out however that under really dry conditions the plant may mature too slowly to provide a reasonable annual return on investment. But with current chronic water shortages in the southwest exacerbated by the amounts of irrigation water needed by conventional crops, guayule agriculture could become a boon to the region and could bring relief to the water supplies there.

So you can see that guayule is a crop that, in the words of SEC. 2(a)(10) of this bill, offers promise of further increases in agricultural productivity in subtropical and arid climates.

Guayule production also relates well to policies on energy independence (its rubber could substitute for petroleum-derived synthetic rubber), and on defense and emergency preparedness (aircraft tires, for example, are virtually entirely made from imported natural rubber).

Thus, I take great satisfaction in being able to recount to you this morning the NAS panel's evidence of guayule's importance to the nation's future. A commitment to guayule research and development is needed. SEC 103(a)(4) provides the funding for it.

Thank you.

Mr. DE LA GARZA. Thank you very much, Dr. Rollins. We appreciate your contribution.

We would appreciate it if you would remain where you are and we will question all the witnesses together.

Are there questions? Mr. Wampler?

Mr. WAMPLER. Mr. Chairman, will we bring the other people to the witness table?

Mr. DE LA GARZA. I thought we might question these two gentlemen, and then call the others.

Mr. WAMPLER. I want to commend both of the witnesses for their excellent statements. Let me say, as one of the authors of one of the bills before us, that certainly this is precisely what we intended.

We wanted the added emphasis of research that will permit us to look at new crops. The gentleman from California, Mr. Brown, a member of this committee, has expressed a particular interest in seeing that we give appropriate consideration, recognition, and funding to efforts such as yours. I think this is exactly what we had in mind because, obviously, the two areas in which you have worked offer such great hope and promise, not only toward helping us utilize the marginal agricultural lands, but helping us to become self-sufficient in some areas in which we could obviously be deficient in a relatively short period of time. Therefore, I commend you for your work.

I see nothing inconsistent with what you are doing and what we contemplate being done under the mechanisms of this proposed legislation. I commend you.

Facetiously, I referred to the plant as a Texas cotton plant. I do not believe that is what it is. [Laughter.]

Mr. VIETMEYER. It comes from Texas.

Mr. DE LA GARZA. Yes, it is a Texas plant.

Mr. HIGHTOWER. From where did the plant come?

Mr. ROLLINS. Trans-Pecos, Tex., from the Pecos River west of the big bend country.

Mr. HIGHTOWER. Is this being grown commercially now?

Mr. ROLLINS. Not as far as we know. The Mexicans have collected the plants for processing guayule from the wild, but they go off and gather the wild stands and bring them in to the processing plants.

Mr. WAMPLER. You mentioned a project being conducted by the Government of Israel. I understand from your statement that those results have been encouraging; is that right?

Mr. VIETMEYER. Very, very encouraging.

Mr. DE LA GARZA. Mr. Hightower?

Mr. HIGHTOWER. Dr. Rollins, this plant is grown in the wild, but it is not now commercially grown; is that correct?

Mr. ROLLINS. Yes. This is why so much research is needed. Although it was grown during the war, essentially the materials taken from the wild and grown for rubber production. Very little improvement has been made.

However, with all of our know-how in the improvement of plants, it would be possible, during the course of domestication of the plant, to really enhance the rubber content considerably, the range on which it would grow, the size of the plants, and so on.

We can cross it with other species—some of these species are as much as 12, 14, or 15 feet high.

Mr. HIGHTOWER. Where was it?

Mr. ROLLINS. California, Arizona, New Mexico, and Texas.

Mr. HIGHTOWER. Is this the same genetic family as sagebrush?

Mr. ROLLINS. Yes, it is. It belongs to the so-called sunflower family.

Mr. HIGHTOWER. Are any of the agricultural experiment stations now involved in this that you know of?

Mr. ROLLINS. Not that I know of.

Mr. HIGHTOWER. If someone were to begin to develop this now, how could they market the product? Is there any processing plant now available?

Mr. ROLLINS. There is none available in this country. The one processing plant in existence is a new one and a very modern one. It is in Mexico. This has been developed with the idea of having it on the cutting edge of the program that they are now undertaking to actually harvest the wild plant.

This seems to happen every 20 or 30 years. During the early 1900s, there were seven processing plants in existence and a large amount of guayule rubber was produced.

Mr. HIGHTOWER. Where was this?

Mr. ROLLINS. Two were in Texas. I think one was in Marathon, Tex. Maybe it was Shafter, Tex., or Alpine. The other plants were in Mexico.

A large amount of rubber was actually processed and brought to the United States during that period. It fell out of existence during the Mexican revolution. That was the thing that really stopped it as far as the Mexicans were concerned.

The shrub was exhausted in Texas by the harvesting.

Mr. VIETMEYER. In 1910, 50 percent of the Nation's rubber came from this shrub.

Mr. HIGHTOWER. Is the shrub cut and processed, or is it drained of something?

Mr. ROLLINS. It is cut and processed. The rubber is contained within the cells of the plant. It is necessary to crush it to get the rubber out by a process of flotation.

There are byproducts. The value of them is scarcely known, but it is known that various waxes and resins are produced as by-products.

Mr. HIGHTOWER. Does it have a deep root?

Mr. ROLLINS. Yes; extremely deep.

Mr. HIGHTOWER. I have quite a bit of mesquite in my country. Could this grow in country that is now good mesquite country?

Mr. ROLLINS. I think the area where guayule grows naturally—and that does not mean that the potential is not there for growth in the mesquite country—is mainly west of the mesquite region, but it certainly could come into the areas where mesquite now grows.

Mr. HIGHTOWER. You mean the drier areas?

Mr. ROLLINS. Yes. It now grows in drier areas than mesquite does.

Mr. HIGHTOWER. Mesquite requires so much water and it sends out such elaborate roots that I thought it might be comparable.

Mr. ROLLINS. It is in some ways, but not absolutely.

The present range of guayule is all the way down to San Luis Paltace in Mexico. Perhaps you can get some idea of the kind of area that it covers from that. It extends from the extreme southwestern part of Texas almost straight south.

Mr. HIGHTOWER. Dr. Rollins, do you happen to know if anyone in the Texas Agriculture Extension Service is involved in this research? Is any research being done in Texas today?

Mr. ROLLINS. Not that I know of. That does not mean that some might not be underway, but that I don't know about it if it is.

I must say to you that my experience with guayule was largely during the war period. I was a researcher in plant genetics and plant breeding during the period of the war. I did continue to work on it some after that on an independent basis, but this represents a new entry into looking into guayule.

Therefore, I am not necessarily the best one to say who might have an interest in it at this moment. I do know that the University of Arizona has started a program and they are beginning to work on some of the material at this time.

Mr. DE LA GARZA. Are there any other questions?

Mr. WAMPLER. Mr. Chairman, I have questions of the other witnesses.

Mr. DE LA GARZA. Go right ahead.

Mr. WAMPLER. Thank you, Mr. Chairman.

I had a brief statement that I wanted to direct to the testimony of Chancellor Robinson and Dean Dollahon. I want to commend both of them for their fine testimony here this morning from the American Association of State Colleges and Universities.

I would like to assure both of these gentlemen that, at least as far as I am concerned, I would be perfectly willing to include language during the markup, or at least strong language in the report accompanying the bill that the full committee will finally approve—as we did in our report last year—that, in the selection process, the Secretary of Agriculture would be strongly encouraged to select a college or university that belongs to the American Association of State Colleges and Universities to serve as one of the six representatives on the advisory board, at least as spelled out in my bill.

I would also like to further assure Dean Dollahon that it is my intention that the role of the State directors of experiment stations or cooperative extension services in the various research, extension, and teaching programs funded under my bill is one of coordination of these programs, only.

I will clarify this in an amendment to my bill which I will offer when the legislation comes up before the subcommittee or the full committee for markup.

Let me say that part of the concept of the bill that I have introduced is to broaden the base of agricultural research in this country to permit universities and colleges, private organizations, Government entities, and others who had normally been precluded for participating in the funding channels in the past to be included.

The uniqueness we would hope would be one thing that this would help promote.

I say this with all respect to one of our last witnesses who represents one of the great universities of our country, Harvard University. I happen to believe that there are a few brains scattered out in the hinterlands of America; that they are not all at Harvard, although it has made a great contribution.

Many of these institutions that your organization represents are doing a great job. It seems to me that the challenges and problems facing American agriculture need great research efforts. We need all the resources in this country—both public and private—to try to find workable answers to these problems.

I want to assure you, speaking for myself, that there is no design in this legislation at all to make it a "closed shop", if you please. We simply would invite you to participate, and a part of the function of the advisory board would be to set those priorities—both long range and short range—to look at all the proposals and, hopefully, to get some new and innovative thinking and research going.

This is what we need.

Permit me to make one observation, if I may, Mr. Chairman.

Dr. Burris, let me say that we welcome you here, as we do all the witnesses this morning. Your testimony was excellent. Your testimony held particular music to my ears because I have used two of the principal thoughts that you advanced this morning, particularly in the need for biological nitrogen research and also photosynthesis.

These are two areas that have been neglected in this country in terms of research. They offer such great hope and promise.

I know that, perhaps, in the past you and your colleagues in this particular discipline of biology have been bypassed. I do not think it has been deliberate, but I think the same thing applies to both public and private institutions of higher learning.

We would hope that this would be one of the first things that the new policy committee; that is, the fact of the need for more research in nitrogen fixation and photosynthesis would adopt as the two areas that have top priority.

I hope that happens.

As you well know, research is not something you turn off and on like a spigot. We are way behind here. We need to proceed forthwith.

I am happy to see that you brought up so many interesting applications of this. They apply not only to agricultural research, but to our need to achieve self-sufficiency in energy, and a policy of better utilization and better conservation of that which we have.

I have been concerned—as many members of this committee have—that there apparently is a limit to the amount of natural gas that we have available in this country. It is a basic feedstock of nitrogen fertilizer.

You are suggesting that there might be a better way of producing this without depleting this valuable resource. Thank you very much.

Mr. BURRIS. As a native of the plains of South Dakota, but currently a member of a land grant institution, I would like to make a response to Mr. Wampler's first comment.

The land grant institutions also welcome this bill, particularly the provisions that will make for open competition for the research funds. Certainly, they are not going to try to block the application or the implementation of the research from the other institutions.

We should broaden the base of our agricultural research.

I might mention, in relation to the last testimony, that there are certain arid land nitrogen fixing plants which I think have been neglected. For example, there are millions of acres in the west of a plant known as purschia. This is not a leguminous plant, but it is one of about 250 species of a nonleguminous plants that fix nitrogen very actively.

This group has been neglected because they are not crop plants, but, at the same time, they fix nitrogen actively and probably are responsible for the addition of larger amounts of nitrogen in the arid regions.

These are not rapid growing plants, but they are important in the overall ecology, and as another group in the far west that should be looked at carefully.

Mr. DE LA GARZA. I have a statement here from Congressman Abdnor. Without objection, that will be submitted in the record at this point.

We thank all the witnesses for being here.

The committee will reconvene at 2 p.m. in the main committee room, in room 1301.

With that, we thank you very much. We stand in recess until 2 p.m.

[Whereupon, at 12:20 p.m., the subcommittee stood in recess.]

[The prepared statement submitted by Mr. Abdnor follows:]

THE HONORABLE JAMES ABDNOR
BEFORE THE HOUSE AGRICULTURE SUBCOMMITTEE
ON DEPARTMENT INVESTIGATIONS, OVERSIGHT AND RESEARCH
MARCH 21, 1977

Mr. Chairman: I want to commend the subcommittee for the early action on legislation of great importance. The world's capability to feed and clothe itself is, and has been, to a large extent, dependent upon American agricultural research.

The need for this research, in my view, is more urgent today than it has ever been. An illustration of this need is found in an article in the Sunday, March 6, edition of the Washington Post citing that over 40 percent of the world's food is lost to pests. I would like to include this article for the record.

Mr. Chairman, I shall not impose on your time with a recital of facts and figures on the accomplishments of past research. Let me endorse early enactment of legislation enhancing agriculture research, by repeating comments I made before the full committee on March 1.

"First and perhaps least controversial, it is entirely appropriate for the federal government to support and foster research to improve the efficiency of our agricultural production, processing, transportation and marketing systems. As far as consumer prices are concerned it appears that the most room for improvement is to be found once the product leaves the farm gate. According to USDA's data on the farm-retail price spread, middlemen receive over 60 percent of the consumer's dollar and farmers receive less than 30 percent.

"There remain improvements to be made on the farm as well. Research efforts to improve farm production efficiency might well be directed toward discovering ways to lower costs of inputs, particularly energy, and to increase conservation practices. Farmers have come a long way in learning to deal with the vagaries of Mother Nature but we've still got a long way to go, as the drought amply attests."

Thank you.

Over 40% of World's Food Is Lost to Pests

By Thomas O'Toole
Washington Post Staff Writer

DENVER.—Almost half of the food produced in the world today is lost to pests, despite the fact that world pesticide use will reach a record 4.1 billion pounds this year.

That amounts to more than a pound of pesticide for every man, woman and child on earth, Dr. David Pimintel of Cornell University told the annual meeting of the American Association for the Advancement of Science, last month. He said that is an increase of 20 per cent in the last five years.

Progress is not being made against the world's pests, Pimintel and the University of California's Dr. Ray F. Smith said, because the pests are de-

veloping a growing immunity to pesticides and because so much pesticide is being used that it is destroying the predators and parasites that are the natural enemies of the pests.

"Fully 90 per cent of all the eggs and larvae of crop pests would be destroyed by their own natural enemies if we made better use of pesticide," Smith said at a press conference. "We're not doing any better than half that, because of our overuse of pesticide."

The leading users of pesticide are the Central American countries of El Salvador, Guatemala, Honduras and Nicaragua where 70 million pounds of insecticide are used to kill cotton pests every year. In El Salvador alone, an estimated 2,400 pounds are

used on every square mile of cotton fields. The tiny country consumes one-fifth of the world's parathion, a leading insecticide.

Cotton yields have not increased in Central America, Pimintel said, because overuse of insecticide has killed off the parasites that destroy the boll weevil and bollworm. At the same time, the indiscriminate use of pesticide is responsible for 4,000 to 5,000 human poisonings every year in Central America, he said.

Moreover, mosquito populations along the coastal plains of Central America have grown so resistant to pesticides that they have begun to carry and spread malaria in all four countries, the scientists said, in El

Salvador alone, the incidence of malaria rose from 25,000 cases three years ago to more than 80,000 last year.

Pimintel and Smith said that about 33 per cent of the food lost in the world is lost to pests before it can be harvested. Another 9 per cent is lost after harvest, much of it to rats before it can be marketed.

Dr. Max Milner of the Massachusetts Institute of Technology said that in one recent year rats consumed 30 per cent of the sugar and corn and up to 90 per cent of the rice harvested in the Philippine Islands. Milner said that in India alone it would take a train 3,000 miles long to haul the grain eaten by rats in a single year.

AFTERNOON SESSION

Mr. DE LA GARZA. The subcommittee will be in order.

We welcome this afternoon's witnesses. Before we proceed, I might inform the witnesses that, due to the long list of witnesses and the fact that we have legislation being considered on the floor, it might be necessary from time to time to call a recess should the Members need to participate in a vote on the floor of the House.

Also, if you have a prepared statement which you do not think that you could read in about 10 minutes, we would be very happy if you would submit your prepared statement, insert it in the record, and cite from it or give us a resume of it.

This is in order that we might accommodate all of the witnesses.

I would also like to apologize to the witnesses for a possible interruption. Sometime during the course of the afternoon, we may have the Secretary of Agriculture with us to testify on this legislation.

We would appreciate your kind and gracious cooperation in allowing the Secretary to testify immediately on his arrival. We may have to cut off one of the witnesses while you are testifying.

I hope that you will be understanding of this situation, and the time constraints that the Secretary has. I ask your indulgence in that matter should he be able to appear this afternoon.

With that, again, we welcome you here. We will be very happy to hear the first witness who is Dr. Charles E. Bishop, president of the University of Arkansas at Fayetteville.

[The statement follows:]

STATEMENT BY CHARLES E. BISHOP, PRESIDENT
UNIVERSITY OF ARKANSAS, FAYETTEVILLE, ARKANSAS

MARCH 21, 1977

MR. CHAIRMAN, I AM PLEASED TO HAVE THIS OPPORTUNITY TO TESTIFY IN SUPPORT OF THIS SUB-COMMITTEE'S EFFORTS TO DRAFT LEGISLATION DESIGNED TO STRENGTHEN OUR NATION'S AGRICULTURAL RESEARCH PROGRAMS, IMPROVE AGRICULTURAL POLICY FORMULATION, AND PROVIDE FOR MORE EFFECTIVE COORDINATION OF THE RESEARCH AND EDUCATION ACTIVITIES ENCOMPASSED IN THE NATION'S RESIDENT INSTRUCTION AND COOPERATIVE EXTENSION PROGRAMS.

THE CONGRESS TRADITIONALLY HAS PLACED A HIGH PRIORITY ON THE DEVELOPMENT OF OUR AGRICULTURAL RESEARCH AND EXTENSION PROGRAMS. HISTORY HAS DEMONSTRATED THE WISDOM OF THIS SUPPORT.

YET, THE ACHIEVEMENTS OF AGRICULTURE IN THE PAST ARE DWARFED BY ITS RESPONSIBILITIES AND ITS OPPORTUNITIES IN THE FUTURE. TODAY, AGRICULTURE AND ITS ASSOCIATED AGRIBUSINESS INDUSTRIES PERMEATE OUR DOMESTIC ECONOMIC PROSPECTS, OUR INTERNATIONAL TRADE, AND MANY OF THE MOST IMPORTANT CONSIDERATIONS OF OUR FOREIGN POLICY. IN THE FUTURE THESE RELATIONSHIPS UNDOUBTEDLY WILL ASSUME EVEN GREATER SIGNIFICANCE.

THE DOUBLING OF THE WORLD'S POPULATION IN THE NEXT QUARTER OF A CENTURY WILL PRESS FIRMLY AGAINST THE LIMITS OF THIS NATION'S SUPPLY OF FOOD AND FIBER. SERIOUS QUESTIONS CONFRONT US CONCERNING ENERGY SUPPLIES AND COSTS, THE AVAILABILITY AND QUALITY OF WATER FOR AGRICULTURAL USES, AND THE LONG-TERM PRODUCTIVE CAPACITY OF THE NATION'S LAND RESOURCES. IN THE SHORT RUN WE FACE FINITE LIMITATIONS TO OUR AGRICULTURAL

PRODUCTION. YET, WE HAVE THE RESPONSIBILITY TO FIND EFFECTIVE MEANS OF OVERCOMING THESE LIMITATIONS. IF WE DO SO, WE CAN MEET OUR WORLD-WIDE RESPONSIBILITIES, VASTLY STRENGTHEN OUR INTERNATIONAL POSITION, AND INJECT VALUABLE NEW LIFEblood INTO OUR DOMESTIC ECONOMY.

BUT WE HAVE ONLY ONE VIABLE MEANS OF CAPITALIZING ON THESE OPPORTUNITIES. IT IS TO DRAW ON THE ONE RESOURCE THAT IS NOT FINITE. THAT RESOURCE IS KNOWLEDGE. THERE IS NO EVIDENCE OF DIMINISHING RETURNS TO THE DEVELOPMENT OF KNOWLEDGE. INDEED, ONLY THROUGH THE EXPANSION OF THE KNOWLEDGE FRONTIERS CAN WE GREATLY INCREASE PRODUCTION FROM THE NATURAL RESOURCES THAT REMAIN AVAILABLE TO US.

OUR KNOWLEDGE RESOURCE IS A DIRECT FUNCTION OF OUR INVESTMENT IN AGRICULTURAL RESEARCH, INSTRUCTION AND EXTENSION PROGRAMS. MOST OF THIS INVESTMENT IS THROUGH THE PUBLIC SECTOR, AND THE PUBLIC HAS BEEN REWARDED BOUNTIFULLY IN RETURN. SEVERAL RECENT STUDIES INDICATE AN ANNUAL RATE OF RETURN OF 35 TO 40 PER CENT FOR EACH ADDITIONAL DOLLAR INVESTED IN THESE PROGRAMS.

THE SUCCESS OF THESE PROGRAMS IS LARGELY THE RESULT OF THE MANNER IN WHICH THEY HAVE BEEN PLANNED, FUNDED AND ADMINISTERED IN A COOPERATIVE AND TIGHTLY COORDINATED EFFORT. THE PROGRAMS DERIVE SUPPORT FROM LONG TERM FEDERAL, STATE, COUNTY AND PRIVATE INDUSTRY SOURCES. RESEARCH, TEACHING AND EXTENSION HAVE BEEN COORDINATED UNDER EFFECTIVELY ADMINISTERED AND FUNCTIONAL UMBRELLAS INVOLVING COOPERATIVE RELATIONSHIPS AMONG FEDERAL, STATE, AND LOCAL GOVERNMENTS AND INDUSTRY

AND CONSUMER REPRESENTATIVES. AS NEW KNOWLEDGE IS GENERATED, IT IS INCORPORATED INTO RESIDENT INSTRUCTION AND EXTENSION PROGRAMS AND TRANSMITTED TO THE PEOPLE WHO CAN IMPLEMENT IT IN AGRICULTURAL PRODUCTION, PROCESSING AND MARKETING ENTERPRISES.

BOTH URBAN AND RURAL CITIZENS HAVE HIGH STAKES IN EXPANDING AGRICULTURAL RESEARCH AND EDUCATION PROGRAMS IN ORDER TO MEET THE NEEDS FOR ADDITIONAL FOOD AND FIBER IN THE YEARS AHEAD. LET ME EMPHASIZE, HOWEVER, THAT WE MUST NOT CONCERN OURSELVES SOLELY WITH INCREASED PRODUCTION AND DO VIOLENCE TO THE PEOPLE AND COMMUNITIES IN RURAL AREAS IN THE PROCESS. AN EXPANDED RESEARCH AND EDUCATIONAL PROGRAM MUST PROTECT AND CONSERVE OUR NONRENEWABLE RESOURCES, WHILE INCREASING THEIR PRODUCTIVITY, AND DO SO WITHIN A CONTEXT OF IMPROVED, ENVIRONMENTAL, SOCIAL, AND ECONOMIC CONDITIONS FOR THE PEOPLE IN RURAL AREAS.

THE BILLS YOU ARE CONSIDERING, HR 4394 AND HR 4863, CONTAIN MANY OF THE ELEMENTS NEEDED TO STRENGTHEN THE AGRICULTURAL PROGRAMS UPON WHICH OUR COUNTRY AND THE WORLD ARE SO DEPENDENT. RATHER THAN DISCUSS SPECIFIC ITEMS WHICH WILL BE ADDRESSED BY MY COLLEAGUES THIS AFTERNOON, I WANT TO EMPHASIZE SELECTED GENERAL REQUIREMENTS WHICH I BELIEVE TO BE NECESSARY IN A BILL DESIGNED TO PRODUCE THE MOST EFFECTIVE AND PRODUCTIVE AGRICULTURAL RESEARCH AND EDUCATION PROGRAMS FOR A GIVEN INVESTMENT OF PUBLIC AND PRIVATE FUNDS.

THE ADVISORY COMMITTEE IN THE PROPOSED BILLS PLAYS AN IMPORTANT ROLE IN IMPROVING THE COORDINATION OF AGRICULTURAL

RESEARCH, EDUCATION AND EXTENSION ACTIVITIES WITHIN THE DEPARTMENT OF AGRICULTURE AND BETWEEN THE DEPARTMENT AND THE INSTITUTIONS OF HIGHER EDUCATION. THIS RELATIONSHIP BETWEEN THE DEPARTMENT AND THE LAND-GRANT INSTITUTIONS HAS BEEN A HIGHLY PRODUCTIVE PARTNERSHIP. HOWEVER, SINCE THE MAJOR PORTION OF THE SUPPORT FOR THE RESEARCH, RESIDENT INSTRUCTION AND EXTENSION PROGRAMS IS PROVIDED FROM STATE, COUNTY, INDUSTRY AND PRIVATE SOURCES, GREATER REPRESENTATION ON THE ADVISORY COMMITTEE SHOULD COME FROM THE LAND-GRANT UNIVERSITIES. I SUGGEST CONSIDERATION OF FOUR (4) REPRESENTATIVES FROM THE LAND-GRANT COLLEGES, FOUR (4) REPRESENTATIVES FROM THE STATE EXPERIMENT STATIONS AND FOUR (4) REPRESENTATIVES FROM THE STATE COOPERATIVE EXTENSION SERVICES.

BECAUSE OF THE MISSION-ORIENTED NATURE OF OUR AGRICULTURAL PROGRAMS, A CONTINUING AUTHORIZATION OF AT LEAST FIVE (5) YEARS IS ESSENTIAL FOR FORMULA FUNDING OF THE LAND-GRANT COLLEGE PROGRAMS. A PLANNING HORIZON OF THIS LENGTH IS NECESSARY FOR STABILITY AND EFFICIENT IMPLEMENTATION OF PRODUCTIVE RESEARCH AND EXTENSION PROGRAMS. I ALSO RECOMMEND THAT THE CURRENT PL 89-106 GRANTS PROGRAM WITH THE 1890 COLLEGES AND TUSKEGEE BE MADE A PART OF THIS FORMULA FUNDING BASE FOR THE AGRICULTURAL RESEARCH AND EDUCATION PROGRAMS. WITH SUCH FORMULA FUNDING, THESE INSTITUTIONS WOULD BECOME FULL MEMBERS OF THE LAND-GRANT COMMUNITY; AND THEY WOULD BE ABLE TO DEVELOP LONGER-RANGE RESEARCH PROGRAMS THAN IS POSSIBLE UNDER A GRANTS TYPE PROGRAM.

AN INCREASED LEVEL OF COMPETITIVE GRANTS FOR HIGH PRIORITY EDUCATION AND RESEARCH ACTIVITIES IS MANDATORY TO THE PROGRESS OF THESE PROGRAMS. THE COMPETITIVE GRANTS PROGRAM PERMITS DESIGNATED FUNDS TO BE PLACED IN INSTITUTIONS WHERE THE MARGINAL RETURN IS GREATEST. I WOULD, HOWEVER, ENCOURAGE YOU TO CONSIDER THE CHANNELLING OF COMPETITIVE GRANTS FOR EDUCATION PURPOSES THROUGH THE PRESIDENT'S OFFICES OF THE QUALIFYING INSTITUTIONS. THE PRESIDENT OF THE INSTITUTION AND HIS STAFF ARE IN THE BEST POSITION TO INSURE THAT THE EDUCATIONAL CAPABILITY OF THE RECIPIENT INSTITUTION IS COMPATIBLE WITH THE AREAS OF NEED WHICH HAVE BEEN IDENTIFIED. SIMILARLY, IN ORDER TO AVOID WASTEFUL DUPLICATION AND TO ENCOURAGE EFFICIENCY IN THE USE OF RESEARCH AND EXTENSION FUNDS, IT IS RECOMMENDED THAT THE DIRECTOR'S OFFICES OF THE STATE EXPERIMENT STATIONS AND COOPERATIVE EXTENSION SERVICE BE DIRECTLY INVOLVED IN THE COMPETITIVE GRANTS FOR RESEARCH AND EXTENSION PROGRAMS. ACCEPTABLE WORKING ARRANGEMENTS AND SAFEGUARDS MUST BE DEVELOPED WHEREBY STATEWIDE COORDINATION OF AGRICULTURAL PROGRAMS CAN BE ACHIEVED WITHOUT DUPLICATING EXPENSIVE RESEARCH FACILITIES AND EXTENSION DELIVERY SYSTEMS.

ONE OF THE SERIOUS LIMITATIONS TO IMPROVED AND MORE PRODUCTIVE BASIC AGRICULTURAL RESEARCH IS THE PRESSING NEED IN MOST INSTITUTIONS FOR FUNDS FOR MODERN FACILITIES AND EQUIPMENT. BECAUSE OF FUNDING LIMITATIONS PROHIBITING THE ACQUISITION OF FACILITIES AND EQUIPMENT REQUIRED FOR COMPLEX BASIC RESEARCH, MANY SCIENTISTS HAVE BEEN FORCED TO TURN TO LOWER COST APPLIED RESEARCH. OVER THE LONG RUN SUCH ACTION

IS SELF-DEFEATING. I, THEREFORE, ASK THAT RENEWED EMPHASIS AND INCREASED FUNDING OF FACILITIES AND EQUIPMENT FOR ADDITIONAL BASIC AGRICULTURAL RESEARCH BE INCLUDED IN YOUR BILL.

YOU HAVE BEFORE YOU A BILL WHICH, IF ENACTED AND FULLY FUNDED, WOULD GREATLY EXPAND OUR KNOWLEDGE BASE AND STRENGTHEN OUR NATIONAL AGRICULTURAL CAPABILITY.

Mr. DE LA GARZA. Thank you very much, doctor. We invite you and all the other witnesses, by the way, to present your testimony and then, if it possible for you to remain available for questions at the end of the session when we might have all the witnesses together, we would appreciate it.

Mr. BISHOP. Thank you.

Mr. DE LA GARZA. Mr. Delano, I must apologize. You were the first witness on the list and I mistakenly skipped your name.

We will be very happy to hear from you at this time.

Mr. WAMPLER. Mr. Chairman?

Mr. DE LA GARZA. Mr. Wampler?

Mr. WAMPLER. I would like to present Mr. Delano to the committee.

In addition to being a fellow Virginian, Mr. Delano is president of the Virginia Farm Bureau Federation. I have known him for many years, since we were schoolmates at our land-grant university in Virginia.

He has been before our committee on a number of occasions in the past. I am sure he will have an excellent statement for us again today.

I want to welcome him here.

Mr. DE LA GARZA. Thank you very much, sir. We join you in the welcome.

You may proceed, Mr. Delano.

[The prepared statement of the American Farm Bureau Federation, submitted by Mr. Delano, follows:]

Statement of Robert B. Delano, Vice President
 Representing American Farm Bureau Federation
 425 13th Street, N.W.
 Washington, D.C. 20004
 March 21, 1977

We appreciate the opportunity to present Farm Bureau's views on agricultural research. Farm Bureau is the largest general farm organization in the United States with a membership of 2,676,259 families in forty-nine states and Puerto Rico. It is a voluntary, non-governmental organization representing farmers and ranchers who produce virtually every agricultural commodity that is produced on a commercial basis in this country. As a consequence, we have a deep interest in basic and applied agricultural research which will help us meet our food and fiber needs today and in the future.

Farm Bureau policy has always stressed the importance of agricultural research. The voting delegates of the member State Farm Bureaus at the 1977 annual meeting of the American Farm Bureau Federation adopted the following policies:

"Research

"Adequate research is the basis for more efficient production and marketing; lower costs; and new food, forest, and fiber products. This leads to improved living for all Americans.

"Expanded research is needed to improve the productivity of crops in terms of yield per acre and nutritional value and the conversion of feed to livestock products to assist in meeting increasing world food needs.

"We strongly support continued research to find (1) solutions to national energy problems, (2) better solutions to agriculture's environmental concerns, (3) acceptable controls for diseases, noxious weeds, and insects, (4) new crop varieties with higher nutritional values and varieties suited to mechanical handling and processing, (5) cultural practices to improve soil and water conservation, (6) solutions to marketing problems, (7) additional uses for agricultural byproducts.

"The major agricultural research agencies should be the Land Grant institutions. Control of these institutions should remain at the state level.

"The agricultural research programs carried on by the Land Grant colleges should include both basic and applied research.

"The trend toward centralization--caused in part by the increases in the percentage of research funds allocated to federal installations--should be reversed. Many of the facilities of the State Experiment Stations have become obsolete. We urge funding of the State Agricultural Experiment Stations Research Facilities Act. We encourage interstate cooperation to intensify research effort and to avoid duplication.

"Future federal research facilities should be located in or near Land Grant college facilities, where practical, so as to further interagency cooperation."

"Research Foundation

"The need for a farmer-financed and controlled research service becomes increasingly urgent as farm costs rise, profits shrink, and farming becomes more technical. This need can be met in part by supplementing the research work of Land Grant universities. There are problems, however, which may be researched more objectively by agencies which rely on private rather than public financing."

"The American Farm Bureau Research Foundation was established to initiate and coordinate research work in areas of particular need such as marketing, credit, management, costs, pricing, and farm profits. The Research Foundation is prepared to contract any needed research work wherever it can be done most economically and effectively. The cost of research work is financed by contributions from individuals, bequests, memorials, gifts to honor deceased Farm Bureau leaders, and grants from business and other foundations."

* * * * *

"Transportation research

"Transportation and other marketing research is not receiving an adequate share of the USDA research dollar. The regionalization of this research effort through the Agricultural Research Service has downgraded it and made it less effective. We favor action by the Secretary of Agriculture and the Congress to reexamine the present marketing and transportation research effort."

"We strongly supported efforts of this Committee to enact H.R. 11743, the National Agricultural Research Policy Act of 1976. We believe the importance of agricultural research was clearly recognized by the Members of the House when they passed that legislation by a 373 to 7 vote last year. Unfortunately, the Senate was not able to take action on similar legislation before adjournment. We commend Congressman Wampler and his associates for their leadership in efforts to update the statutory authorizations for agricultural research both last year with H.R. 11743 and again this year with H.R. 78 and an amended version of that bill (H.R. 4394)."

"We support the provisions of H.R. 4394 which recognize the need for research in all segments of agriculture and our food system. Food distribution accounts for a larger share of the consumer's food expenditures than raw agricultural products. As a consequence, additional research is needed in processing, marketing, and transportation as well as the factors which affect the production of raw products."

"We urge this Committee to move quickly and to recommend passage of legislation to authorize a much needed increase in the federal funding of agricultural research. As the USDA and the state agricultural experiment stations have already demonstrated, any monies invested in agricultural research will return rewarding benefits."

Mr. DE LA GARZA. Thank you very much, Mr. Delano. We invite you to remain and be available for questions.

Our next witness is Dr. R. D. Morrison, president of the Alabama Agricultural & Mechanical University, Normal, Ala.

[The prepared statement submitted by Mr. Morrison follows:]

STATEMENT OF RICHARD DAVID MORRISON
PRESIDENT
ALABAMA AGRICULTURAL AND MECHANICAL UNIVERSITY

Mr. Chairman, members of the Committee: My name is Richard David Morrison. I am the President of Alabama A. and M. University--a land-grant institution. I thank you for the opportunity to testify here today on behalf of the land-grant universities, especially those colleges of 1890, including Tuskegee Institute. With me today, and supporting this statement are:

1. Dr. Lewis C. Dowdy, President
North Carolina A. and T. State University
2. Dr. Luther H. Foster, President
Tuskegee Institute
3. Dr. Alvin I. Thomas, President
Prairie View A. and M. University
4. Dr. C. A. Williams
Executive Vice President
Alabama A. and M. University

These institutions came into being by the Second Morrill Act of 1890.

Their mission follows quite closely the mandates of the 1862 land-grant system--teaching, research and extension.

We support the idea of devising new legislation that will enhance the possibility for land-grant institutions to meet people's needs in a fuller, more adequate manner than is presently the case. This Bill is quite comprehensive and the tenets have merit in terms of support for our agricultural system in general and land-grant institutions in particular.

On behalf of the colleges of 1890 and Tuskegee Institute, I thank Mr. Wampler and Mr. Foley for remembering us and for including us in this Bill.

Our deep concern and my major reasons for wanting to testify before this committee, particularly Section 8, subtitle (1) and subtitle (2) are: First, we have facts regarding our teaching, research and extension capability; and that any study at this time would not likely produce facts we do not now have. Our reviews and evaluations in both research and extension have been impressive and show that 1890 land-grant institutions and Tuskegee Institute can do quality and creditable work based on needs of people.

Secondly, a study into the feasibility of extending the Act of March 2, 1887 (known as the Hatch Act) would delay action for one year or more, and we believe that a suitable mechanism can be developed that would meet the objectives of the 1890 land-grant institutions and be supported by the total land-grant community.

Thirdly, since FY 1972, the colleges of 1890 and Tuskegee Institute have received funds for research under P. L. 89-106 and funds for extension under Smith-Lever 3(d). These funding arrangements, Mr. Chairman, are less than desirable in terms of providing continuous resources for viable and definitive programs of research and Cooperative Extension. Therefore, it is not only desirable, but essential that research and extension efforts at our institutions be funded on a more solid basis than is now the case--funded in the same manner as the 1862 land-grant institutions.

Fourth, in order for the colleges of 1890 and Tuskegee Institute to function according to the land-grant philosophy, the following objectives must be met:

1. Permanent funding for research and extension programs to the extent that staff may be employed on a permanent basis.
2. Continuous funding of research and extension programs to insure stability and continuity of program efforts.
3. Adequate funding, initially and continuously, for research facilities.
(Be it remembered that the 1890 institutions have never received any federal funds for facilities; therefore, there is an urgent need for funding in this area.)
4. Full partner in the land-grant community--teaching, research and extension efforts--become a part of all formulas funding, specifically research and extension.

Of necessity, there must be cooperation between and among all land-grant institutions, nationally, regionally and locally. We fully support an integrated approach; not separatism. However, we strongly seek individual institution integrity. I do not want to be over sensitive, nor do I want to be too timid about this subject. The 1890 land-grant institutions must have the full right and opportunity to develop, implement and evaluate research and extension programs in keeping with the full intent of the Hatch and Smith-Lever Acts. In addition, these institutions must have autonomy in terms of prioritizing program efforts and in terms of resource allocations--financial and staff. This means that 1890 land-grant

institutions are responsible both in terms of budget (financial) and personnel managment.

Mr. Chairman, I believe all of these are within our reach and should be included in any new legislation dealing with research and extension efforts. We have language for both research and extension for the 1890 component that we believe, if enacted, would accomplish our objectives. We would be happy to provide this language for the record.

Those of us who have followed the work of these institutions know about their accomplishments. I would like permission to include for the record proven research performance of the 1890 land-grant institutions and Tuskegee Institute. Not only have these institutions been outstanding in research and extension programs, but more importantly, they have provided opportunities through which Black American students and others may develop their skills and abilities for making noteworthy contributions to a society which they are a part.

Finally, let me repeat, it is highly essential that colleges of 1890 land-grant and Tuskegee Institute become more fully members of the land-grant community with adequate and continuous funding for research and Cooperative Extension programs. We request that these institutions be recognized for what they are and what they can be in terms of essential resources for meeting needs of a large segment of society not now in the mainstream as well as those who are more fortunate. We request that 1890 institutions and Tuskegee Institute be represented on important committees, advisory boards, and policy boards relating to research, extension, and teaching in the food and agricultural sciences.

Mr. DE LA GARZA. Thank you very much, Dr. Morrison. We welcome and appreciate the presence of the representatives of Tuskegee and the 1890 institutions.

Without objection, your supplemental statement on Tuskegee and additional material will be held in the committee files.

[The additional material submitted by Mr. Morrison is held in the committee files.]

Mr. DE LA GARZA. We welcome as our next witness Dr. John S. Robins, dean of agriculture, Washington State University.

We will be happy to hear from you at this time, doctor.

[The prepared statement submitted by Mr. Robins follows:]

STATEMENT OF JOHN S. ROBINS
DEAN OF AGRICULTURE
WASHINGTON STATE UNIVERSITY

My name is John Robins. I am Dean of Agriculture at Washington State University and I currently serve as Chairman of the Division of Agriculture of the National Association of State Universities and Land-Grant Colleges. I am pleased to appear here in that latter capacity to support the principles underlying the provisions of the several bills now before this committee that relate to agricultural sciences, and in particular, HB-4349 as introduced by Chairman Foley and Congressmar Wampler and HB-4863 sponsored by Congressman Thornton.

I certainly concur in views widely held concerning the importance of our national agricultural resource and the vital role of our agricultural science system in the development of that resource. And as we move forward in the last quarter of this century and through the next one, it is quite clear that our science and education community will be increasingly challenged to provide the science base, the technology, the trained manpower, and the information and educational programs to assure the continued vitality of our food and agricultural system and the health and stability of rural America.

And beyond the national scene, our agricultural science system is and will continue to be called upon to assist in the monumental task of developing capability around the world to feed, clothe and shelter an exploding world population. That task will remain an ever-present and escalating challenge for many decades. It is of such proportions as to be perhaps our ultimate challenge. We continue to search for ways to maximize our contribution to that arena and will continue to do so.

Returning now to the legislation before the committee, I would like to make just a few observations. We in the Land-Grant Colleges along with our colleagues in U.S.D.A. and in the private sector have expressed concern for at least 15 years at the diminishing strength of our research and education system supportive of agriculture and forestry as measured against the size and increasing complexity of the tasks facing us. Events of the past 5 years have led others to join in similar expressions.

At the heart of these concerns is the observation that research simply cannot adequately address the widening array of problems--problems of broadening scope and increasing complexity and difficulty--that face our food and agricultural system and our rural communities with a static base of resources. And that has been essentially the state of affairs for many years. Neither can those problems be adequately addressed without a larger and well-trained manpower pool and a strengthened system of technology transfer and information delivery. In research, the federal budget in deflated terms has, in fact, declined from the level of 1966. In extension education, except for the special nutrition education funds, the same applies. In teaching, the basic federal funding supportive of the Land-Grant Colleges has not been updated since the early 1960's.

Secondly, we believe that the U. S. Department of Agriculture could and should take a stronger leadership role for food and agricultural sciences in the federal government, including planning evaluation and coordination as well as taking initiative for assuring adequate programs and levels of support to respond to identified needs.

Thirdly, we observe need for strengthened interaction between the agricultural science community and user groups. This need runs far beyond the relations problem. Input by these groups is vital to the research planning process and better assures relevance and utility of its output.

Finally, there needs to be a wider participation of scientists and educators from all institutions to assist in solving the problems facing agriculture and forestry, especially those in the basic sciences that undergird the applied disciplines. Pushing back the frontiers of knowledge has always been the key to breakthroughs in practical technology.

These needs are well summarized in a resolution passed on February 21 of this year by the Executive Committee of the National Association of State Universities and Land-Grant Colleges which encourages efforts aimed at legislation that encompasses the following:

1. a substantial new public investment in food and agricultural research, with emphasis on basic research, and including expanded effort on such fields as human nutrition, animal diseases, and forestry, as advocated in President Parks' press conference of October, 1973 and reaffirmed by Senate Resolution in November, 1974,
2. a focus of policy and program leadership in the Department of Agriculture to enhance the long-standing partnership with our universities and to improve coordination and communication,
3. improved relationships among the teaching, research and extension functions in the university and better communications with user groups, including consumers and environmentalists,
4. wider participation of educators and scientists in both Land-Grant and non Land-Grant universities, and including the acceptance of 1890 land-grant colleges and Tuskegee as full partners in the community of institutions.

We in the Universities' Colleges of Agriculture agree with these needs and believe that elements of the several bills before this committee and especially HB-4349 and HB-4863 respond in principle and substance to them. We commend Mr. Wampler and the Chairman, Mr. Thornton, and others in the committee for their aggressive and forthright efforts to provide the needed strengthening of the science support system through this legislative initiative.

I can assure you that the Land-Grant and other relevant institutions stand ready to meet the challenges of the future including the conduct of the necessary research, the development of manpower, and the extension of the output of research through that manpower as our roles in a total coordinated effort, given the resources to do so. I hope and trust that those resources will be forthcoming and believe that a highly responsive mechanism to assist to that end can emerge from the legislative agenda now being addressed by this committee.

Mr. DE LA GARZA. Thank you, doctor. We invite you to remain and be available for questions.

The next witness is Dr. R. D. Rouse, dean of the school of agriculture and the director of agriculture experiment station, Auburn University.

[The prepared statement with attachments thereto submitted by Mr. Rouse follows:]

PRESENTED: DR. R. DENNIS ROUSE, DIRECTOR
 ALABAMA AGRICULTURAL EXPERIMENT STATION
 DEAN, SCHOOL OF AGRICULTURE
 AUBURN UNIVERSITY
 AND CHAIRMAN

EXPERIMENT STATION COMMITTEE ON ORGANIZATION AND POLICY (ESCOP)

I AM HONORED TO APPEAR BEFORE YOU AS CHAIRMAN OF THE EXPERIMENT STATION COMMITTEE ON ORGANIZATION AND POLICY (ESCOP) REPRESENTING THE 56 DIRECTORS OF STATE AGRICULTURAL EXPERIMENT STATIONS, TO SPEAK IN SUPPORT OF H.R. 4394 AND H.R. 4863. WITH ME IS DR. GEORGE BROWNING, EXECUTIVE VICE-CHAIRMAN OF ESCOP, DR. JIM ANDERSON, CHAIRMAN OF OUR LEGISLATIVE COMMITTEE, AND DR. JIM BEATTIE, CO-CHAIRMAN OF ARPAC'S RESEARCH STRATEGIES COMMITTEE. ALTHOUGH ESCOP IS AN ORGANIZATION FOR THE STATE EXPERIMENT STATIONS, IN ORDER TO PROVIDE MAXIMUM COORDINATION AND COMMUNICATION, IT HAS AFFILIATE MEMBERS REPRESENTING THE RESEARCH ORGANIZATION OF FORESTRY SCHOOLS, THE RESEARCH ORGANIZATION OF 1890 LAND GRANT COLLEGES AND TUSKEGEE, THE RESEARCH COMPONENT OF SCHOOLS OF HOME ECONOMICS, AND THE RESEARCH INTEREST OF THE DEANS OF SCHOOLS OF VETERINARY MEDICINE. THESE INTERESTS ARE HERE TO SPEAK TO THESE CONCERNS. THEREFORE, ALTHOUGH I SPEAK FOR THE TOTAL AGRICULTURAL RESEARCH INTEREST OF THE DIVISION OF AGRICULTURE AND THE NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND GRANT COLLEGES (NASULGC), I WILL DIRECT MY REMARKS MOSTLY TOWARD THE INTEREST OF THE STATE AGRICULTURAL EXPERIMENT STATIONS.

WE COMMEND THE AUTHORS OF THESE BILLS FOR THEIR INITIATIVE IN DRAFTING LEGISLATION TO IMPROVE THE AGRICULTURAL RESEARCH CAPABILITY OF THIS NATION. A MAJOR STRENGTHENING OF AGRICULTURAL RESEARCH IS VITAL TO THIS NATION'S FUTURE.

DURING THE CENTURY SINCE THE ESTABLISHMENT OF THE UNITED STATES DEPARTMENT OF AGRICULTURE AND IN EACH STATE A LAND GRANT COLLEGE, A STATE AGRICULTURAL EXPERIMENT STATION, AND A COOPERATIVE EXTENSION SERVICE, A SYSTEM OF PUBLICLY SUPPORTED AGRICULTURAL RESEARCH HAS BEEN DEVELOPED IN THIS NATION THAT IS HELD AS THE ULTIMATE IN EFFECTIVENESS

THROUGHOUT THE WORLD. AMERICA IS INDEED THE ENVY OF THE WORLD BECAUSE OF THIS AGRICULTURAL SYSTEM.

INCREASES IN PRODUCTIVITY AND IMPROVEMENT IN PRODUCT QUALITY HAVE MADE THE AMERICAN CONSUMER THE RECIPIENT OF AN AGRICULTURAL BOUNTY UNPARALLELED IN THE HISTORY OF MANKIND. THIS TREMENDOUS PRODUCTIVITY HAS ENABLED THE AMERICAN FARMER TO SUPPLY DOMESTIC NEEDS AT REASONABLE PRICES AND ALSO MAINTAIN AN EXPORT CAPACITY SUFFICIENT TO SUPPLY MUCH OF THE WORLD'S NEEDS.

SCIENCE AND TECHNOLOGY AND THE APPLICATION OF THIS TECHNOLOGY IN THE PRODUCTION, PROCESSING, AND MARKETING OF AGRICULTURAL PRODUCTS ARE RESPONSIBLE FOR PRODUCING THE AGRICULTURAL BOUNTY WE TAKE FOR GRANTED. IT IS UNFORTUNATE THAT AGRICULTURAL RESEARCH HAS BEEN THE VICTIM OF DECLINING FEDERAL SUPPORT IN THE PAST TWO DECADES BECAUSE THE WORLD'S NEEDS FOR FOOD AND FIBER CONTINUE TO INCREASE EACH YEAR. AGRICULTURE AND MAN ARE A PART OF THE VASTLY COMPLEX BIOLOGICAL SYSTEM OF THIS EARTH -- A SYSTEM THAT IS NEVER STATIC. WITH MAN'S POPULATION INCREASING IN THIS NATION AND WORLDWIDE AT SUCH A FRIGHTENING RATE, COUPLED WITH THE VAGARIES OF CLIMATE AND WEATHER, IT IS FOOLHARDY NOT TO MAKE THE INVESTMENTS IN AGRICULTURAL RESEARCH NEEDED TO PROVIDE THE MAXIMUM DEGREE OF INSURANCE BY SCIENCE AND TECHNOLOGY. YET THERE HAS BEEN NO INCREASE IN AGRICULTURAL RESEARCH PURCHASING POWER AT THE FEDERAL LEVEL IN THE PAST 10 YEARS.

ONE OF THE STRENGTHS OF THIS SYSTEM HAS BEEN THE FEDERAL-STATE PARTNERSHIP. THE LACK OF INCREASED FEDERAL SUPPORT HAS SHIFTED THE BURDEN OF AGRICULTURAL RESEARCH IN THE STATE AGRICULTURAL EXPERIMENT STATIONS TO THE STATES. NOW ONLY 18 PERCENT OF THE SUPPORT FOR THESE STATIONS COMES FROM FEDERAL SOURCES, NOT VERY CONSISTENT WITH THE

REQUIREMENT THAT THE STATES PROVIDE FUNDS TO MATCH THE FEDERAL DOLLARS. NOT ONLY HAVE FUNDS BEEN INSUFFICIENT TO MAINTAIN EXISTING PROGRAMS, BUT A WHOLE ARRAY OF NEW PROGRAMS MADE NECESSARY BY ENVIRONMENTAL DEMANDS, ENERGY SHORTAGES, AND CONSUMER CONCERNS HAVE NECESSITATED SHIFTING OF RESOURCES TO MEET THESE NEEDS. THE END RESULT HAS BEEN FURTHER DETERIORATION OF THE CAPABILITY OF THE AGRICULTURAL EXPERIMENT STATIONS TO ADEQUATELY ENGAGE IN THE BROAD SCOPE OF MISSION-ORIENTED AND BASIC RESEARCH RESPONSIBILITIES ASSIGNED BY FEDERAL AND STATE STATUTES TO PROVIDE THE KNOWLEDGE BASE NEEDED FOR AMERICA TO ACHIEVE ITS POTENTIAL IN AGRICULTURE AND RURAL LIFE.

HOW COULD WE HAVE LET THIS HAPPEN? THOSE OF US WHO DEVOTE OUR LIVES FULL TIME TO AGRICULTURAL RESEARCH ASK THIS QUESTION OVER AND OVER. WE ENUMERATE MANY THOUGHTS, SUCH AS OUR SURPLUS OF A SHORT TIME AGO AND THE CHALLENGE OF "SPUTNIK." I'M SURE THE REASONS ARE MANY, BUT I WISH TO MAKE ONE POINT THAT IS IMPORTANT IN CONSIDERING THE LEGISLATION BEFORE US. UNTIL 1950 BASIC AND APPLIED RESEARCH HAD MARCHED HAND-IN-HAND STIMULATING AND MOTIVATING EACH OTHER. AT THAT TIME THE DECISION WAS MADE THAT THE PRODUCTIVE CAPACITY OF THIS NATION WAS SO GREAT IT DID NOT NEED TO BE GREATLY CONCERNED FOR THE PRESENT BUT IT HAD AN OBLIGATION TO PREPARE FOR THE DISTANT FUTURE AND MAKE SIGNIFICANT NEW INVESTMENTS IN BASIC RESEARCH TOWARD THAT END. NOW A SITUATION WAS CREATED AND DOLLARS DANGLED BEFORE THOSE WHO COULD DREAM OF RESEARCH THAT WAS NOT TAINTED WITH ANY USEFUL BENEFITS. AS MORE AND MORE FUNDS WERE DIRECTED AWAY FROM AGRICULTURAL PROBLEMS, THE AGRICULTURAL RESEARCH SCIENTISTS AND THEIR ADMINISTRATORS WERE LEFT ON THE OTHER SIDE TO ATTACK THE EVER INCREASINGLY COMPLEX PROBLEMS OF THE PRODUCER, THE CONSUMER,

AND THE ENVIRONMENTALIST. THERE SIMPLY WAS NOT SUFFICIENT FUNDING TO MAINTAIN THE NEEDED LEVEL OF USEFUL RESEARCH AND TO CARRY WITH IT BASIC RESEARCH TO UNDERGIRD APPLIED RESEARCH IN AGRICULTURE.

NOW WE FIND THAT OF THE TOTAL FEDERAL R&D DOLLARS ONLY 1.6 PERCENT IS DIRECTED TO FOOD AND AGRICULTURE WHEREAS 11.3 PERCENT IS ASSIGNED TO BASIC SCIENCE, 14.1 PERCENT TO SPACE, 10.5 PERCENT TO BIOMEDICAL, 9.7 PERCENT TO ENERGY, 5.6 PERCENT TO ENVIRONMENT, 4.4 PERCENT TO SOCIAL, AND 42.7 PERCENT TO DEFENSE. GENTLEMEN, 1.6 PERCENT FOR FOOD AND AGRICULTURE IS NOT EVEN HALF ADEQUATE.

CORRECTIVE ACTION MUST NOW BE TAKEN TO MEET OUR NATION'S NEED IN FOOD AND FIBER PRODUCTION AND IN HUMAN NUTRITION. I HAVE SEVERAL POINTS TO MAKE THAT THIS RESEARCH COMMUNITY CONSIDER IMPORTANT, BUT THE OVERRIDING POINT, AND IF I COULD MAKE ONLY ONE, IT WOULD BE THIS -- AGRICULTURAL RESEARCH IN THIS NATION IS AILING BECAUSE OF LACK OF ADEQUATE FUNDING; NOT BECAUSE THE SYSTEM IS UNSOUND. ALL OF THE MANY STUDIES MADE ATTEST TO THE VALIDITY AND EFFECTIVENESS OF THIS FEDERAL-STATE PARTNERSHIP. THEREFORE, IT IS OUR PLEA THAT LEGISLATION GO FORWARD WITH A CLEAR PURPOSE TO COMPLEMENT, AUGMENT, AND SUPPLEMENT EXISTING STATUTES BUT IN NO WAY TO REPLACE THEM OR DECREASE THEIR EFFECTIVENESS. THEY PROVIDE THE STRONG BASE ON WHICH THE STRENGTH OF THIS NATION'S SCIENCE AND TECHNOLOGY IS FOUNDED, AND WITHOUT SUCH A STRONG BASE NO AMOUNT OF GRANT FUNDING WILL ADEQUATELY SERVE THIS NATION AGRICULTURALLY. BOTH H.R. 4396 AND H.R. 4863 STATE CLEARLY THE PURPOSE OF THEIR LEGISLATION IS TO COMPLEMENT, AUGMENT, AND SUPPLEMENT EXISTING STATUTES BUT WE CONSIDER IT SO IMPORTANT FOR THE COMMITTEE TO UNDERSTAND AND APPRECIATE THE HIGH PRIORITY WE PLACE ON SUPPORT FOR OUR BASE LEGISLATION FOR RESEARCH, THE HATCH ACT FOR THE AGRICULTURAL EXPERIMENT STATION AND THE ORGANIC ACT FOR THE DEPARTMENT OF AGRICULTURE THAT WE TAKE THIS VALUABLE TIME TO

REEMPHASIZE THIS HERE. CERTAINLY THE OTHER FUNDING STATUTES ARE IMPORTANT BUT THESE ARE THE BASE THAT MAKES ALL OTHERS PRODUCTIVE.

BOTH BILLS CLEARLY ESTABLISH THE USDA AS THE LEAD FEDERAL AGENCY IN FOOD AND HUMAN NUTRITION RESEARCH AND PROVIDES A SEPARATE ASSISTANT SECRETARY FOR RESEARCH AND EDUCATION. WE CONSIDER BOTH OF THESE IMPORTANT.

WE ARE CONCERNED ABOUT THE STRUCTURE FOR COORDINATION SET FORTH IN EACH BILL. WE RECOGNIZE THAT ESTABLISHING USDA AS LEAD AGENCY IN FOOD, NUTRITION, AND AGRICULTURAL RESEARCH REQUIRES COORDINATION AT THE FEDERAL LEVEL. H.R. 4863 PROVIDES CLEARLY FOR THIS UNDER SECTION 102 BY AN AMENDMENT TO THE NATIONAL SCIENCE AND TECHNOLOGY POLICY, ORGANIZATION, AND PRIORITIES ACT OF 1976 AS AMENDED.

WITH USDA THE LEAD AGENCY IN THE FEDERAL GOVERNMENT, WE NEED TO CONSIDER WHO IS CONDUCTING PUBLICLY SUPPORTED FOOD AND AGRICULTURAL RESEARCH IN THIS NATION. THE RECORD SHOWS THAT 60 PERCENT IS BEING CARRIED OUT IN THE STATE AGRICULTURAL EXPERIMENT STATIONS AND THEY RECEIVED ONLY 18 PERCENT OF THEIR SUPPORT FROM FEDERAL DOLLARS. THEREFORE, AS A NATION, OUR FIRST CONCERN IS THE DEVELOPMENT OF A SOUND NATIONAL POLICY ON FOOD AND AGRICULTURAL RESEARCH AND THE FEDERAL POLICY SHOULD BE SUPPORTIVE OF IT. HISTORICALLY, THE RESEARCH ARMS OF THE USDA AND THE AGRICULTURAL EXPERIMENT STATIONS HAVE WORKED AS PARTNERS, A STATE-FEDERAL PARTNERSHIP. ALTHOUGH WE SUPPORT THE NEED FOR AN ADVISORY COMMITTEE STRUCTURE, WE DO NOT SEE THAT THE "AGRICULTURAL RESEARCH EDUCATION POLICY ADVISORY COMMITTEE" PROVIDED FOR IN H.R. 4863 OR THE "NATIONAL AGRICULTURAL RESEARCH, EXTENSION, AND TEACHING POLICY ADVISORY BOARD" PROVIDED FOR IN H.R. 4394 WILL PROVIDE THE KIND OF OBJECTIVE ADVISORY COMMITTEE

NEEDED TO ADEQUATELY SERVE THIS NATION'S NEEDS IN THIS FEDERAL-STATE PARTNERSHIP. WE BELIEVE THE ADVISORY COMMITTEE SHOULD BE MADE UP OF THOSE WHO BENEFIT FROM RESEARCH BUT THE PLANNING AND COORDINATING OF RESEARCH MUST BE DONE BY THOSE WHO HAVE BEEN ASSIGNED THE RESPONSIBILITY FOR DOING THE RESEARCH.

THE PROCESS THAT IS IN USE AND HAS BEEN SINCE 1969 IS A MEMORANDUM OF AGREEMENT BETWEEN THE PRESIDENT OF NASULGC AND THE SECRETARY OF AGRICULTURE WHICH ESTABLISHED AN AGRICULTURAL RESEARCH POLICY ADVISORY COMMITTEE (ARPAC) WITH REPRESENTATION OF THOSE RESPONSIBLE FOR RESEARCH; STATE AND USDA. THIS COMMITTEE THEN ESTABLISHED A NATIONAL PLANNING COMMITTEE AND REGIONAL PLANNING COMMITTEES. THE USERS INPUT IS MADE AT THE REGIONAL LEVEL ON A REGULAR BASIS AND AT THE NATIONAL LEVEL ON AD HOC BASIS SUCH AS THE KANSAS CITY FOOD CONFERENCE. THE PRESENT WORDING IN ALL BILLS INTRODUCED SEEM TO SIMPLY ADD TO AND NOT REPLACE OR PROVIDE A SUBSTITUTE FOR THE EXISTING STRUCTURE. WE QUESTION IF THEY WILL NOT DECREASE PRODUCTIVITY OF RESEARCH RATHER THAN ADD TO ITS PRODUCTIVITY. WE BELIEVE IT IS VERY IMPORTANT THAT THIS MATTER BE GIVEN A THOROUGH EVALUATION. THIS ASSOCIATION HAS BEEN WORKING WITH THE USDA TO DEVELOP A STRUCTURE THAT MEETS THE NEEDS FOR PLANNING AND COORDINATION AND ALSO PROVIDES ADEQUATE INPUT FROM USERS AT THE NATIONAL LEVEL. WE REQUEST PERMISSION TO SUBMIT OUR CONSENSUS RECOMMENDATION AT A LATER DATE.

BOTH H.R. 4394 AND 4863 PROVIDE FOR A NEW PERSPECTIVE TO RESEARCH GRANTS AND WE ARE SUPPORTIVE OF THIS CONCEPT. EACH HAS SOME DESIRABLE COMPONENTS NOT PRESENT IN THE OTHER. H.R. 4863 PROVIDES SPECIFICALLY FOR NEW CROP RESEARCH. WE REQUEST THAT THIS BE EXPANDED TO INCLUDE NEW FOOD ANIMAL RESEARCH. IN ADDITION TO

POTENTIAL NEW CROPS, THERE IS GREAT POTENTIAL FOR EXPANDING THE KINDS OF USEFUL ANIMALS, ESPECIALLY AQUATIC FOOD ANIMALS. IT ALSO PROVIDES FOR SUPPORT OF SCIENTISTS IN OTHER NATIONS. THIS IS ESPECIALLY IMPORTANT AS WE LOOK FOR NEW PLANTS AND ANIMALS AND SEEK KNOWLEDGE OF DISEASES THAT ARE POTENTIAL HAZARDS TO THE AGRICULTURE OF THIS NATION OR, AS WE SEEK DISEASE ORGANISMS OR PARASITES THAT MIGHT BE USEFUL IN INTEGRATED PEST MANAGEMENT PROGRAMS.

ON THE OTHER HAND, H.R. 4394 HAS A VERY IMPORTANT DISCRETIONARY GRANT CAPABILITY THAT WOULD AUTHORIZE THE SECRETARY TO MAKE ONE-TIME DEVELOPMENTAL RESEARCH GRANTS FOR FOOD AND AGRICULTURAL RESEARCH THAT RESULTS FROM SUDDEN BREAKTHROUGHS IN BASIC OR APPLIED RESEARCH. THERE IS AN UPPER LIMIT OF \$100,000 WRITTEN INTO THE BILL, SECTION 5E, PAGE 24, LINE 7. WE REQUEST THAT THIS LIMIT BE DELETED. THE AMOUNT SHOULD BE AT THE DISCRETION OF THE SECRETARY. WITH THE COST OF INSTRUMENTATION, RENOVATION, AND CONSTRUCTION INCREASING SO RAPIDLY, IT IS NOT POSSIBLE TO PREDICT WHAT WOULD BE THE MOST PROFITABLE USE OF AVAILABLE FUNDS.

H.R. 4394 PROVIDES FUNDING FOR FACILITIES WHEREAS H.R. 4863 PROVIDES ONLY FOR A STUDY. ESCOP HAS, IN SEEKING SUPPORT FOR P.L. 88-74, MADE NUMEROUS STUDIES AND ANALYSES OF FACILITY NEEDS. THE NEEDS ARE SO GREAT OUR PLEA IS FOR A LEVEL OF FUNDING FOR CONSTRUCTION AND RENOVATION AT LEAST AS GREAT AS CALLED FOR IN H.R. 4394 TO ENABLE THE FEDERAL GOVERNMENT TO SHARE WITH THE STATES IN MAKING THE NEEDED MODERNIZATION OF AGRICULTURAL RESEARCH FACILITIES. WE CANNOT EXPECT TO ADDRESS THE COMPLEX PROBLEMS BEFORE US IN OUTDATED INADEQUATE FACILITIES. H.R. 4394 PROVIDES FACILITY FUNDS ONLY FOR STATE AGRICULTURAL EXPERIMENT STATIONS. WE REQUEST THAT THIS AUTHORIZATION BE AMENDED TO ALSO PROVIDE FUNDS FOR THOSE

INSTITUTIONS REFERRED TO AS 1890 LAND GRANT INSTITUTIONS AND TUSKEGEE INSTITUTE AND TO THOSE INSTITUTIONS ELIGIBLE FOR FUNDING UNDER P.L. 87-788. THIS BILL ALSO STIPULATES, SECTION 6B, PAGE 28, THAT FUNDS WILL REMAIN AVAILABLE FOR NOT MORE THAN 2 FISCAL YEARS. WE REQUEST THAT THIS BE EXTENDED FOR FIVE YEARS TO ALLOW TIME TO DEAL WITH STATE LEGISLATURES, ARCHITECTS, AND CONTRACTORS.

WE SUPPORT THE NEW EMPHASIS ON FOOD AND HUMAN NUTRITION RESEARCH IN BOTH BILLS. THIS NEED HAS LONG BEEN RECOGNIZED BY THE EXPERIMENT STATIONS. MUCH OF OUR CURRENT KNOWLEDGE BASE OF HUMAN NUTRITION HAS BEEN PROVIDED AS A RESULT OF THE ASTUTENESS OF OUR SCIENTISTS IN SPIN-OFF FROM ANIMAL NUTRITION RESEARCH AND WITH A MINIMUM OF ALLOCATION OF EXPERIMENT STATION FUNDS SPECIFICALLY FOR HUMAN NUTRITION RESEARCH.

WE SUPPORT THE NEW EMPHASIS ON ANIMAL HEALTH RESEARCH SET FORTH IN BOTH BILLS. THIS IS ANOTHER AREA RECOGNIZED OVER THE PAST MANY YEARS BY THE STATION DIRECTORS AS NEEDING SUBSTANTIAL ADDITIONAL EFFORT. IT HAS BEEN A HIGH PRIORITY AREA WITH US FOR ADDITIONAL SUPPORT BUT WITH LEVEL FUNDING AND CONTINUING ADDITIONAL DEMANDS, WE HAVE HAD TO DEPEND ON ARS IN THEIR NATIONAL LABORATORIES FOR THE MAJOR EFFORTS. THIS IS NOT ADEQUATE. ADDITIONAL FUNDING IS ESSENTIAL. THE SAME KIND OF STATE-FEDERAL PARTNERSHIP EFFORT IS NEEDED IN ANIMAL HEALTH AS IN OTHER PRODUCTION PROBLEM AREAS. IT IS IMPORTANT THAT THIS NEW LEGISLATION PROVIDE FOR A COORDINATED PROGRAM IN ANIMAL HEALTH BECAUSE MUCH OF ANIMAL HEALTH IS MANAGEMENT, GENETIC, PHYSIOLOGY, AND PATHOLOGY INTERRELATED. THEREFORE, EFFECTIVE FOOD ANIMAL PRODUCTION PROGRAMS MUST INCLUDE ALL FACTORS AFFECTING HEALTH AND THUS A CLOSE WORKING RELATIONSHIP BETWEEN THE STATION ANIMAL SCIENTISTS AND THE VETERINARY SCIENTISTS IS ESSENTIAL. THIS COORDINATION IS PROVIDED FOR IN BOTH H.R. 4394 AND H.R. 4863.

H.R. 4394 IN SEC. 7, PAGE 40 AND 41, AUTHORIZES THE SECRETARY TO EXPEND NOT TO EXCEED \$250,000 ANNUALLY IN CONTRACTING WITH THE NATIONAL ACADEMY OF SCIENCES OR OTHER NON-PROFIT GROUPS OR ASSOCIATIONS TO ASSISTING THE SECRETARY IN HIS EVALUATION OF THE PROGRAMS OF RESEARCH, EXTENSION, AND TEACHING IN THE FIELDS OF FOOD AND AGRICULTURAL SCIENCE. THE SECRETARY ALREADY HAS THIS AUTHORITY AND MOST SUCH CONTRACTS TAKE AWAY FROM THE PRODUCTIVITY OF OUR SCIENTISTS AND TEACHERS AND, THEREFORE, SHOULD ONLY BE MADE WHEN A NEED IS INDICATED. WE BELIEVE MOST SUCH STUDIES SHOULD BE MADE INHOUSE, THEREFORE, WE OBJECT TO THE INCLUSION OF THIS SECTION.

IN THE ATTACHMENT TO THIS STATEMENT, WE PROPOSE A FEW EDITORIAL CHANGES FOR EACH BILL THAT WE ASK CONSIDERATION FOR WITHOUT DISCUSSION.

I WISH TO THANK THE COMMITTEE FOR GIVING ESCOP THIS OPPORTUNITY TO APPEAR BEFORE YOU AND WE ALSO WANT TO EXPRESS TO YOU OUR APPRECIATION FOR THE FINE WAY YOUR COMMITTEE STAFF HAS WORKED WITH ESCOP AND THE AGRICULTURAL RESEARCH COMMUNITY DURING THE DRAFTING OF THIS LEGISLATION.

NOW AS A CLOSING STRONG POINT, JUST AS I BEGAN, WE HAVE IN THIS STATE-FEDERAL PARTNERSHIP THE BEST AND MOST PRODUCTIVE SYSTEM OF AGRICULTURAL RESEARCH IN THE WORLD. OUR PLEA TO YOU IS TO NOURISH IT WITH THIS LEGISLATION SO THAT AGRICULTURAL RESEARCH CAN SERVE THIS GREAT NATION MOST EFFECTIVELY.

Recommended Changes in H.R. 4863 by R. Dennis Rouse, March 21, 1977

Page 4, Line 22, Insert after agriculture "Forestry and Aquaculture".

Page 5, Lines 21 and 22, Delete "Livestock, Poultry, and Other" so as to assure the broad definition of animals essential to the Nation's food supply.

Page 6, Line 4, Insert after crops, "and animals,".

Page 6, Line 5, Insert after soils "and waters."

Page 6, Line 21, Change "twenty-one" to "twenty-three."

Page 8, Line 4, Change "two" to "four" so that the Experiment Stations of each of the 4 regions shall have representation.

Page 13, Line 1, Delete competitive.

Page 13, Line 4, Add after competitive "and selective."

Page 13, Line 22, Insert after of "new animal and."

Page 17, Line 11, Change "study" to "act" then insert Sec. 5(g) page 26, 27, 28, and 29 of H.R. 4394 and then follow with the study set out in Sec. 106 of H.R. 4863.

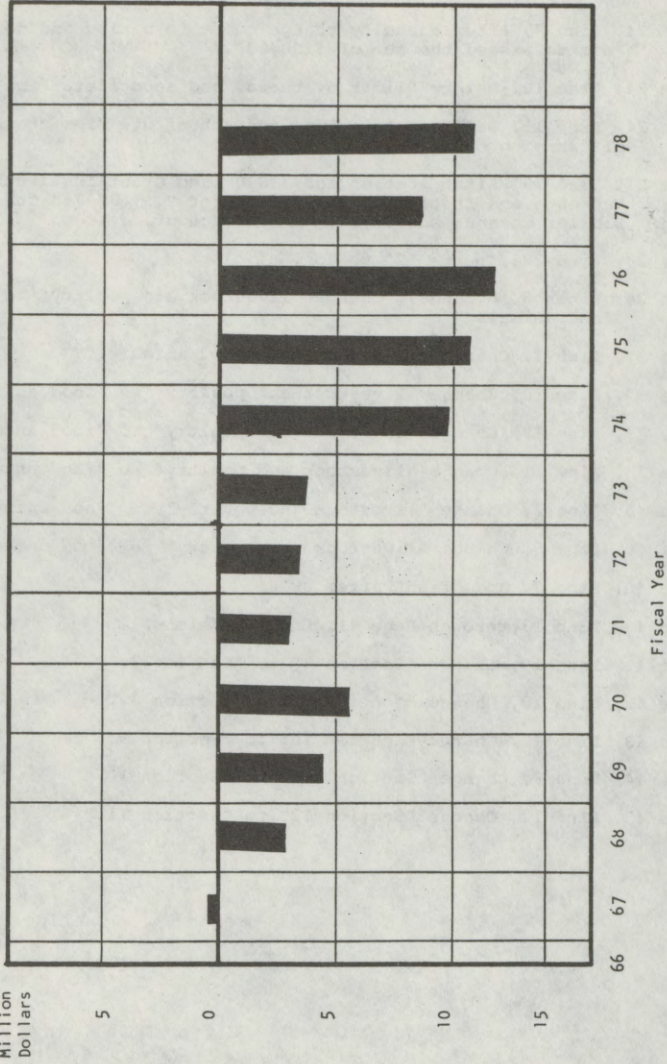
Page 25, Lines 8 and 9, Insert "and" delete "or" after Guam and change comma to period after Virgin Islands and delete all afterwards. This will limit this definition to those with Land Grant status. To bring in miscellaneous possessions would make administration very difficult.

Amendments to H.R. 4394 Recommended by ESCOP, March 31, 1977

- Page 6, Line 12, Delete "domestic livestock, poultry, and other" so as to be all inclusive of food animals.
- Page 24, Line 7, After annually change comma to period and delete "not to exceed the sum of \$100,000."
- Page 24, Line 10, Delete "limit overhead" and substitute "not allow."
- Page 24, Line 11, Delete entire line and substitute "for the purpose of carrying out these grants."
- Page 27, Line 19, After station add "1890 Land Grant Institutions and Tuskegee and Institutions eligible for P.L. 87-788 funds." Similar changes should be made throughout.
- Page 28, Line 22, Change "2" to "5".
- Page 26, Lines 5, 6, and 7, Change "livestock and poultry" to "food animals."
- Page 37, Line 2, Change "livestock" to "food animals."
- Page 37, Line 10, Change "livestock and poultry" to "food animals."
- Page 37, Line 17, Change "livestock and poultry" to "food animals."
- Page 37, Line 11, Change "livestock and poultry" to "food animals."
- Page 40, Line 2, Change "livestock and poultry" to "food animals."
- Page 40, Line 5, Change "livestock and poultry" to "food animals."
- Page 40, Line 7, Add "fish" after swine.
- Page 40, Line 13 through Page 41, Line 7, delete.
- Page 41, Line 10, Change "Section 8" to "Section 7."
- Page 42, Line 12, Change "Section 9" to "Section 8."
- Page 43, Line 17, Change "Section 10" to "Section 9."
- Page 44, Line 6, Change "Section 11" to "Section 10."
- Page 45, Line 12, Change "Section 12" to "Section 11."

HCORD 617
3/18/77

Hatch Funds, Payments to States, Required to Maintain FY 66 Level of Support After Adjustment for Inflation¹



¹ Assume an annual increase of 6% for FY 66-73 and 10% for FY 74-78.

Mr. DE LA GARZA. Thank you very much, Dr. Rouse. We appreciate your testimony. We invite you to remain for the balance of the hearing and be available for questions.

Mr. ROUSE. Thank you, sir. We request permission to submit our consensus recommendations at a later date.

Mr. DE LA GARZA. Without objection, so ordered. The next witness is Dr. David Call, director of cooperative extension, Cornell University.

[The prepared statement submitted by Mr. Call follows:]

STATEMENT OF DAVID L. CALL
DIRECTOR OF COOPERATIVE EXTENSION
STATE OF NEW YORK

My name is David Call. I am the Director of Cooperative Extension for New York State and am located at Cornell University. Currently, I am honored to serve as Chairman of Extension Committee on Organization and Policy (ECOP) of the Division of Agriculture of the National Association of State Universities and Land-Grant Colleges. I am pleased to have this opportunity to represent the other Directors of Extension and this statement will reflect their views for we have given these legislative thrusts a great deal of attention.

We strongly support the major concepts of the bills under consideration in that there definitely is a need for an increased initiative in food and agricultural research. As Directors of Extension, we can justify this increased need for research from our daily efforts to transfer the knowledge of the land-grant university and the U.S. Department of Agriculture to the farmers, families, youth and communities who are faced with increasingly complex decisions. We are on the firing line in the fields and the homes of America and see the desperate need for new knowledge to solve new and continuing problems.

Our first major point is to reemphasize the important nature of the joint effort by research and extension workers within this system to advance a common set of objectives. For approximately 60 years this partnership has advanced agricultural technology and the quality of life in the rural areas of the United States to the current high levels. As the educational arm of the U. S. Department of Agriculture and the land-grant universities, we have developed a process of technology transfer that is held in

high esteem throughout the world. Although extension work is often not as highly recognized or as glamorous as research, without it the research would often gather dust in a library.

Not only has Cooperative Extension provided for the dissemination of the results of research through this transfer of technology to citizen users, we have also provided the most important feedback from these users to the researchers at the universities and the U. S. Department of Agriculture. This feedback loop is an often overlooked component of the total research and extension system, but it is in many cases, the most important segment. Over the years we have developed many types of informal educational programs which allow us great flexibility in delivering information at a place and in a form best suited to the needs of local citizens. Drawing upon the broad base of expertise in the land-grant universities, we have been responsive in developing special educational programs addressed to important problems such as the quality of the environment, energy conservation, pest management, land use, water conservation and quality, marketing, consumer education, food and nutrition education and others.

The reason for this background statement is our concern that, of the bills under consideration, only HR 4394 directly addresses the extension side of this research-extension partnership. We view the continued flow of research-based information and its utilization as absolutely vital to the maintenance of a highly productive agriculture and informed citizenry. We urge the adoption of the significant new thrust for extension envisioned in HR 4394. We gratefully acknowledge the proposed increased

support provided for in this bill for we have seen the gradual erosion of purchasing power that has led to extension personnel reductions throughout the country. Last year alone we lost over 450 professional workers. Regrettably it appears FY 1977 may show an even greater reduction.

At a time when we are experiencing reductions in real funds at the local, state and national level we are also finding increased demands placed upon our system. For example, we have participated in the Pesticide Certification Training Program, explained OSHA requirements, initiated new pest management programs, handled millions of calls for information from nonagricultural audiences interested in urban horticulture, been actively involved in energy conservation programs, developed many innovative ways to get youth involved in productive experiences and so on.

We have adapted and shifted resources and become more efficient, but still the system is under great pressure. On top of these pressures, we recognize some major unmet needs where new and expanded programs are called for. The legislation before us presents an opportunity to plot some new directions on these unmet needs.

Nutrition Education

In HR 4394 there is a recommendation that increased attention be given to "education programs for human nutrition including food utilization for all segments of society." Our current Expanded Food and Nutrition Education Program which reaches the highest priority low-income audiences is an excellent example of a proven

program that is being starved to death through the lack of adequate funding. To date we have been able to reach less than 20% of the potential low-income families. The funding for this important program has remained stable since 1973 and we have seen a reduction of almost one third in the number of personnel assigned to it.

We strongly urge that this program conducted under Section 3(d) of the Smith-Lever Act as amended [7 U.S.C. 343(d)] be mentioned specifically in this type of legislation and be targeted for expansion. We could handle a doubling of funds with practically no start-up time and with very small increases in administrative overhead.

Forestry and Natural Resources

We also commend the specific reference in HR 4394 toward an increased extension effort for forestry, wildlife and natural resource programs.

In 1975, ECOP published a report, "Extension Education in Forestry," that drew attention to the critical need for an expanded effort in this area. Currently there is only one Extension Forester in Cooperative Extension for each 28,000 private woodland owners or one for each two million acres of privately-owned, nonindustrial forest land. These forest lands are one of our nation's most valuable resources and their potential contribution to the economic welfare of our country is only partially realized. A revitalized extension forestry program is essential if we are to enhance the potential value of these resources. We would welcome congressional support in this area and would be most happy to work with you in drafting even more specific legislation.

Small and Limited Resource Farmers

We are disappointed that HR 4394 did not identify the problem of reaching the limited resource farmers as a high priority area. Last year a special ECOP task force identified this as a top priority program for expanded funding. Based on pilot programs conducted in many states, we know we can reach this audience but it will take specially designed programs.

One of our directors recently made the following statement which expresses our views quite well:

"In many areas of the country there is just as wide a gap between the productivity and efficiency of the progressive farmer and the backward farmer as exists between the agriculture of the United States and many of the lesser developed countries. Many of our top farmers would succeed even without an Extension Service. They seek their own answers -- often going directly to the source. But the small, limited resource farmer needing help is the one least apt to seek it. If research is going to benefit him, he's got to be reached and sold on the advantages of changing many of his farming practices. If we don't incorporate an extension education component into new legislation, the magic ring of research could easily end up with a hollow sound."

Proposed Extension Evaluation

We would like to comment specifically on HR 4394 where in Section 5 (j) (3) it is proposed that a major evaluation of the economic and social consequences of extension programs be conducted by September 30, 1978. If it is the sense of Congress that such a study is necessary, we will be pleased to cooperate. However, we would suggest that a study of this scale, \$1.5 to \$2.5 million, would best be conducted over a two-year period with an interim report on September 30, 1978.

Summary

In summary, we commend this interest in expanding our nation's agricultural research capability and ask that Extension be included so this unique partnership can move ahead since the need has been so well documented. We would be most pleased to respond to any questions you might have.

Mr. DE LA GARZA. Thank you. We appreciate your testimony and we invite you to remain for the balance of the hearing to be available for questions.

The next witness is Dr. C. D. Browning, dean for resident instruction of the University of Florida.

Before we hear from you, Dr. Browning, we are called to a vote on the House floor. Rather than having members going in and out, we will call a short recess. In that way, you can have the undivided attention of the members.

[Recess taken.]

Mr. DE LA GARZA. The subcommittee will return to order.

Please continue, Mr. Browning.

[The prepared statement submitted by Mr. Browning follows:]

STATEMENT OF C. D. BROWNING
CHAIRMAN
RESIDENT INSTRUCTION COMMITTEE ON
ORGANIZATION AND POLICY

I appear before you today as Chairman of the Resident Instruction Committee on Organization and Policy (RICOP) representing the 70 Deans and Directors of Resident Instruction of agricultural programs in the State Universities and Land-Grant Colleges of this country. We would like to go on record as strongly supporting H.R. 4394, "The National Agricultural Research, Extension, and Teaching Policy Act of 1977," and supporting in principle many of the concepts in H.R. 2223, "The Agricultural Research Act of 1977." We commend the authors for their leadership in bringing to the attention of the Committee on Agriculture the many important aspects included in these Bills.

Although the main thrust of the Bills in question is to increase the level of funding for agricultural research, and we certainly agree and support this concept, we would like to comment primarily on the provisions in both Bills for the support of teaching programs related to the food and agricultural sciences in our Colleges of Agriculture. To our Resident Instruction community, this is a most significant and vital aspect of the proposed legislation. This is probably the most important legislative proposal concerning agricultural teaching since the establishment of our Land-Grant institutions by the first Morrill Act of 1862. The United States Congress has long been involved with teaching programs in the food and agricultural sciences in Colleges of Agriculture. The second Morrill Act of 1890, the Morrill-Nelson Act of 1907 and the Bankhead-Jones Act of 1935 gave increased support through uniform and variable grants for the "more complete endowment and maintenance of these teaching programs." However, the current legislative

proposal would clearly focus national attention and support on teaching as an integral and inseparable function along with agricultural research and extension in our Land-Grant colleges. Bringing these functions together at the national level and giving the Secretary of Agriculture the responsibility for them would help insure that our nation's needs for education and manpower development in the sciences related to food and agriculture, as well as agricultural research and extension activities, receive the coordination and national planning we feel are essential. Only with strong, high-quality teaching programs can we produce the scientific manpower needed for research and extension programs. This need is probably greater today than at any other time in our history. The legislative proposals would create more appropriate levels of funding that could more adequately meet the needs of these teaching programs.

Undergraduate student enrollment in agriculture and related programs in the 70 member institutions of NASULGC increased 181% from 1963 to 1976. Not only have the enrollments increased to meet the needs of agriculture but the educational mission has changed by becoming more complex--more science based. In addition to dealing with highly technical production agriculture, the curricula have continually been adapted to the expanding needs relating to marketing, processing and distribution of food and fiber. Information relating to the compatibility of agriculture with a quality environment and the conservation and wise use of natural resources has been translated into valuable educational programs to meet the needs of students, their prospective employers and society. Even with the growth in enrollment, our graduates have been in strong demand and we have not yet reached a level that satisfies the needs of this nation and the opportunities that

exist world wide. In the fall of 1976 there were 97,728 undergraduates compared to 92,161 the previous year--a 6.0% increase. This is the smallest increase in recent years. In fact, since 1971 there has been an annual increase of approximately 12% each year. The point of greatest concern is that the increase in the Freshman class was only 0.5%. The growth in undergraduate enrollment appears to be slowing at a time when needs appear to be the greatest. It is important to recognize that students enrolling in Colleges of Agriculture, although better prepared academically, are less well prepared in terms of their experiences and knowledge of agriculture. Innovative programs involving internships and practical work experiences are being used to make up for these deficiencies. Another change of importance is that more than 28% of the students enrolled in our programs are women.

Graduate student enrollments (Master and Ph.D. degree) in agriculture and the related sciences increased 15% from 1974 to 1975, but only 6.8% from 1975 to 1976. There are a total of 22,133 students in the 70 member institutions. These graduate programs, training and educating agricultural scientists and extension specialists, are truly a "national resource"--the major source of the scientists required to keep our research current and provide the manpower for the Agricultural Extension Service.

At the present time there is a shortage of agricultural engineers, agricultural economists, horticulturalists, veterinary scientists as well as agricultural scientists in several other fields. The proposed expansion of agricultural research programs will intensify this shortage and indeed other deficiencies will develop if teaching programs are not given immediate attention. The Chronicle of Higher Education reported that fewer

than 1,000 Ph.D. degrees were awarded in 1975 in all fields of Agriculture and the Natural Resources. How many are needed? This question goes unanswered. At the present time, many states have moratoriums on the development of badly needed new teaching programs to meet the changing needs taking place in agricultural sciences. There is a dire need to increase the number of graduates from some advanced degree programs and to develop innovative interdisciplinary programs to meet needs that did not exist five years ago. Integrated pest management is an example of one such need.

A recent report of the Board on Agriculture and Renewable Resources of the National Academy of Sciences (NAS) directed attention to manpower education and training programs and supports my remarks concerning graduate education. The report stated that "trained manpower is essential if the U.S. is to respond to national and international concerns to help solve the world food problem." In addition the report stressed that "trained manpower requirements will increase and the kind of training necessary will be different than in the past" and that "manpower training should be a part of an expanded research investment in food production capacity." The NAS Report recommended that a systematic review at the national level was needed and that a "study commission should be established to compile an inventory of manpower resources and to project needs, and to assess the major issues and priorities for the development of education in agriculture and renewable resources." RICOP fully concurs in this recommendation and suggests that the proposed legislation offers an excellent means to implement and coordinate such a study.

In support of increased Federal funding for fellowships, the NAS study made the following statement, "to meet the need for increased research in

the basic science areas of agriculture, food science, and nutrition, highly trained research scientists are urgently required. Professionally and technologically trained manpower must increase in the areas of plant physiology, plant pathology, entomology, microbiology, plant and animal genetics, animal nutrition, veterinary medicine, agricultural engineering, food chemistry, food and nutrition, soil science and agronomy. This can be most readily accomplished by the implementation of a long-term program of support for graduate education in the sciences that are basic to agricultural production.¹¹ Again, we concur with this statement of the National Academy of Sciences and point out that the proposed legislation would implement programs to help meet these needs.

If this nation is to make an impact on the food and fiber needs of the emerging nations of the world, one of the most important and effective programs will be graduate education for foreign students so that they may return home with the knowledge and ability to improve food production in their home countries. Technology transfer without trained manpower in-country is not adequate nor successful. Even though Federal dollars have supported foreign student educational programs through USAID and similar activities, the individual states have shared a large portion of the total expense for such things as out-of-state fee waivers, relatively low tuition costs, and the physical facilities and faculty necessary to provide these educational opportunities.

Higher education, in general, is facing difficult times. The states are finding it difficult to adequately support educational programs. The first programs to suffer have been and will continue to be at the graduate level. It seems reasonable that a "national resource" such as educational programs in food and agricultural sciences justifies national support.

The effectiveness and logic of the interrelationship of the functions of teaching, research, and extension have been amply demonstrated in Land-Grant Colleges of Agriculture. Most teachers in such programs hold joint appointments as research scientists. These functions cannot be separated if optimum outputs at the lowest possible cost are expected. Oftentimes our agricultural research system is viewed by those who study it as being unique and a model for the world. This is undoubtedly true. However, another characteristic important to the success of our system is that the functions of teaching, research, and extension in our Land-Grant Colleges are closely related and coordinated. The proposed legislation would bring together at the Federal level the responsibility for the coordination and policy planning of these programs. The inclusion of teaching in the Bills would help communicate to the various States the importance that the U.S. Congress attaches to food and agricultural sciences teaching as well as to the related research and extension programs. The Competitive grants provided for in the proposed legislation would add a flexibility not now available and an opportunity for national policy to speak to emerging needs, particularly in the important interdisciplinary activities that require innovative and imaginative programs of teaching to meet national needs. The Federal-State partnership relating to instructional programs in food and agricultural sciences that has existed since the Morrill Act of 1862 needs to be strengthened and revitalized and we feel the proposed legislation is an important step in this direction.

Mr. DE LA GARZA. Thank you very much, Dr. Browning. We hope that you can remain with us for questioning at the end of the witnesses.

As we mentioned earlier, we now have the honor of the presence of the Secretary to appear before us. We hope that the witnesses will excuse us for interrupting for Secretary Bergland's remarks.

We are very happy to have the distinguished Secretary of Agriculture, a distinguished alumnus of this committee, with us. We will be very happy to welcome you here, Mr. Secretary.

I might inform the members, with some degree of pride, that this is the Secretary's first appearance before a committee here in the House of Representatives, and we are happy that it is our subcommittee that he honors.

We will be happy to hear from you, Mr. Secretary.

STATEMENT OF HON. BOB BERGLAND, SECRETARY, U.S. DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY RUPERT CUTLER, NOMINEE AS ASSISTANT SECRETARY, CONSERVATION, RESEARCH, AND EDUCATION

Secretary BERGLAND. Thank you very much, Mr. Chairman.

I am pleased to be home with you and the members of this distinguished subcommittee to talk about what I regard to be the most important agricultural issue confronting not only the United States, but indeed all mankind.

I would like to introduce the gentleman on my right, Rupert Cutler, whom I have suggested—and whom the President has just nominated—to be the Assistant Secretary for Conservation, Research, and Education.

The hearings on his confirmation have not as yet been scheduled, so he is here today, Mr. Chairman, without an official portfolio. Mr. Cutler comes highly recommended in the area of research. He is from one of the leading land grant institutions in this country.

While he cannot speak as an official of the USDA, he is on board as an expert consultant to me, and will be the person who will be in general charge of research, education, and conservation. I am convinced of the Senate's action in this regard.

I would like to have him respond to any technical questions which may come up that I am not able to handle. Mr. Chairman, I would like to suggest that I have a rather tight timetable, and must be at another meeting, 6 minutes away, at 4 o'clock.

Therefore, if it is agreeable with you, I am committed to stay with you until about 6 minutes before four.

Mr. DE LA GARZA. Mr. Secretary, we are delighted to have you, and will be happy to hear from you.

You set the time and I think I can avail myself of the prerogatives of the chairman to dismiss you from any questions at this time from the members since we know that you would always be available to us.

Therefore, please take the time you feel necessary to give us your statement. Then, as chairman, I shall exercise the prerogative to let you retire. If any members have questions, we will get them to you later.

Secretary BERGLAND. Thank you, Mr. Chairman.

I have a statement which has been prepared and distributed, I believe, to all members of the subcommittee. If it please the chair, I would prefer to forego reading any statement and ask, rather, that it be inserted in the record.

Mr. DE LA GARZA. Without objection, we will submit your full statement to the record. You may proceed as you see fit.

Secretary BERGLAND. Thank you, Mr. Chairman.

[The prepared statement submitted by Mr. Bergland follows:]

STATEMENT OF SECRETARY OF AGRICULTURE, BOB BERGLAND,
BEFORE THE
HOUSE AGRICULTURE SUBCOMMITTEE
ON
DEPARTMENT OPERATIONS, INVESTIGATIONS AND OVERSIGHT

March 21, 1977

I appreciate this opportunity to appear before your Committee and respond to the bills pending before the Committee on agricultural research, extension and teaching.

No one today would deny that agriculture faces a formidable task in feeding the billions more who will populate our planet by the year 2000.

Such terms as "starvation" and "famine" overstate our future food production problems only if:

We can develop alternative energy sources for farming and forestry;

We can overcome the problems of water shortages and dropping groundwater tables;

We can reduce the enormous losses that now go to pests and diseases, both before and after harvest;

We can get food from where it is grown to where it is needed more efficiently;

We can find ways to increase food and fiber supplies without threatening our environment or the quality of rural life;

We can put the results of research to use quickly by those who grow and distribute food;

The food we produce is translated into healthful, nutritious diets for people;

Climatic disasters such as those we are witnessing in our own country can be lessened or averted.

The answers to these and other "ifs" can only come from a commitment to a strong agricultural research and extension effort. No endeavor facing us today is more complex.

It can no longer be farming as usual. The costs in energy and other natural and human resources are simply too high.

It cannot be merely more of the technology we already have. Yield responses to traditional "inputs" such as fertilizer are leveling off dramatically.

We can no longer feel secure in vague or naive hopes that a scientific "breakthrough" will arrive in time to save us. We have too long ignored the need for basic research and our storehouse of fundamental knowledge is low. We are today eating from the fruits of laboratory "miracles" that occurred 20 and 30 years ago.

Farming can no longer be considered an occupation apart from others. It is an intricate part of our economy, our environment, our social institutions. The new technology must accommodate itself to the varied needs and desires of consumers and producers alike.

Even the development of new knowledge itself is no longer enough. The results must get to people faster and in ways that make sense to them.

That the House of Representatives passed a bill on agricultural research, extension and teaching during the last session and that there are a number of such bills currently pending in the House is witness to the awareness of Congress of the difficult problems we face.

We share the concerns of Congress that there are problems we must resolve in the planning, coordinating and policy-setting procedures for agricultural research and extension. Better mechanisms are needed to produce the kind of planning and coordination that will relate the parts to the whole. Such mechanisms can aid us immensely in setting priorities and advancing an understanding of the cooperation that is vital to our success.

We must have a coherent policy that can serve broad interests without ignoring the needs of individuals; a policy that can be articulated convincingly; and one where technology assessment can be built into the planning process so that an awareness of the future, and attention to consequences, will replace reactive, short-range planning.

To accomplish this coherence we certainly endorse the concept that the Department of Agriculture is the lead agency in agricultural research and extension.

We endorse the provisions to strengthen the historic partnership between research and extension and to expand the participation in these activities to institutions outside the traditional USDA-Land-Grant system.

We share the view expressed in the proposed legislation that promotes the responsiveness of agricultural research and extension to the needs of the public--consumers as well as producers, the small farmer as well as the large farm operation.

In the various bills, there are similar but not identical proposals for advisory and staff groups to assist the Secretary of Agriculture in bringing about coherence, coordination and responsiveness. We recognize these needs. However, both Congress and the President have expressed their concern about the number of advisory committees and their undue proliferation. The Federal Advisory Committee Act of 1972 also points out clearly the need for restraint in establishing advisory committees.

It is in the spirit of the provisions of the Federal Advisory Committee Act that I believe the establishment of such advisory groups can be appropriately carried out under existing authorities of the Department. Along this same line, I do not believe legislative action is needed to establish an additional Assistant Secretary for Research and Extension. I believe that the Assistant Secretary for Conservation, Research and Education can give the full emphasis needed for these important activities.

We will certainly consult with Congress. We shall also keep in mind that these provisions in the legislation have been proposed, at least in part, because the Congress has been uncertain in the past about the extent to which the Executive Branch was willing to act. We want to stress to you in the strongest possible terms that this Administration intends to take the action needed and to do so quickly.

All of the bills before us today emphasize the importance of continuing support of agricultural research over the long haul.

We cannot solve the problems we face with a crises approach. Crises have a way of obscuring basic needs. After the immediate emergencies are

met, the underlying problems tend to be put on the back burner. We cannot afford to have that happen.

Our success can also be diluted by complacency--just as well as by lack of funds. We cannot risk becoming the glamour science of the next few years or of considering our problems solved should good weather in various parts of the world favor us with record harvests. Our long-term commitment must be solid and steadfast and broad in view.

In this respect, we believe that legislation is needed to provide continuous funding in agricultural research and extension for the 1890 Land Grant Colleges and Tuskegee Institute. Currently these institutions are eligible for support only under the special grants authorities of the Department. It is important that their eligibility be made comparable to the continuing support available to State Agricultural Experiment Stations and Cooperative Extension in order that they can participate in long-range planning at the State level and utilize the funds for tenured personnel. These institutions play a unique and important role in research and extension in this country, and they should take their place as full partners in the agricultural research and extension system.

We would also support action to make the veterinary colleges full partners in the agricultural research community. Traditionally their support and activities have been separated from the main-stream of agricultural research. Furthermore, their ability to contribute to animal health, to the productivity of the livestock industry, and to improve the diets of our people, needs continuing and strengthened support. It is our preference that the Congress give full expression to its desires in this area through instructions to the Department and the universities rather than to enact new legislation establishing additional formulas and advisory

mechanisms and requiring increased overhead costs. I can assure you that animal health research will receive high priority in the 1979 budget and beyond, and that it is my intention to use existing legislative tools such as P.L. 89-106 and the Hatch Act to accomplish these purposes.

We also endorse the emphasis the proposed bills give to the continuing and expanded role of the Department in human nutrition research and extension, if programs can be prudently and properly constructed. The Department will take quick action following the release of the report of the National Academy of Sciences in June of this year, and the results of subsequent recommendations to the President by the Office of Science and Technology Policy. The health and well-being of every American demand that we increase our knowledge of what we should and must have in our diets; meet these needs through new or improved techniques in food production, processing and distribution; and get the information to people so that they know what a good diet is, why it is important, and how they and their families can choose and use food wisely. The results of our dedication to this task will show up not only in longer lifespans but in healthy, vigorous lives as well.

We concur, too, in the need for an evaluation of the economic and social consequences of cooperative extension programs. Extension has ably served the country by providing practical information resulting from research in agriculture, natural resources, family living, youth and community resource development. However, the unprecedented demands of today challenge us to come up with a

determination of the best ways that extension can continue to serve us, both in its traditional agricultural role, and in other areas of public concern. We must devise ways of evaluating these activities so that we can appraise their effectiveness and develop timely priorities at the county, State, and also national levels. We need to explore the role that cooperative extension can play in the solution of national problems for which agencies other than the Department of Agriculture are responsible.

We note that some of the legislation addresses the interrelationships among forestry and the other areas of agricultural research and extension. We believe that there is need for even more explicit language which will clarify the important roles and responsibilities of forestry research, and forestry education and technical assistance.

In addition to the special attention given to specific research and extension areas, there are two others which we believe require serious consideration.

One relates to the role of the Department of Agriculture in international research and technical assistance.

The Department of Agriculture must be brought into a more effective working relationship with the Agency for International Development. Agriculture must have a strong, responsible role if we are to increase the effectiveness of those who provide expertise to the developing countries.

The second relates to the need to establish an Agricultural Libraries and Information Network as a basis for cooperation between the National Agricultural Library and the libraries of the cooperating universities. The National Agricultural Library is one of the principal agencies in the Department dealing with the collection and dissemination of scientific

and technical information. There is a great opportunity to expand on this agency's role as a national library to work with State universities to achieve cooperation, coordination, and more effective utilization of the information that is available throughout the country.

We have read with interest the proposals to transfer the administration of certain training and education funds from the Department of Health, Education and Welfare to the Department of Agriculture. We appreciate the importance of manpower development through undergraduate and graduate teaching in the food and agricultural sciences. We also understand the concern of the universities that this area is not currently receiving the necessary emphasis by the Federal Government. An adequate and well-qualified corps of scientists, engineers, and educators is essential to the public and private programs in agriculture and forestry, including research and extension.

However, rather than add another activity to the Department's missions at this time, we would prefer to explore the establishment of linkages between our Department and HEW which could provide assurances that the educational needs of agriculture are fully considered along with the rest of our higher education policy. Until we have had an opportunity to explore such linkages, we suggest that legislative transfers of authority be withheld.

I wish now to stress that the need for continuing long-term support of agricultural research, which I discussed at the beginning of these remarks, does not minimize the importance of programs for research grants. Research grants will complement the ongoing efforts of the USDA agencies, universities and private organizations. With grant funds we can open the system to a broader spectrum of the scientific community and hasten our grasp of the knowledge vital to the understanding of basic biological, physical, and

social processes. We must have the fullest participation by the Nation's most talented researchers for the years ahead.

As you know, the President's budget for F.Y. '78 calls for a major expansion of competitive grants in basic research. We consider this program a pioneering step for the Department and one that is rich in potential pay-offs.

All of the proposed bills recommend funding authorizations for specific program areas as well as overall authorizations. We understand the values and limitations of such authorizations. However, research and extension are dynamic activities, and they require adaptability as well as continuity. They must remain flexible and responsive to problems and opportunities. Therefore, we believe that continuing competition for public funds through the budget and appropriation process is more likely to produce a reasonable balance for these programs than legislative authorizations.

There is also a secondary problem posed by the authorization amounts in the proposed legislation. Such amounts need to be based on solid estimates of program requirements. If the Congress decides to go ahead with the dollar authorizations, we would wish to work closely with you to make sure the amounts are both appropriate and realistic.

We welcome the broad initiatives shown by Congress in developing this legislation. We have in this brief statement indicated our response to general areas of the proposed bills. We stand ready to work with you in regard to the details of any changes within these areas. Our objectives shall be to work with you towards an encompassing and comprehensive approach to the legislative needs. In doing so we will indicate where administrative

action could be used in place of legislation in order that the resulting bill may be focused on the most critical legislative needs.

The legislation that comes from this Congress will surely mark a new era in agricultural research and extension work. It will serve as the blueprint for marshalling the expertise and talents of our country, which in the final analysis are our most important resource. We feel privileged indeed to be working with you and look forward to a cooperative, productive partnership.

Secretary BERGLAND. As you will see in the statement, we generally endorse and applaud the direction in which this committee is going, and we commend the authors of those bills which have been designed to enhance and to further the authority of the Department of Agriculture in the area of research.

We do, however, have some recommendations that we would like to have inserted in the minds of members considering the matter. For example, we are not of the opinion that we need any undue proliferation of advisory committees. In fact, we are doing our best to reduce the number of advisory committees which are in the Department of Agriculture.

We find them often to be expensive and, in some cases, of doubtful value. Therefore, we would urge a bit of caution in that regard.

I would, however, like to point out that we are vitally concerned with the kinds of problems that are confronting agriculture. I am 48 years old, Mr. Chairman, and the world's population has doubled in my lifetime.

It grows at the rate of 200,000 a day. At this rate of growth, it will double again in 30 years. During my lifetime, we have invented hybrid seed corn, we have invented pesticide and fertilizers. As a result of this technological revolution, yields have doubled and tripled in the United States.

As a consequence of this enormous technological growth, the United States has, indeed, been the world's granary.

We now produce half the world's commercial wheat exports. We produce half the commercial rice exports. We produce three-quarters of the commercial soybean on the globe. The list of commodities in which America is prominent in the commercial agricultural trade is long, and it is a very fine record.

However, the question now is not what we have done, but where we are going. A food demand in this world in the dimension of that which I have suggested, means that we simply cannot afford to leave things to chance.

We cannot afford to sit idly by and let the marketplace find solutions. In research, particularly, there is such an enormous lead-time required that it is imperative that the research mission of the U.S. Department of Agriculture be clearly defined and that we proceed to meet the needs of tomorrow.

This mission should not, necessarily, rest on the laurels of yesterday.

Therefore, we are going to be asking for authority—and we are glad to see the support that comes for this mission from the number of bills that have been presented to this committee—to expand the role of the Department of Agriculture in this mission.

We think USDA is the proper research agency. We think, however, that we need to change.

American agriculture has been built on a sometimes stated presumption that petroleum would be cheap and with us forever. We know that it is not true.

We know that petroleum is neither cheap, nor will it ever be inexpensive. In fact, the only question is: How high will it go? We know, also, that it is limited in supply.

This means, therefore, if we have any hope of feeding a hungry world, we need to do a great deal more in the area of finding the capacity to produce without increasing dependence on either petroleum or in the case of nitrogen fertilizer, increasing our dependence on natural gas.

We need to know more about the nutritional needs of the human race. The areas in which we need to do more are limited only, I guess, by one's imagination.

Therefore, Mr. Chairman, I would say that we are vitally interested in this research area. We commend the committee.

I would be willing to spend such time as you may wish to devote to answering questions as best I can.

Mr. DE LA GARZA. Thank you very much, Mr. Secretary. We welcome you, Mr. Cutler, and wish you well. I know that your confirmation will come soon. We look forward to working with you, sir.

Mr. CUTLER. Thank you, Mr. Chairman.

Mr. DE LA GARZA. In order that I might not be called an authoritarian chairman, I will forego the promise that I made you of no questions, since we have some time.

Mr. THONE. Mr. Chairman?

Mr. DE LA GARZA. Mr. Thone?

Mr. THONE. On behalf of this side of the aisle, Mr. Secretary, I would like to welcome you to your first official appearance before this committee on which you served so well.

I think I speak for all of the Republicans here when I say that you were well prepared, always well informed, eminently fair, and a person whose word was always good.

However, welcome back to this committee. You did some outstanding work here. You and I, in particular, collaborated with Mr. Poage, as I remember, and a couple of others on that Commodity Futures Trading Act. Then you and I had H.R. 8410, the Packers and Stockyards Act, which revitalized that well-meaning paper tiger they had in the Department.

I have just one question, Mr. Secretary. I think we all here agree with you on the proliferation of all these meaningless advisory committees, although, frankly, lately I have been seeing more of them appointed. I don't know if we are ever going to be rid of them, or even rid ourselves of the appointment of new ones. But some are meaningful and very helpful.

I noticed, in your prepared statement, that you opposed the establishment of an additional Assistant Secretary for research, extension, and education. Am I correct in this point? And how strongly do you feel about it, Mr. Secretary?

Secretary BERGLAND. Thank you very much for the kind words, Mr. Thone. I appreciate your courtesies, and well remember the times you and I worked together in advancing the cause of justice.

We don't think we need a special Secretary for the area of research because we have, in Doctor Rupert Cutler, one of the leading minds in this area. He heads up the research mission of the USDA in a general way.

He is also in general charge of the education through the U.S. Extension Service, and in general charge of the Soil Conservation Service, the U.S. Forest Service, and other related kinds of activities.

He is keenly and vitally interested in this whole area. I understand that you are not bringing his credentials into question, but we think that we have the organization now that will enable us to coordinate these activities.

Mr. THONE. Again, very briefly, on this, Mr. Secretary, he does have a lot of hats to wear, as you just indicated. Of course, we do not question his qualifications. We understand they are exemplary.

I think President Bishop of the University of Arkansas put the situation well, and I think you reiterated it just a little while ago when you said that agriculture is really going to be in the limelight in the future. As President Bishop said it:

The achievements of agriculture in the past are dwarfed by its responsibilities and its opportunities in the future. Today agriculture and its associated agribusinesses permeate our domestic economic prospects, our international trade, and many of the most important considerations of our foreign policies.

I notice that we recently split up one Secretary-ship down there in the Department. We did divide these responsibilities a couple or three ways. I do not want to press this any stronger, I guess, than I have with you.

But is there an area here which you think, perhaps, there could be some give and take, some compromise?

Secretary BERGLAND. I think it is something we need to pay attention to on a continuing basis. I cannot overstate the importance I attach to research. It is very, very essential.

I think most of the tensions in the last 30 years on this globe have been political in nature. Generally, they have been disputes between the Communists and the so-called non-Communist countries. We fought a war over this issue.

I think we now see a kind of accommodation between the East and the West under the general umbrella of detente. Therefore, we should better examine the world as it will be tomorrow, next year, and in the next 30 years.

We now hear talk of the so-called north/south dialog. This simply means tensions between countries who have food and those who do not. We need to use the enormous resources of American agriculture and our research community in helping the world feed itself, or the world will be consumed in war, in my generation, in my time.

I really believe that. Therefore, I cannot overstate the importance of research. Dr. Cutler has an assistant, and I should let him explain precisely what he has in mind. However, indeed, we think that we are able to manage this commitment and we will give it all we have.

Mr. THONE. I think you successfully avoided the bottom line of my question, but I would not have expected less of you, Mr. Secretary. I thank you so much.

[Laughter.]

Secretary BERGLAND. Thank you.

Mr. DE LA GARZA. Chairman Poage?

Mr. POAGE. Mr. Secretary, I would not want to take this group's time for detailed questions in regard to research.

I do want to call your attention to what I think is probably the most pressing field of research right now—a lot of people don't agree.

However, a vast section of this country is drying up. At least, we don't have enough moisture to assure our capability of making a crop. We may make it, but we will be very fortunate if we do.

Not all of that territory, but a very large part of it is covered with brush. In my State, there is 90 million acres of brush—primarily mesquite. Some of it is shinary and some of it is juniper.

The Soil Conservation tells us that that brush is consuming more water than all of the cities, all of the industries, and all of the irrigation in the State of Texas. Obviously, the same sort of thing is happening in Oklahoma and New Mexico. The mesquite tree is moving up into Kansas and Colorado so I guess it is happening to a lesser degree up that way.

We are not asking you, as the Secretary of Agriculture, to kill those trees, but we are asking you to tell us how. Of course, you don't know, and I don't know. However, Dr. Cutler and his people can find out if they can have the tools to work with.

We want to use this opportunity to suggest that we feel that, for a far less amount of money that we have been spending on dams—and I have no criticism of them—a far less amount of money than we have been spending on many of our programs, we can save a large part of that water.

This is water that is in the ground today and would be usable to produce forage or grass if we didn't have this brush taking it.

I just want to call that to your attention because I think it is often overlooked. The figures that I am quoting are from the Department of Agriculture, itself—the Soil Conservation Service—and they sound fantastic to anyone, but that is what they say—that they take 20 times the amount of water that our citizen industries use.

Thank you, Mr. Secretary.

Secretary BERGLAND. Thank you, Mr. Chairman.

Mr. DE LA GARZA. Mr. Wampler?

Mr. WAMPLER. Thank you, Mr. Chairman.

I, too, want to extend a very hearty welcome to the Secretary and his assistant-designate. Thank you for coming by.

Let me just make one very quick observation as one of the authors of one of the bills under consideration. I want to ask you to carefully consider what I consider to be one of the major innovative thrusts of this legislation—the creation of this advisory committee.

I quite agree with you that there are a number of committees that have been created by the Congress and by the executive branch that really don't serve any useful purpose, but if you will glance to the chart on the easel to your right, you will see that this is a committee composed of a very broad constituency.

It has been my feeling—and I am reasonably sure it is your feeling—that, for many years, we simply have not taken under the umbrella the legitimate concerns of many outside of the normal funding channels of the Department of Agriculture—the Hatch Act, and so forth.

Therefore, what we are attempting to do here is to bring consumers, environmentalists, and other groups in so that they can get some input into helping to make recommendations to you on what the short-term and the long-term priorities ought to be of agricultural research.

We are also, of course, asking for an increased thrust, increasing the amount of appropriated funds available for agricultural research because the record shows that we are spending less on agricultural research today than we did 10 years ago.

I don't think there is any difference of opinion between you and I about the need for agricultural research, but we hope that you would carefully review this.

Part of the purpose in establishing a position of Assistant Secretary of Agriculture to oversee research, extension, and education is not to attempt to tell you how to run your Department, but simply to stress the importance that we feel it deserves.

At this point in time in any of your considerations for reorganization plans within the Department, do you contemplate asking for any new positions of Assistant Secretary of Agriculture, or are you in a position to respond to that at this time?

Secretary BERGLAND. Thank you very much, Mr. Wampler, for your kind words.

I would say that we have not definitely settled on whether or not we are going to request any additional numbers. We will probably wind up requesting Assistant Secretary status for the Director of Economics.

We may ultimately request authority to appoint an Assistant Secretary for Policy, however, that is not definitely decided.

I would like to comment on the question of advisory committees. The proposition to which you have alluded is, obviously, carefully thought out and I don't want to dismiss it lightly.

We do need to have outside advisory capacity, particularly in the scientific area. We intend to make a number of changes in the USDA. We do intend to establish a group within the Department of Agriculture that can give me guidance on policy direction, in a whole range of areas, that is separate and distinct from those who do what has been agreed to.

As it now stands, in the budget area, for example, the same ones who establish budgets are the ones who run them. We want to have policy and program appraisal and analysis as a separate and distinct function from those who are in line administration so that we have cross-fertilization of ideas. That is the only way that we are sure that we have a clearly defined set of goals and objectives, and that managers run programs in conformance to the goal, once it is agreed to.

In the area of research, I plan to ask the President's chief science advisor—when that person is finally designated—to take on the task of giving me advice—to appoint a committee composed of eminent scientists who can give advice to the Department of Agriculture on where we ought to be going.

We can't afford to reinvent the wheel. There is no point in the Department of Agriculture granting money to the local land-grant university to do that which that university would like to do unless that is a part of a national comprehensive, carefully thought-out strategy.

We simply don't have enough money to be financing projects for a community if it has no real national need, or if it does not fit into a national goal and objective.

Therefore, our plan is to create, on a very temporary basis—maybe 1 year—a group of advisers composed of people who are not a part of the USDA system, who are not a part of the land-grant college system, who are not a part of the private research community, but who are persons who can take a detached, objective, long-term look into the implications of the energy problem, for example.

It takes more fuel to dry corn than it does to grow it. What does that mean? What will happen to the United States in the next 20 to 30 years as the reserves of petroleum are drawn down, and down, and down?

We use between 10 and 15 petroleum calories to produce a food calorie. We often tout the American system of agriculture as the world's most efficient, and in many ways it is. However, when you put it in a petroleum context, we rank about dead last.

It means, therefore, that we need to take a long, hard look at our dependence upon petroleum not only to run our tractors, but to dry our grain, and to produce our chemicals and fertilizers, and other items which are so essential under the system we have developed.

These are matters on which I need advice. Heaven knows that I am not capable in this area, and need counsel. Our plan is to get the best counsel that we can find in this world to give us advice on how to meet some of the pressing needs.

One is petroleum, as I mentioned. The other is the continuing controversy surrounding the use of pesticides—whether or not there are other ways of controlling pests. I think we ought to be examining this very, very carefully.

There was a report issued just recently from a panel of experts meeting in Colorado in which they suggested that certain chemicals emanating from the continued use of nitrate fertilizers would, in due time, destroy the ozone layer.

We may say: "That's just not true." Maybe it is not true, but what if it is? The fact is that we need to know. We are dealing with the future of civilized mankind. We cannot afford to take chances.

I am not competent to sit in judgment on these scientific questions. We need the best brains we can find, and we propose to incorporate the use of the President's scientific advisory community to give the Department of Agriculture advice so that we are sure that what we are looking at is an objective kind of a strategy, and not one that can be criticized as self-serving.

Mr. WAMPLER. I appreciate your response.

Mr. Chairman, I realize we have consumed a good deal of time. Thank you very much.

Mr. DE LA GARZA. Thank you.

Mr. Thornton, one of the main authors of one of the bills concerned.

Mr. THORNTON. Thank you very much, Mr. Chairman.

With regard to the question of agricultural research, I know of your strong interest in improving basic research in agriculture and in coordinating that research activity as pointed out in both your oral and prepared presentations.

Mr. Wampler has already mentioned the importance of having an interchange with various components of the public which may not have been able to get an input into formulation of agricultural research policies in the past.

I would particularly like to ask for your opinion upon the importance of getting input from State and local institutions in the formulation of an agricultural policy. Dr. Bishop mentioned the importance of having an input from these sources which contribute a large amount of the funding.

Have you any comment with regard to that?

Secretary BERGLAND. I could not agree more than with the statement you just made on the need for the Department to be more diligent in seeking out the talents which lie, in profusion, within State government and within the college community of the United States.

We are taking that note seriously, Mr. Chairman. One of Dr. Cutler's great strengths is that he does come from a land-grant college and his associates are similarly well equipped in this regard.

The new Deputy Secretary for the Department, the Honorable John White, former commissioner of agriculture in the State of Texas, will be—among other things—taking on the enormous task of cooperating with the various elements of State governments across this great country so that we are sure that the wisdom, the knowledge, and the expertise of State government is brought into the highest decisionmaking process in the Department.

Oftentimes, State governments have to deal with line agencies, and they don't have the authority in the broad, general policy area. We intend to bring it in in such a way that we can use that skill, and that it is brought to me and those with whom I join in making decisions.

Mr. THORNTON. Mr. Secretary, I am happy to say that my particular bill does not call for the creation of an additional Assistant Secretary position, but I do think that it is important to reflect on the need for a coordinated program which you have just described.

In that regard, I wonder whether it might be appropriate to say that one of the things we are trying to accomplish with an agricultural research bill is to establish new institutions which can assist those people engaged in agricultural research in formulating policies for our Nation, and in carrying out the objectives of agricultural research—both basic research and applied research.

Would you agree with that?

Secretary BERGLAND. Yes, sir. I would.

Mr. THORNTON. Thank you, Mr. Chairman.

Mr. BROWN [acting chairman]. Thank you, Mr. Thornton.

Mr. Secretary, I join in expressing my appreciation for you being here this afternoon. I sense the fact that, in general, your comments—both the prepared and your extemporaneous comments—reflect a commitment shared by the committee to the goals of the legislation before us.

I speak particularly of your remarks with regard to the north/south division and the importance of using food, and our technological know-how in food production, as an instrument for resolving some of the major problems that face the world.

In that connection, there has been some criticism of agricultural research as being aimed at the kind of technology suitable to this country, one which is a high user of energy, of chemicals, and so on, much of which is not suitable to the underdeveloped world.

Likewise, there is a need for new crops that are energy conserving, water conserving, and suitable to the agricultural resources of much of the arid world which includes this underdeveloped world.

There is a section in both of the bills dealing with new crops on which we heard testimony this morning. In fact, we heard testimony urging that this be broadened to include new animal resources, as well as new crop resources.

You did not address either of these points in either your written statement or your other remarks. I am wondering if this reflected a negative position, or merely that you could not include everything that you wanted to say in one brief statement.

Secretary BERGLAND. Mr. Brown, I would like to yield to Dr. Cutler on that question. He has gone through all the bills and worked with our agencies on this matter.

Mr. BROWN. We would be happy to hear from him.

Mr. CUTLER. Thank you, Congressman.

I am happy to say that the Department is looking at new programs for small farmers involving new technology, low energy input, and low capital. These are the kinds of opportunities that could be exported to the southern part of the hemisphere.

In fact, we have some people on board at the moment, on a 90-day basis, who are developing a focal point in the Department for these kinds of programs.

Typically, the larger agricultural institutions have been able to take advantage of the output of our Agricultural Research Service and our State experiment stations better than the small farmers, and the part-time farmers.

Through new programs in the Extension Service and with our research people, we are attempting to address the needs of the small farmers as President Carter, I believe, indicated he would like to see happen, during the campaign.

We are responding to that need right now.

Mr. BROWN. Thank you. I appreciate that response.

Mr. DE LA GARZA [chairman]. Thank you very much, Mr. Secretary. We appreciate your presence. We are honored that you would choose this subcommittee for your first appearance.

I am sure that this is an acknowledgment of your interest in the area of research—not necessarily specifically in that, but as one of the major factors in the agricultural process to help our Nation.

Secretary BERGLAND. Mr. Chairman, I appreciate your kind words.

I would say, in closing, that we stand, willing, and—I think to some extent—able to help in this regard. Any time you or any member of your committee or staff wants anything from me or any of my assistants, all you need do is call.

We want to cooperate with you fully and be affirmative in our action, and not always negative.

Mr. DE LA GARZA. Thank you very much.

We welcome you, Dr. Cutler, and look forward to working with you.

Mr. CUTLER. Thank you, sir.

Mr. DE LA GARZA. Our next witness is Ms. Jo Ann Barton.

Mr. WAMPLER. Mr. Chairman?

Mr. DE LA GARZA. Mr. Wampler?

Mr. WAMPLER. May I have the privilege of presenting Ms. Barton to the committee. She is the assistant professor of foods and nutrition at the College of Home Economics, Virginia Polytechnic Institute and State University.

You may recall that Ms. Barton, along with a group of her associates, appeared before the committee last year in connection with our consideration of the food stamp program. They made an excellent presentation on nutritional education.

In addition to being a constituent, I consider her to be a friend and certainly an authority on the subject which she will address.

I would like to welcome her to the committee.

Mr. DE LA GARZA. Thank you very much, Mr. Wampler. We certainly concur in your presentation of Ms. Barton.

Ms. Barton, we will be very happy to hear from you at this time.

[The prepared statement submitted by Ms. Barton follows:]

STATEMENT OF JO. ANNE BARTON
 ASSISTANT PROFESSOR OF FOODS AND NUTRITION
 COLLEGE OF HOME ECONOMICS
 VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

I am Jo Anne Barton, a member of the faculty in the Department of Human Nutrition and Foods at Virginia Polytechnic Institute and State University, Virginia's land-grant university where my responsibilities are with the extension mission of the university. I appreciate the opportunity to comment on the agricultural research bills from the viewpoint of the home economics profession. I am representing the Commission on Home Economics of the National Association of State Universities and Land-Grant Colleges and the Association of Administrators of Home Economics.

Home economics is recognized as a component of "food and agricultural sciences" in HR 4394 but only the human nutrition and food consumption components of home economics appear in HR 4863. In neither of these bills is there recognition of the complete scope of home economics activities. The home economics profession is fully supportive of additional funding for research, teaching and extension programs in the food and agricultural sciences. However, we believe it essential to the well-being of the nation that home economics be clearly recognized as a vital part of those activities.

Earlier legislation provided a basis for focus on the producers (rural families) of food and fiber, as well as on the production of food and fiber. For example, the 1925 Purnell Act states:

"production, manufacture, preparation, use, distribution and marketing of agricultural products"....."and such economic and sociological investigations as have for their purpose the development and improvement of the rural home and rural life"

And in the Amendment of the Bankhead Jones Act and Agricultural Marketing Act of 1946, Title I:

"to promote the efficient production and utilization of products of the soil as essential to the health and welfare of our people and to promote a sound and prosperous agricultural and rural life as indispensable to the maintenance of maximum employment and national prosperity."

The focus of home economics is the family unit whether you opt for the traditional definition of the family as a group of two or more persons related by blood, marriage, or adoption, and residing together in a household or a more contemporary definition which defines the family as a unit of interacting and interdependent persons who share common goals, have commitment to one another over time, share resources, and usually a common living space. Families are one of the most vital and fundamental institutions of this nation. There is a critical need to develop and expand through research, teaching and extension an adequate knowledge base to identify, increase understanding of, and where possible, prevent or alleviate pressures and problems of families.

Certainly the quality and availability of food and fiber have an impact on the family unit but so do many societal forces. For example, a malnourished child may have needs other than for nutritious food. An unstable family situation, or poor management of family resources, or an unhealthy environment may be contributing to the child's nutrition problem.

Research related to the processing and utilization of foods is the most obvious tie between home economics and agriculture. The whole chain of events from production of a food through studies of its composition, processing, preservation, safety, storage, home and institutional preparation, marketing, cost, consumer selection, and the effect of the food on the ultimate consumer should be studied.

The production of fiber is commonly mentioned in bills under consideration but there is little reference to the fate of the fiber after it is produced.

Textiles for apparel and household use are a concern of home economists.

The present concern for energy conservation affects the selection and use of textiles for clothing and for household use.

Forestry products are used to build and furnish homes. The choices which a family makes will influence the comfort, utility, and appearance of the home.

A section from a position paper prepared by the Commission on Home Economics defines clearly the potential contributions of professionals in home economics to the total food and agricultural capabilities of the nation:

"With appropriate resources, nutritionists and food scientists can contribute and expand research investigations which can ultimately improve human health and vitality. Researchers in family economics and human development can help to identify, analyze and understand the changes, pressures and problems faced by families and develop the knowledge necessary to address these problems. Other areas of investigation may include, but need not be limited to studies in:

- *nutritive values, cost, composition, quality and safety of foods.
- *interrelationships among food intake, nutritional status and basic health.
- *human nutritional requirements, status and surveillance.
- *family and household environments (including housing, equipment and furnishings) and the impacts on family stability and well-being.
- *economic, nutritional and sociological impacts of various public policies such as the Federal food programs.
- *quantitative and qualitative aspects of different consumption levels.
- *physical properties, economic and sociological implications of textile products and clothing.
- *family resource management and utilization.
- *intra-family relationships, family-community relations and related support systems.
- *food service systems within households and institutions.

Findings from such studies can build a broader and firmer knowledge base for undergraduate and graduate programs in home economics, as well as in agriculturally related curricula. Researchers of the future will be trained through these efforts. Through the extension function of the educational system present in our land-grant institutions, the research results can be widely disseminated, with particular attention to the families and households most urgently in need. Reciprocally, home economists who are members of the delivery network of knowledge dissemination in the land-grant system can provide a constant flow of information to the researchers about relevance of research results to needs of families and households, and about new or changing problems needing research."

We are pleased that these major components of home economics are spelled out in Sect. 5 of HR 4394 and wish to indicate strong support for this particular section. Unfortunately HR 4863 does not clearly define the home economics component.

The previous bill which passed the House in the last session recommended an initial appropriation of \$5 million for human nutrition research; the current bill, HR 4394, recommends this same amount for the total home economics effort. A significant increase seems worthy of consideration.

Home economics is supportive of increased funding for research, extension and teaching programs. We are pleased that HR 4394 defines home economics research as these have traditionally received poor support. We would like to see a representative from the home economics profession on the Board. Further, we are confident that the support of home economics activities will yield significant gains for the American family and for the entire nation.

Mr. DE LA GARZA. Thank you very much, Ms. Barton. We appreciate your testimony, and we invite you to remain with us.

We have, next, Dr. Donald P. Duncan, Director of the School of Forestry, Fisheries and Wildlife, University of Missouri at Columbia, Missouri.

STATEMENT OF DONALD P. DUNCAN, PRESIDENT, ASSOCIATION OF STATE COLLEGE AND UNIVERSITY FOREST RESEARCH ORGANIZATIONS

Mr. DUNCAN. Thank you, Mr. Chairman and members of the committee.

I am appearing before you as the president of the Association of State Colleges and University Forest Research Organizations. The role of forestry schools in the universities include the education of professional foresters; the search for new knowledge and solutions to problems relating to forestry and related rangelands; and the dissemination of research findings to those who can use them effectively.

We are interested in providing guidelines and recommended practices for the assessment, establishment, management, and utilization of the forest resource—a resource which occupies one-third of the land of the United States.

In addition, we are concerned with the added one-third of the land area of this country which is rangeland.

Our renewable forest and range resources which occupy 69 percent of the Nation's land area provides a variety of human benefits.

First, they provide 2,000 pounds of wood per person per year. The best prediction is that, by the year 2000, our annual cut in American forests may well exceed the annual growth.

Congressman Poage referred, a few minutes ago, to the problems associated with water. Sixty percent of the water available in surface flow for municipal, agricultural, and industrial use in the United States is derived from forests and rangeland. A better knowledge base for the intricacies of watershed management is seriously needed.

Regarding forage, with the world food shortage and the need to release grains for human consumption, more intensive management of our range resources for livestock is essential.

The demand for outdoor recreation has doubled each decade since World War II, and is still rising rapidly.

Regarding our wildlife and fish habitats, not only do forests and rangelands provide much of the native habitat—food and shelter—for species taken by hunters and fishermen and observed by bird-watchers, photographers and others, they also provide home for many rare and endangered species.

There are amenities of these resources of great variety. These include windbreaks, shelterbelts, sound barriers, sewage effluent disposal areas, aesthetic values—including wilderness areas and urban greenbelts—and many others.

Research and extension of research findings to potential users is now undertaken at 61 institutions in the Nation. The research is pursued under the aegis of the McIntire-Stennis legislation of 1962—Public Law 87-788.

This legislation provides that non-Federal funds shall at least equal Federal appropriations under the law. Currently non-Federal funds are about $2\frac{1}{2}$ times the appropriations under Public Law 87-788.

These funds—both State and Federal—are the lifeblood of forestry and related range-land research at U.S. universities.

Federal funding under the McIntire-Stennis legislation is allocated, by formula, to the States and ultimately to the forestry schools and departments undertaking rangeland and forestry research.

These funds provide the base with which to acquire permanent staff, graduate research assistants, and equipment needed in research. Without such base funding, it would not be possible to undertake research opportunities available through added financial resources derived from competitive grants—NSF and others.

Four major problems exist for the forestry schools in their efforts to meet their obligations. These are:

First, Inadequate continuing research funding. To meet the substantial demands upon the forests and the rangelands of the U.S., the research expenditures by universities relating to these lands—and the goods and services derived from them—must be significantly increased.

The authorized limit for funding under McIntire-Stennis legislation is one-half of the amount appropriated for Federal forestry research conducted directly by the Department of Agriculture, largely by the Forest Service. Current appropriation under the McIntire-Stennis legislation is about 10 percent of that appropriated for research by the U.S. Forest Service.

There is reason to believe that H.R. 4394 or similar legislation will provide additional sources of funds for forest and rangeland research. This bill recognizes that:

Meeting the Nation's needs for forest and rangeland products and amenities is essential to the Nation's economy, environmental health, and quality of life.

The second major problem is in the area of competitive grant opportunities. To supplement the base funding with which to attack particularly urgent problems and to broaden the basic understanding essential to good management of forest and range resources is necessary.

The grant provision of H.R. 4394 will significantly improve these opportunities. We believe that competitive grants under a carefully monitored peer review system is an excellent approach to the provision of basic research and to the solution of pressing problems.

Three: One of the great problems which forestry schools have had over the years has been their very limited capacity with which to disseminate research results to users. A very strong feature, in our judgment, of this bill is the provision to significantly increase emphasis—under existing Smith-Lever legislation—upon forestry and natural resources.

The fourth problem confronted by forestry schools is a lack of adequate facilities at many institutions with which to provide the professional education, to undertake research, and to provide means of disseminating research information.

My own institution is a prime example. H.R. 4394 can help to overcome these problems by providing assistance with which to improve available facilities.

I would like to comment, Mr. Chairman, in view of Secretary Bergland's comments, on the need for national planning. The forestry community—both university and U.S. Forest Service personnel involved in research—is currently undertaking a major national planning effort.

In this effort we hope to get user input through a series of four regional workshops, culminating in a national symposium to be held in early 1978.

Chairman de la Garza, I appreciate the opportunity to make this presentation of needs among the forestry schools of the U.S., and the ways in which pending legislation may help to meet them.

Thank you.

MR. DE LA GARZA. Thank you very much, Doctor. We appreciate your testimony.

Would the witnesses who have appeared before return to the front of the room at the witness table and in the front row?

Are there any questions of the witnesses? Let us just pose the question to the specific witness.

MR. THONE. Mr. Chairman, all of you were here when I had a discussion with the Secretary about the need, or lack of need, for an Assistant Secretary in this area.

By show of hands, how many of you witnesses who testified would feel that it would be advisable to divide responsibilities here with a separate Assistant Secretary? Would you raise your hands?

[Show of hands.]

MR. THONE. Well, that's almost all of you. How about the advisory board that Mr. Wampler embellished somewhat after my colloquy with the Secretary? How many of you feel that this advisory board is essential here?

[Show of hands.]

MR. THONE. Mr. Brown suggests we should get the negative votes. It is a good point.

On the first question of the Assistant Secretary, how many feel that this would be unnecessary?

[Show of hands.]

MR. THONE. Just one. How many think the advisory board would be unwise?

[Show of hands.]

MR. BROWNING. I think, perhaps, some clarification is needed. Perhaps not that advisory board, but some form of coordination is needed in an advisory sense.

MR. THONE. Your point is well taken.

MR. BROWNING. I would vote for that.

MR. THONE. Thank you.

MR. ROUSE. We certainly recognize the need for this kind of input. We have had a long history of a partnership relationship between

the Department and the land grant community. At that level, we have brought in the advisory people on an ad hoc basis.

Perhaps we need a standing advisory committee of users. I feel that it is important that we separate the doers of research from the users, and make some decisions. Interaction is important.

Mr. BISHOP. Mr. Chairman, I think it is also important to note that the States, at the local level, put in approximately 60 percent of the funding for the research and the extension programs, and about 98 to 99 percent of the funds for the instruction programs in agriculture.

We would be very much concerned about such a small representative on the advisory committee. The success has come from the fact that there has been coordinated planning. I think that is an essential element.

Mr. DE LA GARZA. I think, probably, what we are getting at is this: The title advisory committee immediately concerns many people because we have had a tremendous proliferation of this sort of thing which meets once every year or every 2 years.

It is a nice way to give someone a trip to Washington to be here for 2 days. Very frankly, there is a political debt to be paid.

This is possibly to what the Secretary was addressing himself. Maybe what we need to do is this: As you mentioned, we are looking for a partnership of the people who would be working together.

With that kind of input, we possibly would not call it an advisory committee because the present occupant of the Chair has spoken out loudly and strongly against the proliferation of advisory committees.

I am against just naming a friend here or a friend there, have them 1 or 2 days in Washington every other year, and nothing else happens.

Therefore, I think that possibly when we get to the markup and we get to meetings with the administration conceivably some of our witnesses today as well as other people might help us have some input that might be acceptable.

Mr. THONE. Let me quickly say, Mr. Chairman, that I am aware of your strong feelings on this, and I think you have strong support in the subcommittee and the full committee.

However, the Thornton bill—in section 101—envisioned such an advisory committee and the Wampler bill—in section 4 of title I—also provides for such an advisory committee. In fact, as I read these bills—and I have not studied them all that carefully—it seems to me that the committee seemed to be an integral part of the legislation.

On a somewhat lighter note on this, Mr. Chairman, I tore out a column yesterday, although I did not know that this was going to come up at this time. It says here that, already, since taking office, we have had four Presidential advisory boards appointed.

One is on ambassadorial appointments, one is on the selection of the Director of the Federal Bureau of Investigation, one is the U.S. Circuit Judge Nominating Commission, and one is the President's Commission on Mental Health.

There are also 10 more in the offing, currently. By the way, these all required the concurrence of Bert Lance at OMB. They range all the way from the Advisory Panel for Population, Biology, and Psychological Ecology, under the National Science Foundation, to the Shallow Shrimp Fishery Advisory Panel in the Commerce Department.

I would hope that if there is going to be such a good watchdog on this like you, Mr. Chairman, in agriculture matters, maybe someone should spread this around the entire administration a little more. We would probably all then be better off.

Lastly, I would say this, Mr. Chairman. Jo Anne Barton had a good suggestion, I thought, in her argument for more recognition in here for the scope of home economic activities. I wonder, Jo Anne, if you have any specific suggestions in this regard for both of these bills.

I realize you had some specific thoughts on the fourth page of your statement. Do you have any general ideas, or, specific ideas, I should say, for either the Thornton bill or the Wampler bill?

Ms. BARTON. I think that we felt that, in the Wampler bill, the focus on home economics is well spelled out, but nowhere in that section does it call it home economics.

Perhaps it would help some to have the insertion of the term "home economics" and consider it a profession at that level.

In substance, the home economics is, perhaps, well spelled out in suggestions of various areas of study, but you have to know that it is home economics in order to recognize it.

Mr. THONE. Thank you.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Are there any other questions?

Mr. BROWN. I am not sure that what I have is a question.

I felt that most of the witnesses were pointing to the need for the enhancement of agricultural research broadly interpreted to include all of the many fields that contribute to the meeting of our Nation's food and fiber needs and their proper utilization.

Most of the witnesses pointed to the shortage of research funds, which I think is amply documented and was illustrated by the charts presented by one of the witnesses.

I would like to comment that there is a feeling, which I think is fairly widespread not only in this committee but, probably, in the Congress and outside of the Congress, that agricultural research has tended to become somewhat narrowly focused.

This includes a feeling that one of the reasons for the lack of funds may be this perception among policymakers, such as Congressmen, most of whom do not know too much about the field anyway, and I am one of those, and the public, as a whole, that agriculture is not addressing as rapidly as it should some of the new agenda of problems which the Secretary referred to and we are all aware of, including all of you ladies and gentlemen who testified.

The thrust of both of these bills is an effort to open up the whole process of agricultural research, not in a radical way, but in an incremental way, not losing any of the values which, we all recognize,

have been contributed by the great system that we have, but perhaps by a little shaking up process to bring in other elements that have not been brought in and to expose some fresh ideas, and to raise the question about new direction in which we might need to be going.

On that basis, a thrust is to create a base on which we could legitimately support the additional resources which all of you recognize are needed.

Many of you testifying on behalf of the National Association of State Universities and Land-Grant Colleges, and on behalf of ARPAC recognized the need for some of these new directions in research, but I had sort of a feeling that you had a vested interest in this present organizational structure and you did not look kindly upon what you may have perceived as a radical disruption of it.

I do not see this as a radical disruption as much as I do a process of incremental broadening in order to move forward on a higher level than that on which we have moved before.

Am I mistaken in my interpretation of the thrust of your testimony? I will address that question particularly to Dr. Rouse because I think he made the point most tellingly.

Mr. ROUSE. I appreciate the opportunity to comment concerning this.

You have evaluated our position fairly accurately, I think, except I would like to expand on it just a bit. As I indicated in my testimony, it appeared to us that this is added on top of what we already have.

It does not provide for a continuation of the partnership that has been so vital to this Nation. The experiment stations have been located out where the people are with the problems and we, working with the USDA, have been able to react closely to these problems that people have.

Thus, we have had this close, continuing partnership that we feel is vital in arriving at national needs and national policy for agriculture.

Mr. BROWN. Dr. Rouse, pardon me for interrupting, but I think you have had a partnership, a real close-knit partnership between the establishment of the Department of Agriculture and the establishment of the State land-grant colleges and the extension services.

However, that may be a part of the problem here—those people out in extension may not have been talking to the clientele that they should be talking to. For example, the consumers, who are a major policy element in the equation today, or the need, suggested by the Secretary, for a type of agriculture that was not so reliant on high energy and resource inputs in order to achieve results.

If that partnership has been working well, but missing some of these new thrusts, then that partnership has to be expanded, not destroyed, but some new infusions brought into it.

Mr. ROUSE. We agree with you fully. We know that we have not done all that needed to be done.

Just as Congress responds to the most urgent needs that they see—the wheel that squeaks the loudest—we certainly have to admit that this is what we have done. We have fought the battles that were right in front of us.

We recognize the need for the other battles that did not squeak so loud or that were farther down the road. Certainly, we recognize this fully. That is why we are so supportive of this kind of legislation that has been introduced here to expand and give us the capability of broadening the horizons, both on the research base and the response to the problems.

Mr. BROWN. Let me give you an example from your own statement. I think you pointed out that agriculture has been sort of tied to the nuts and bolts of the agricultural enterprise, and that you have not had, because of limited resources and this focus upon the ongoing priority needs of the people you were working with, the opportunity to go so much into basic research, for example.

You know that the basic research needs to be done.

Mr. ROUSE. Absolutely.

Mr. BROWN. Yet, we have an example of a new agency—ERDA in the energy field, which is very popular. Today everybody can recognize the importance of energy, but energy is not as important as food to this country.

Yet, this new Energy Research and Development agency has gone into basic research with a fairly substantial program because it knows that it is necessary and it can sell it. It is politically salable.

In my opinion, in this country, there is nothing that would be more politically salable than a strong program of basic research aimed at enhancing our capability to fix nitrogen or to use photosynthesis for the direct conversion of sunlight to energy, or to accomplish some of these other very important goals.

I am saying that the agricultural establishment has a better shot at increased resources by broadening their perspective than any other agency that I know of. I think we need to do this.

Mr. ROUSE. We feel the time is right to take advantage of this, and that that would indicate basic research and applied research motivate and stimulate each other. They need to be working on the same problems.

The energy research program of ERDA needs to be motivated both on the basic research and the applied research ends. Certainly, those of us who have responded to opportunities with ERDA are doing this on both the basic and the applied ends.

Mr. BROWN. Another example is the National Science Foundation, which was formed to encourage basic research. It moved into its RANN—research applied to national needs—to create a political base, if I may interpret it from my own viewpoint.

They felt the need to be involved in something that people could see the immediate importance of. Therefore, they tie, to some degree, their basic research program to its applicability in the RANN program.

You have the connection made to order in agriculture.

Mr. ROUSE. Absolutely.

Mr. BROWN. I am encouraged by your response and I thank you for it.

Mr. ROUSE. Thank you, Congressman.

Mr. DE LA GARZA. Are there any other questions?

Mr. WAMPLER. I have one quick observation, Mr. Chairman.

I would like to express my personal appreciation again to all of the witnesses who have appeared and testified today. I know it has been a long day for you. Many of you have been here since early this morning.

A number of excellent suggestions have been made, which, speaking for myself, I assure you I will digest and carefully consider. I still feel very strongly about the need for the advisory board.

One of the reasons why I have become so interested in the subject, generally, of agricultural research is that, in my judgment, as of today, agricultural research is not a primary mission of the Department of Agriculture.

I thought that this was one of the reasons why the Department of Agriculture was established, to conduct functions like research, extension, soil conservation, meat and poultry inspection, and other such functions.

Just a casual examination of the budget of the Department of Agriculture for the last several years will indicate, quite clearly, that now the Department of Agriculture operates more in the nature of a ministry of food than an agency that is concerned with the missions that I thought it was created to perform.

I am not quarreling with the nutrition programs because, basically, I have supported them. However, I think, in the minds of many Members of Congress and many taxpayers, the Department of Agriculture and the American farmer are being charged with well over half of this budget which, of course, is more in the nature of an income-transfer program.

This was the first opportunity, publicly, that I have had to discuss this with the Secretary of Agriculture. Unfortunately, time would not permit us to get into a close examination of the merits of the bill.

However, I want to assure you that I hope that the efforts of this committee, whether we ultimately report a bill, whether or not one becomes law, will have some impact on the decisionmakers in the Department.

This is why I was particularly interested in the Secretary's response to any reorganizational efforts not taking place. We hope that research does not get shoved back on the back burner again as it has been for so many years.

I think this is a great tragedy. There can be honest differences of opinion as to what mechanism we should use but, I think, quite clearly, the need is there to once again establish research as a primary mission of the Department of Agriculture, and that we make the necessary commitments to see that this program is carried out to answer the needs of the American consumer.

I was among those who urged President Ford to reestablish the Office of Scientific Adviser to the President. I think this is much needed. This was the first time that I had heard the suggestion that the Secretary may ask that individual to make recommendations to his Department.

I am not necessarily opposing that, but I still believe that an advisory board, a functioning board, one with broad constituency, such as the one my bill would envision, would be an ongoing function to monitor, to make recommendations, and to report to the Congress and to the President what they consider to be the top priorities in agricultural research.

Again, Mr. Chairman, I want to thank you and the other members of the committee for your courtesy in extending me so much time to ask questions and make comments.

I also want to thank each one of you, the witnesses, once more for coming here because you have made an invaluable contribution. We are very grateful for it.

Mr. DE LA GARZA. The Chair joins in thanking all of the witnesses. You have been very helpful. Your contribution has been quite substantial.

Dr. Browning, you have cooperated above and beyond the call of duty.

Mr. Thornton appears to have a statement.

Mr. THORNTON. Thank you, Mr. Chairman.

I would like to join in the philosophy just expressed by Mr. Wampler as to the importance of having an agricultural research and education advisory committee, or other institution, which is capable of focusing upon a broad national agricultural policy, and upon the need to reemphasize the role of agricultural research as it relates to the many areas described by Congressman Brown.

These range from energy to the development of better methods of nitrogen fixation, photosynthesis, and the many things that can be carried forward by a strong and positive program.

I would also like to thank each of the witnesses who has appeared today. Their ideas have been very helpful. I am sure we will gain a great deal from them.

If I may, Mr. Chairman, I would like to especially thank Dr. Charles Bishop, President of the University of Arkansas, for his fine testimony and for his participation in the panel. I wish we could have had his response to the question posed by Mr. Brown a few minutes ago.

Have you any comment, Dr. Bishop, with regard to the matter which has just been discussed?

Mr. BISHOP. I will share my comments with you later in the interests of time.

Mr. THORNTON. Thank you.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Thank you very much.

The subcommittee will stand in recess until 10 a.m. tomorrow morning.

[Whereupon, at 4:35 p.m., the subcommittee recessed.]

AGRICULTURAL RESEARCH AND RESEARCH EDUCATION

TUESDAY, MARCH 22, 1977

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS,
OVERSIGHT AND RESEARCH OF THE
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The subcommittee met at 10:30 a.m., pursuant to notice, in room 1302, Longworth House Office Building, Hon. E de la Garza (chairman of the subcommittee) presiding.

Present: Representatives Brown, Breckinridge, Hightower, Fithian, Jenrette, Thornton, and Grassley.

Also present: Representative Wampler.

Staff present: John E. Hogan, associate counsel; Christine Abram, clerk; Thomas E. Adams, Gerald R. Jorgensen, Humberto Ruben Pena, L. T. Easley, and Charlotte H. Farwell.

Mr. DE LA GARZA. The subcommittee will be in order.

We continue this morning with the legislative hearings on H.R. 4863 and other related bills having to do with research in the agricultural field.

I might mention that the reason that no other members are here is that the full committee is meeting next door at the present time. We will begin the session and await the arrival of other members.

Is Mr. Gus Douglass, the commissioner of agriculture of the State of West Virginia present?

I was informed that he might be late this morning. Apparently that is the case.

The next witness is Dr. Jack Stockton. We welcome you, sir, and we would be very happy to hear your presentation.

[The prepared statement submitted by Mr. Stockton follows:]

STATEMENT OF DR. JACK STOCKTON
DEAN, SCHOOL OF VETERINARY MEDICINE, PURDUE UNIVERSITY
REPRESENTING THE ASSOCIATION OF AMERICAN VETERINARY COLLEGES

I am Jack Stockton, a Doctor of Veterinary Medicine and currently Dean of the School of Veterinary Medicine at Purdue University in West Lafayette, Indiana. Today I represent the Council of Deans of the Association of American Veterinary Medical Colleges and on its behalf I thank you for the privilege of speaking to some aspects of H. R. 78, H. R. 2223, H. R. 4394, and H. R. 4863.

More and more, in the face of expanding world populations and shifts in trade and power bases owing primarily to energy supply and demand, the expression "Food is Fundamental" is being uttered by an increasing number of people who recognize the critical position that food occupies on the world scene. Its position bodes to increase in importance in the years ahead. Biologically, nutrition has always been, and will always be, fundamental as there are certain basic qualitative as well as quantitative requirements that must be met for any organism to survive, to grow, and to be productive in its environment.

In the face of world-wide population increases and the attendant food shortages and malnutrition problems, questions are being raised about the priority order of grain usage. Criticism is leveled at the practice of feeding grain to livestock rather than processing it for direct human consumption. No doubt some amount of "shift" can, should, and will occur but the production and human consumption of animal protein will not lessen, nor should it. Animal protein provides essential amino acids which are either deficient or totally absent in commonly consumed plant proteins. Meat, fish, poultry, eggs, milk and cheese are common sources of "complete proteins", these being those proteins which contain all of the essential amino acids which the human organism cannot synthesize. Of prime importance is the availability of adequate amounts of these and other required nutrients during early growth and development, as these are particularly important with regard to the development of the central nervous system, including of course, the brain. Thus our concern, in this regard, is for animal protein.

Man has historically lived in close association with animals and has domesticated many of them for pleasure and to provide food and fiber. Heavy reliance is placed on farm animals, especially cattle, swine, and poultry, to convert plant materials, many of which man cannot use directly as food, to complete animal proteins which are found highly desirable both nutritionally and organoleptically for human consumption. In the United States animal products comprise significant portions of the food supply and account for two-thirds of the protein, one-third of the energy, one-half of the fat, four-fifths of the calcium, nearly two-thirds of the phosphorous, and significant quantities of essential minerals, vitamins, and micronutrients. Economically, in the United States, the livestock industry alone is a \$50 billion yearly enterprise and for it to be fiscally sound the animals must be productive. Likewise the products from them must be wholesome and nutritious and thus on all counts the animals must be healthy. As "Food is Fundamental" so likewise "Health is Fundamental."

There are 21 schools of veterinary medicine in the United States, and one of their major functions is supplying the veterinary medical manpower to meet the nation's needs. With increases in enrollments and with the establishment of three new schools in the past few years, the projected needs can be met by 1985-1990 if we can continue at current enrollment levels and thus meet the projected rate of veterinary medical manpower production. Data on entering class and total enrollments in the professional degree curricula in Schools in the United States over the period 1970-1976 are:

Year	# Schools	# in 1st Yr. Class	% increase	$\bar{x}$ /1st yr.	# in all Classes	% increase	$\bar{x}$ /School
1970	18	1430	--	79	5006	--	270
1973	18	1594	11.5	89	5720	14.3	318
1976	21	1856	16.4	88	6571	14.9	313
			30.0			31.3	

These data show that over the past 6 to 7 years enrollments have increased by 30 per cent and when the three new schools shown in the 1976 data become fully operational and have a full complement of students the increase will be one-third. As you are aware Health Manpower Legislation has included veterinary medicine and indeed has permitted the expansions cited above. The American Veterinary Medical Association is, I understand, about to engage in a comprehensive manpower study and until information from that effort is available it would appear to be wise to call a moratorium on new program implementation. We have all witnessed the problems of oversupply of highly trained/educated manpower in some areas and these are as difficult and discouraging to cope with as those of undersupply. We believe that it is logical and realistic to provide funds to upgrade research facilities and to make as productive as possible the already existing schools and departments and the legislation under consideration would allow this. We are supportive of the use of federal funds to permit regional action in meeting Doctor of Veterinary Medicine manpower needs building primarily on already existing programs, but only when thorough and objective study shows an indicated need.

All of this does not, however, speak to the need of post-DVM education and training which essentially translates into research. For the past 8 to 10 years there has been a relative void in this area as the financial support needed for this important activity has not been such as to allow for the full productivity of veterinary medical college faculties and veterinary science department faculties in research and research training activities. The need is there, the desire is there, and the capability is there -- dollar support is what is required to make this productive. Because of this situation the education and training of veterinary medical research scientists has decreased significantly and concomitantly with this has been a lowering of the research productivity. Part

and parcel to this problem is the critical matter of an adequate number of post doctoral trained/educated veterinary medical scientists to fill positions currently vacant and that are being created in program expansions.

Permit me to do a bit of averaging regarding this pool of veterinary medical manpower which I have just indicated is in place and could immediately become productive in carrying out needed research on some important diseases of the nation's food and fiber producing animals. There are, on the average, about 100 veterinary medical scientists-teachers at each of the nation's veterinary medical schools. On the average, one-third of these individuals' time should be spent in research and research training. On this basis, 33 Full Time Equivalent well-trained and capable scientists and developing scientists representing a wide background in competence in animal disease research constitute the immediate pool at each school. In addition to this pool there is also a group, similar to this in training and expertise, in departments of veterinary science on university campuses not having schools of veterinary medicine.

In 1975 the United States Department of Agriculture through the Cooperative States Research Service (as reported in CRIS) supported approximately 1.9 million dollars in animal disease research in the nation's schools of veterinary medicine. This averages less than \$100,000 per school. Of the \$25 million spent by the United States Department of Agriculture through the Agricultural Research Service, approximately \$600-700,000 was extramuralled to these schools thus providing, on the average, another \$33,000 per school for a total of approximately \$125,000 per school in federal funds through the United States Department of Agriculture. Depending on what figure one uses as a reasonable yearly cost per scientist year, and recognizing that animal disease research is costly because of some rather obvious reasons, the United States Department of Agriculture is supporting about 1.3 scientist years per school per year. By comparison, the Department of Health, Education, and Welfare in 1974 supplied \$15 million to these schools. Two points are significant in this comparison. First -- the DHEW support was through the competitive grant route indicating the soundness of the proposals and the capability of the scientists in competition in the national arena. Second -- justification for this support is that the research to be accomplished stands to contribute in a very direct way to human health as the specific diseases of or biological processes in the experimental animals represent models which have application to human disease/biological process counterparts. For the most part they are not disease problems of economic importance and significance to animal agriculture, the livestock industry, and the nation's supply of animal protein.

Legislation being considered would help significantly to rectify this situation by authorizing funds to support the kind of research that needs to be done, that we are interested in doing, and that we are well qualified to carry out. A great deal of the capability to make some significant and early gains is already in place awaiting only adequate funding to get the job done.

We support the idea of the USDA being the central federal agency for the study, planning, and coordination of efforts, and likewise support the designation of funds specifically to our schools/colleges of veterinary medicine to conduct animal disease research much of which is acutely needed and has a significant likelihood of profitable results, and which the schools/colleges are eminently qualified and eager to carry out.

Mr. BROWN [acting chairman]. Thank you very much, Dr. Stockton. It is the custom of the committee to defer questions until all of the witnesses have appeared. So if you can remain until all of the witnesses have testified, we will call you back for any questions that may arise.

Our next witness is Dr. Harry A. Gorman, president of American Veterinary Medical Association, Fort Collins, Colo. We are happy to have you here this morning.

[The prepared statement submitted by Mr. Gorman follows:]

STATEMENT OF DR. HARRY A. GORMAN
PRESIDENT, AMERICAN VETERINARY MEDICAL ASSOCIATION
FORT COLLINS, COLORADO

Mr. Chairman and members of the committee, I am Harry A. Gorman, D.V.M., President of the American Veterinary Medical Association, from Ft. Collins, Colorado. The AVMA appreciates the opportunity to be heard on the consideration of agricultural research legislation, and I will naturally limit myself to the question of federal financial support of animal disease research.

There are two subjects to which I wish to address myself today:

(1) the importance of the livestock and poultry industry to this country, and (2) the need for additional research efforts in combating livestock and poultry diseases.

The Congress recognized the importance of these matters with the passage of H.R. 11873, in 1974. That act would have provided for the necessary financial support for and stimulation to the states to make major advances in animal disease control through research. Unfortunately, that bill was vetoed by President Ford, and his statement at that time indicated that he had been ill advised about the amount of effort going into animal disease research. The colleges of veterinary medicine are rather extensively involved in research, and this can lead one to the false assumption that it is research directed to the prevention and control of diseases of animals. However, much of this research is oriented to solving human health problems, supported by the National Institutes of Health and other agencies with human health responsibilities. The colleges of veterinary medicine should be doing this because they have much to contribute; however, they can also do much more on diseases of animals which do not have a direct impact on, or relationship to, diseases of people.

Animals should be given a high priority in the development of additional supplies of protein for human consumption for several reasons. In addition to the consumer preference for animal over vegetable protein, animal protein has characteristics which make it essential to good nutrition. There are certain unique proteins, necessary to good health, which humans must derive from animals; they cannot be obtained directly from plants.

Our animal population is also extremely important as a source of additional food supplies. There are, of course, many grain and forage crops which cannot be used as food by people. Forage crops will grow in places where human food crops would not be feasible. With some plants, humans can consume only the fruit, and with others, no part of the plant at all. But animals can convert a far greater portion of the plant to a form of protein usable by man.

The economic importance of food animals cannot be underestimated. In the United States, milk supplies about 24 percent of our food protein, 12 percent of our energy, 76 percent of our calcium, 38 percent of our phosphorus, 44 percent of our riboflavin, and important percentages of other food needs. Dairy men in the United States own about 12 million cows, conservatively valued at \$500 each. This \$6 billion investment is accompanied by an additional investment in dairy farms of between \$6 and \$12 billion in land, buildings and equipment.

The beef industry, as well, is a way of economic life for many rural Americans, and processing and marketing provide thousands of jobs and dollars for the economy of every state. Beef sales account for over 25 percent of the total cash receipts on farms.

Between 90 and 100 million swine are marketed annually in this country. The direct cash income from this market amounts to \$5.5 billion, and the swine industry generates an additional yearly agribusiness income of at least \$4.5 billion.

Pets and other so-called companion animals are, of course, not in the same category as the nation's food animals, but I think that it would be a grave mistake to underestimate the contribution of these animals to the country's quality of life and general well-being.

Now I want to illustrate my second point, the continuing problem of disease in the livestock and poultry industries. The huge investment in the dairy industry is inadequately protected against disease. Major portions of the funds available to the U.S. Department of Agriculture (USDA) for dairy cattle disease research are spent for knowledge and protection against exotic diseases, such as foot-and-mouth disease. With the exception of certain catastrophic and exotic diseases, most of the expenditures on dairy cattle disease research in the last 40 years have been directed toward the State-Federal programs to control brucellosis and tuberculosis, which have a direct public health impact. It is time now to exert a significant effort against those diseases which cripple America's dairy industry such as mastitis, infertility, and enteric diseases.

The beef industry has experienced great expansion within the past few years. American cattlemen have realized that enormous losses can result from diseases. Diseases such as enteric infections, respiratory infections, and infertility still cost the industry approximately \$1 billion annually. Today, beef cattle are produced in great concentrations and are frequently transported over great distances, providing many opportunities for exposure

to disease. Disease still represents the greatest single hazard to the efficient production of an adequate and wholesome supply of beef protein.

In the swine industry, estimates indicate that diseases cause a yearly loss of over \$800 million, nearly 20 percent of the direct gross income from that industry. Enteric and respiratory diseases are major problems. Pseudorabies is emerging as a potentially costly disease.

The poultry industry in the United States has expanded tremendously in this century, and poultry disease research, measured by cost-benefit ratios, has been productive, but many problems continue. Viral diseases, including infectious bronchitis, Newcastle disease, Influenza A, and Laryngotracheitis, cause significant losses. In addition, fowlpox, infectious bursal disease, and avian encephalomyelitis are widespread. Certain of these infections may predispose disease by other infectious agents. The factors which affect their occurrence and spread must be carefully studied to develop improved methods of control.

Coccidiosis, clinical and subclinical, continues to be a major deterrent to efficient production of poultry, meat and eggs. Coccidiosis in commercial layers and breeders results in unthrifty birds, excessive culling, deaths, and decreased egg production. After prolonged usage of the agents used to control coccidiosis, many become ineffective because resistant strains of coccidia develop or because of changes in environment and management. More effective control measures are needed to achieve maximum performance.

Internal parasites often cause heavy losses in poultry flocks, but more commonly they cause chronic insidious losses by preventing maximum productivity. Continuous use of chemicals for control of these diseases is not practical. Emphasis must be given to preventive measures and good management practices.

The sheep industry of the United States faces a crisis unlike any other food animal-producing industry on record. The present population of domestic lambs is barely sufficient to assure a viable sheep industry. Unless a supreme effort is made to help the industry, sheep production within the United States will be a thing of the past.

Research on diseases of sheep and goats has made possible practical control measures for such problems as vibriosis, enterotoxemia, and white muscle disease. Still awaiting the development of adequate methods for prevention and treatment are caseous lymphadenitis, respiratory diseases, reproductive failure, foot rot, internal parasitism, salmonellosis, perinatal diseases of lambs, and other diseases that regularly cause severe losses in sheep. Until these problems are solved, the entire industry will suffer.

There have, of course, been notable successes in the control of animal diseases. Several important bovine diseases have been reduced to a relatively low level of incidence, such as: brucellosis, tuberculosis, contagious bovine pleuropneumonia, and anthrax. A notable example in the poultry industry was the development of a successful vaccine for immunization against Marek's disease, a leukemia-like disease of chickens.

However, as I have indicated, there is still much to be done. The level of research support for animal disease problems is currently so low that disease is still a major source of losses for producers. Such losses, of course, result in smaller food supplies than would otherwise be available, and higher prices for the consumer. The shortage of research support also has the long-range effect of limiting the opportunities for young

scientists to obtain their graduate education with research problems in animal disease. While this situation persists, the ability to educate animal disease research scientists is severely limited, thus perpetuating the disease problems.

The American Veterinary Medical Association strongly supports the enactment of a new authority for funding of research directed to the prevention and control of animal disease. We believe that the animal disease research provisions of H.R. 2223 and H.R. 4394 would accomplish this worthwhile purpose as would the recently introduced H.R. 4863 and H.R. 4864.

Mr. DE LA GARZA. Thank you very much, Dr. Gorman. We appreciate your presentation, and we invite you to remain for questions.

The next witness is Dr. Lawrence Bogorad, Professor of Biology, Harvard University.

[The prepared statement submitted by Mr. Bogorad follows:]

STATEMENT OF DR. LAWRENCE BOGORAD
PROFESSOR OF BIOLOGY, HARVARD UNIVERSITY

Our country is fortunate in having a large and efficient institution to carry on much-needed applied research in agriculture. The United States Department of Agriculture is unique among federal agencies not only with regard to the subject matter of its interests, but also in its objective of developing technology and effectively transferring it to commercial use. The flourishing American agricultural enterprise and the magnitude of our agricultural exports attests to the success of the USDA and the commercial agricultural enterprise which its work nourishes.

The U.S. Department of Agriculture also has to its credit some remarkable advances in basic research. Two which come to mind are the research on the growth and metabolism of the mold Penicillium, which produces penicillin, done at the Northern Regional Research Laboratory in Peoria in the 1940's and the discovery of phytochrome, a minute constituent of many plants that perceives and regulates many aspects of plant form and flowering. Phytochrome was discovered by a group led by Sterling Hendricks at Beltsville, Maryland in the 1950's and 1960's. These are but a few of the successes of the USDA at various kinds of basic research, but fundamentally, the agency is organized to carry on applied research and development in its own facilities and in closely related ones such as various state experiment stations.

On the other hand, basic research on plant function has been very poorly supported in American. A broadened study of basic research is essential to support the USDA's more applied structure. We need more basic biological research underlying agriculture and this is a very good time to start building the capacity for this work. Over the past 2½ decades, we have seen a revolution in our understanding of biological processes, particularly in bacteria. In the last few years, this information has begun to be used to probe mechanisms that control life forms in higher organisms. The information obtained by studying bacterial processes has provided both a technology for beginning the exploration of molecular biology of

higher plants and higher animals and also a base of knowledge with which new discoveries can be compared. Biological processes in higher organisms are not identical to those in bacteria, but the information from the simpler systems provides a map to the best places to launch the attack.

Comparatively little of this new basic biological information--molecular genetics and molecular developmental biology--has found its way into research on the green plants which are the basis of our agricultural enterprise. This seems to be the time to invest in the basic research in plant sciences which can ultimately benefit American agriculture and the agriculture of the world as a whole.

It may be useful

- * to review a few cases in which basic research has in fact paid off in applications in agriculture,
- * to describe some prospects for use of new information on biological mechanisms to make further advances,
- * to review the motivation of scientists entering a field, and thus
- * to examine how to entice more bright, active people into the basic research underlying agriculture.

Examples of Basic Research Which Has Benefitted Agriculture

Our present high agricultural productivity of plants depends on fertilizers with major and micro-nutrients. Knowing what to do today depends on research by plant physiologists here and abroad which revealed which elements are essential for plant growth. By 1910, plant physiologists in Europe had established that higher plants require, in addition to carbon, hydrogen and oxygen, nitrogen, potassium, phosphorous, calcium, magnesium, sulphur, and iron. A number of micro-nutrients, including molybdenum, an essential component of the enzyme for nitrogen fixation, chlorine, vanadium, copper and other mineral elements were determined to be essential for growth. Today, a major portion of the production of beans, cabbage, celery, lettuce and sweet corn in Florida would be impossible without the knowledge of trace element needs of higher plants. Boron deficiency occurs in several important agricultural crops, particularly alfalfa, fruit and vegetable crops, and fertilizer that corrects this deficiency is important in farming in 33 different states. Zinc deficiency has been reported in a variety of citrus fruits, nut and vegetable crops in 30 states. Manganese deficiency in crops such as vegetables, fruits, corn and alfalfa in 25 states. Molybdenum deficiency has been identified in important vegetable and leguminous crops in 15 states in the United States it is indispensable for legume production in many parts of Australia. And so on and so

on... The knowledge of trace element needs of plants has proven to be a major factor in the production of food for the increasing world population. This is a field in which the Department of Agriculture has contributed greatly, but it's not likely that we need additional programs in these areas. We do need to know the molecular basis for why these elements are needed. This will come as we learn about the enzymes in plants. This is one example of problems which started as basic research investigations and resulted in agriculturally, commercially important practices.

Another very broad area of basic research which has brought benefits to agriculture is the study of plant hormones. Such work, in a way, began with inquiries by Charles Darwin and his son into why plants turn toward the light. Continuing basic research many years later led to the recognition of a class of hormones called auxins. And later to the discovery in 1942 that 2,4-D (2,4-Dichlorophenoxyacetic acid) is an auxin which could be used as a differential herbicide. New groups of compounds which possess greater selectivity and are not environmentally persistent are being studied and analyzed continually. Substances which control plant growth and senescence have come of similar basic studies into mechanisms of plant growth. Here too we still need to know how simple plant hormone molecules work at the molecular level and new insights will surely come and may eventually permit us to alter the forms of crop plants to increase their edible or their fiber-containing parts.

Attempts to understand how plant cells differentiate led to the development of systems for growing pieces of plant tissue and plant cells in culture. Growing stem tips, i.e. apical meristems, of potato, tomato, chrysanthemum, orchid, dahlia, narcissus and lily can be grown in artificial culture medium and then used to reform entire plants. Apical meristems of virus-infected plants such as dahlia and tomato were to be found free of virus and could be used to produce plants free of virus. The virus-free plants were much more productive than those containing the virus. This led to commercial application with vegetable crops, especially plants like potato, and with commercial flowering plants. In many cases, commercial growers of seed sources or stocks for vegetative propagation find it useful to start with virus-free plants derived from meristem culture.

Examples of Newly Possible Basic Research

Much of the revolution in biological knowledge has been in the realm of molecular genetics and molecular developmental biology. An area of plant biology

which seems likely to be a beneficiary of this new knowledge is the process of biological nitrogen fixation. Higher plants don't fix nitrogen all alone. Some depend entirely upon nitrates or ammonia in the soil. Other plants such as soy beans and alfalfa, i.e. legumes, are able to attract special strains of Rhizobium bacteria. The bacteria bring with them genes for producing the enzyme nitrogenase. This enzyme, when supplied with large amounts of energy derived from products of photosynthesis in the plant, convert atmospheric nitrogen-- N_2 --to a reduced form of nitrogen which can be used to make amino acids. The latter, in turn, are used to make proteins.

There are several interesting possibilities for the future. One is to understand the biology and genetics of the Rhizobium bacteria well enough to fully comprehend their contribution to the process. On the practical side, this could permit selection or construction of strains which do better or which recognize and inhabit a wider variety of plants. On the other hand, the invasion of the bacterium requires the production of special structures on the roots and this is done by the plant. An understanding of the plant's ability to attract the bacterium and to make the nodule which is required for nitrogen fixation is a subject of another range of studies in this problem. If we could understand this well enough, perhaps more plants could be made to form nodules. All of these processes are genetically determined. Now that we can understand better how to analyze the genetic system of an organism, and as we learn how genetic elements are introduced or lost--basic biological problems of great importance--we may also understand better how to do something about important agricultural crops or about bacteria which are now not very useful but could be made important contributors to nitrogen fixation. A far-out possibility is transferring genes for the enzyme nitrogenase from Rhizobium into a place in a cereal plant, for example, where the enzyme could be produced and could work.

Another major problem of importance is of course photosynthesis. It is by this process that living things on the earth are connected to the sun. (And for humans a significant part of the connection is through the North American agricultural enterprise!) Except in a few blue-green algae, photosynthesis goes on in chloroplasts of plants. Chloroplasts make and contain the complex chlorophyll-containing membranes required for capturing light energy and converting it to forms of energy which can be used by any biological system. These green organelles, the chloroplasts, contain some genes of their own. An understanding of how these genes and how their products interact with those of genes in the nucleus of the

cell should tell us how the photosynthetic machinery is put together. The genetic system of the chloroplasts is much simpler than that of the nucleus of the cells. We now know quite a lot about the string on which the genes of corn chloroplasts are strung. Also chloroplast genetic material may be just the place to put useful genes, for nitrogenase as an example, using new techniques of genetic engineering. Understanding chloroplast genetics may also let us tailor photosynthesis eventually.

This preceding discussion is a reminder that useful genes should be saved. Programs of research are needed to identify and rescue germ plasm distributed in out-of-the-way corners of the world. These genes, evolved to adapt the plant to some environmental factors which we may or may not yet have recognized, may be very useful to us in producing the crops of the future.

We could go on much longer with detailed discussions of the examples already cited or we could discuss additional examples of basic research which now needs to be done and could eventually lead to increased productivity. However, even if we went on for hours, there would be things we would not touch on because we do not know about them. This is one of the strengths of basic research. The results of basic biological research frequently suggest questions as well as answers that we should have thought about long ago.

Improving, Extending and Enlarging Basic Research Related to Agriculture

The essential ingredient in all research, basic and applied, as well as in development, is the human one. In all cases, we need bright, energetic people with the imagination to conceive the questions and with the training and resourcefulness to start answering them. The total number of people studying basic biology underlying agriculture is small; the number of outstandingly gifted people is, as usual, much smaller.

The number of research scientists involved now is very small. For example, an International Conference on Nucleic Acids and Protein Synthesis in Plants, was held in Strasbourg, France, last summer. The slightly more than 200 people who attended represented virtually every major laboratory in the world studying a very broad range of subjects from basic mechanisms of protein synthesis in plants to the molecular basis of plant hormone action, and even limited aspects of plant virology. An International Conference on Nitrogen Fixation held at Salamanca, Spain late last summer attracted only about 500 research workers from around the world.

Why are so few people studying basic problems of plant biology underlying agriculture? To understand this question, we must analyze why research scientists

pick a particular field of investigation.

For the beginning student, probably nothing is as important as a sense of excitement and the promise of succeeding at solving an important question. Right now there are many exciting and important problems in plant growth which seem soluble, but the scale of investigations is very small. The excitement will soon evaporate unless there are enough people to continue the flow of significant information which will in turn fire the imagination of active and potential research workers. If the number of people involved is too small, progress is slower and the thrust, the excitement is lost. More people have to be brought into the field as beginning students and as converts from other disciplines. People trained in molecular genetics, molecular developmental biology, biochemistry, biophysics, microbiology, cell biology and other areas need to be attracted.

Another consideration made by scientists selecting a field of research which can not be overemphasized is the possibility of making a career in this line. Thus, as in other professions, the scientist must perceive that he or she will have a place to work in the long run--that there is a reasonably good chance to be appointed to a position in a research establishment or university when training is completed and that it will be possible to obtain funds to carry on the research if it is meritorious.

HR 78 and HR2223 both recognize that the best ongoing research programs in this field can not thrive without an infusion of funds and that there must be some sign that these programs are very likely to continue for a number of years. These bills also recognize that the results of basic research can best be implemented by continuing to support, at a high level, programs already in progress within the overall USDA umbrella. These new funds will not in themselves assure success in basic research, but without them, one can be quite certain that there will be no success.

The competitive grant programs also recognize the need to broaden the base of all biological research which is brought to bear on agricultural problems. A large part of the basic biology for agriculture is now being done in land grant colleges and universities. Many of these are very good and this work should be supported and enlarged rather than reduced, but there are many other institutions in which the amount of agriculturally-related biology going on is very small. The latter are sometimes the very institutions which have biological research groups working at the forefront of understanding biological mechanisms in other systems. An important part of expanding basic research underlying agriculture is to increase the interconnections with other basic biological research programs in institutions

which now barely have such interactions. These are largely private institutions and state institutions without agricultural programs and with only a few experimental plant scientists.

The problem of keeping the best young people trained in the plant sciences working on these problems and of bringing in the most able individuals trained in other fields is recognized in HR 2223 in its provision of funds for training grants and individual postdoctoral awards. The appendix to this testimony describes in more detail a proposed plan for improving and increasing basic research underlying agriculture by recruiting excellent young scientists under the provisions of HR 2223. As I understand it, the postdoctoral support program of this bill could also be used to establish some new positions in universities and research establishments on at least a temporary basis. A model for this is the very successful Research Career Development Award Program of the National Institutes of Health. Awards are made of five years of salary support for promising young investigators. Although the initial excitement and interest may be high, the perception that there will be no long-term place to work if one enters basic plant science underlying agriculture soon causes enthusiasm to wane. New positions must be made available either on a temporary basis or by establishing professorships by individual application from institutions or as parts of training programs. This would be one of the very best ways of enlarging the interface between basic research underlying agriculture and the forefront of other biological research at institutions where the contacts are few because the number of plant research scientists is too small.

Conclusions

- (1) Basic plant research has contributed to the present high level of agricultural productivity in this country.
- (2) The present U.S. effort is too small to sustain the large investment we make in applied plant agricultural research.
- (3) The new knowledge which has been acquired in the past 2½ decades about how living organisms work is ready to be exploited in studies of agriculturally-important organisms. But we must enlarge our present basic research program. The enlarged enterprise is required to take full advantage of the leads in hand and to create an atmosphere of excitement which will attract the best young scientists.
- (4) Improving, increasing and spreading basic research underlying agriculture

will take an infusion of money to support the research and to train or retrain talented scientists. HR 78 goes part of the way and HR 2223 farther along the way to permitting the necessary expansion in quality and quantity.

(5) Finally, I must point out that the amounts proposed for the basic research program are modest, but still it will take foresight and courage for the Congress to embark on the enlargement of this program. Basic research findings which can be turned to agricultural advantage will not come in a year, and may not come in ten years. If you enact this legislation--I hope that you will and I think that you should--you are very unlikely to be able to point to the results at the time of your next election to office or perhaps even in the legislative lifetime of some members. Yet, in a way, this points all the more strongly to the urgency of getting started now. The prudent person starts earlier on a longer journey and does not put off time of departure until the failure to reach the goal in time is assured. The journey will be long, but I believe that it will be exciting and it will be profitable. You are being asked to create a vehicle which is reliable and durable enough to take us to distant but very worthwhile goals.

Mr. DE LA GARZA. Thank you very much, Dr. Bogorad.

Our next witness is Mr. Jack Dahl of Gackle, N. Dak. He is representing the American National Cattlemen's Association.

STATEMENT OF JACK DAHL, CHAIRMAN, AMERICAN NATIONAL CATTLEMEN'S ASSOCIATION AND THE NATIONAL LIVESTOCK FEEDERS ASSOCIATION

Mr. DAHL. Mr. Chairman and members of the committee, my name is Jack Dahl. I am a rancher from Gackle, N. Dak., and also serve as chairman of the Animal Health Committee of the American National Cattlemen's Association. ANCA and the National Livestock Feeders Association represent almost 300,000 cattlemen engaged in every phase of beef production.

We appreciate very much this opportunity to offer our support, our suggestions, and our constructive criticism to the proposed agricultural research legislation offered by Congressman Wampler and Thornton.

The food and agriculture industries are certainly the most vital of all activities to the well-being of people or a nation. No activities are more critical to the health, productivity and happiness of human beings and no needs are more basic than those which people express for wholesome and nutritious food.

Consequently, agriculture is the major industry of the United States and of the world. It is a major consumer of many of the essential manufactured products such as fuel, steel, rubber, and fertilizer. The food system affects each American every day, and one-quarter of the world population is supplied with food from the American farm. The American farmer and rancher are part of the most elite group of our world population—making up one-tenth of 1 percent of that population, but helping to produce food for 25 percent of the world's population.

These U.S. producers operate approximately 2.8 million farms in the United States, with 800,000 of these producing about 88 percent of the food and fiber. These farms and ranches are capitalized at \$540 billion—or about three-fifths of the capital assets of all U.S. corporations. By comparison, the auto industry is capitalized at about \$80 billion annually.

The export value of agricultural products in 1977 is expected to exceed \$22 billion. This is a major factor in the positive balance of payment for the United States now and into the future.

Part of the return to investment in agricultural research comes in the form of a more abundant supply of agricultural products which results in a lower real cost of food to consumers. Another part of the return to agricultural research is the release of traditional resources from agriculture—mainly labor. A nation that must employ 70 to 80 percent of its people to produce food cannot produce much of anything else. Hence, its standard of living is low.

Two hundred years ago, it took about 80 percent of the U.S. population to produce food for our Nation. Now it takes less than 5 percent. Without the increase in agricultural productivity made possible by agricultural research, we would still be an underdeveloped country.

Therefore, the beef cattle industry is gratified that Congress has recognized the need for additional research effort. We have always been concerned in our operations with profit, or benefit, from investment of capital and labor.

Today, the popular term is "cost-benefit ratio." And it is important that the public be concerned about this ratio in publicly supported research. Surely few investments have yielded greater returns than past expenditures in agricultural research. A recent study shows that the public received an annual rate of return of 26.5 percent from investments in research on production agriculture during the period 1939 to 1972. Further, the study estimates that even greater returns for additional investments may be expected during the period of 1978 to 1985.

Without an adequate increase in agricultural research, there is an increasing concern about the ability of American agriculture to increase food production to the point where it can help offset world hunger. There is even more concern that agricultural production will not be able to keep pace with population growth here in the United States. Today, the American farm producer is expected to lower production costs, reduce food prices and still feed a good part of the world. This is a large order—especially when the United States has been backing away from its responsibility in agricultural research.

If the world is to accommodate 7 billion people by the year 2000, we must determine as a Nation whether or not we will be expected to contribute to world food supplies as we now do. If the answer is yes, we have a great challenge to meet.

Increases in spending for agricultural research have not kept pace with inflation. The amount of time scientists can spend in important research areas has declined as the research system has been caught between a budget that's not growing and ever rising costs. And although the U.S. continues to provide the most support among all nations for all types of research and development, the U.S. support, in terms of gross national product, has declined steadily since 1964.

During that same period, West Germany, Japan and the Soviet Union have increased that portion of their GNP allotted to research. Of all governments which do provide funds for agricultural research, only Italy, with 1 percent, provides a smaller portion of its centrally appropriated funds than the United States.

In 1887, the Hatch Act made it possible for States to establish research units as a part of land-grant universities. We believe this act as amended, combined with USDA-Agricultural Research Service, ARS, has proved to be an excellent system for providing research leadership. Under this legislation, there is adequate machinery for accountability and for review and revision in research emphasis.

In addition, the agricultural research community which resulted has built an enviable record of accomplishments, integrity, and wise use of funds.

We believe that it would be a step backward to replace the current agricultural research which has been so successful with some proposed new systems that are subject to serious question.

Failure to meet agricultural research needs has not been for want of laws or basic policies. We have adequate laws. And as I have just

noted, we have a structure and system which can carry out those laws. The real problem has been a lack of necessary commitment to research—a lack of funding to conduct research needed to keep our producers more efficient and competitive, and to help provide more food and better food for a hungry world.

The bills under consideration here today—H.R. 4863, introduced by Congressman Thornton; and H.R. 4394, introduced by Congressman Wampler—recognize the need for additional support of agricultural research. We support the proposals in these bills which: One, establishes USDA as the lead agency for agricultural research; two, states that the purpose is to augment, coordinate and supplement the planning, initiation and conduct of existing agricultural research programs under existing statutes; three, establishes a philosophy for reasonable balance of competitive and discretionary research allocations; four, increases the funding for agricultural research; five, recognizes the importance of the Extension Service to educate users of research; six, recognizes the need for additional human nutrition research; and, seven, places new and vital emphasis on animal health research.

However, we vigorously oppose the provisions in these bills for enumerable advisory boards, councils and committees. Surely these would be counterproductive, and they would be contrary to the President's stated objective of streamlining the bureaucracy.

If Congress concludes that advisory groups are absolutely necessary, we suggest that advisory representatives from most Federal agencies be ex-officio and that additional representation from the agricultural community—the users of research information—be incorporated into the advisory groups.

For instance, the Wampler bill places only 4 producers, farmers and ranchers, on the 32-man overall Agricultural Policy Advisory Committee. And there is no provision in the Wampler bill for producer advice and input on animal health research matters.

On the other hand, the Thornton bill provides that 3 of 11 members of the Animal Health Advisory Board are to be producers. But there are no provisions in the Thornton bill for producers on the overall 21-man Policy Advisory Committee. So if this committee feels that a minimum number of advisory panels are needed, we would like to work with you on the makeup of them.

In the animal health area, we seriously and respectfully ask that any newly established animal health research advisory board include as members at least one person representing each major livestock species. We ask further that those persons should be chosen from the major national organizations representing that commodity.

The membership of the American National Cattlemen's Association has already developed its own set of research needs and priorities which are continually revised and updated. We have a copy of this attached to our testimony this morning.

The beef cattle industry feels that the Agricultural Research Service and the State agricultural experiment stations have been very responsive to our research needs. To further remove decisions on research needs from these researchers and from producers themselves would lead to less research productivity—not more.

In addition, we question the establishment of any large competitive grant system initially. While limited use of competitive grants may be desirable, unwise use can certainly lead to expensive and questionable results. Competitive grants often lead to inefficient use of expensive research equipment and do not provide the necessary stability to encourage good continuity of research or research staffs.

In closing, let me repeat that it is essential that agricultural research capabilities, which have been developed with such great effort over a long period of time in the States and the Nation, be maintained and sustained. This capability needs to be recognized as a public resource that must be fostered, not a public expense that should be curtailed. It is an investment in both the present and future well being of our country.

Mr. Chairman and members of the committee, we certainly appreciate this opportunity to be here this morning. Thank you.

Mr. DE LA GARZA. Thank you very much, sir. We appreciate your offer of cooperation, and the attachment to your statement will be put in the record.

[The attachment to Mr. Dahl's statement follows:]

BEEF INDUSTRY RESEARCH NEEDS

(Revised 1975)

BEEF PRODUCTION

	Current \$M	Recommended \$M Equivalents
1. Reproduction (physiology, management and nutrition)	44	70
2. Environmental quality	48	90
3. Management systems (including confinement)	12	50
4. Genetic breeding studies	62	70
5. Carcass evaluation and meats research (related to consumers' desires)	35	40
6. Merchandising procedures	26	40
7. Nutrition research	87	100
8. Other (production areas not included above)	18	60

PASTURE, RANGE, FORAGES
AND SILAGE

1. Forages as related to conservation of soil, water, forests and other natural resources	114	130
2. Protection of forage crops from weeds, insects, diseases and various pollutants	125	150
3. Improved production efficiency and quality of range, pasture and forage crops (including plant breeding, fertilization, management, harvesting)	276	315
4. Improved processing, preservation and utilization of forages, crop residues and by-products	35	45

INFECTIOUS DISEASE
AND INSECT AREAS

	Current \$M	Recommended \$M Equivalents
1. Respiratory and shipping fever complex	14	31
2. Calf scours complex	10	28
3. Foot rot	.5	1
4. Pink eye	3	5
5. Anaplasmosis	10	14
6. Reproductive diseases (including leptospirosis and vibriosis)	7	13
7. Brucellosis vaccine research (development of new vaccines and identification of vaccinates)	.5	6
8. Bluetongue	1	7
9. Encephalidity	1	4
10. Foot and mouth disease	12	24
11. Insects and parasitism (internal and external; excluding anaplasmosis and screwworm)	28	33
12. Screwworm	6	10
13. Weak calf syndrome	4	6
14. Sudden death syndrome	1	4
15. Other (disease areas not included above)	17	20

ECONOMICS

1. Economics of production and competitive factors	28	35
2. Opportunities for development of foreign & domestic markets	1	10
3. Structural changes in agriculture	16	20
4. Marketing costs, returns and efficiency	23	25
5. Supply, demand and price cycles	6	15

Mr. DE LA GARZA. The next witness is Mr. Hugh Anderson, president of the Pacific Rubber Growers. We welcome you, sir; and will be happy to hear from you.

[The prepared statement submitted by Mr. Anderson follows:]

STATEMENT OF HUGH ANDERSON
PRESIDENT, PACIFIC RUBBER GROWERS
SOUTH PASADENA, CALIFORNIA

Members of the Committee, I am honored to address the hearings on a subject about which I feel strongly.

The United States is virtually dependent upon foreign sources for the very strategic commodity - rubber. OPEC pricing decisions continue to raise prices of oil derived synthetic rubber and the finite natural fossil fuel supplies cause further concern. Traditional natural rubber is grown almost exclusively in the troubled countries of Southeast Asia. In recent years acreage under cultivation has been reduced in some areas, while supplies of this labor intensive commodity have been thwarted for us from Viet Nam and Cambodia. We must view with some suspicion long term supply access of natural rubber from Thailand and other producing Southeast Asian regions.

Consumption of natural rubber is increasing in the United States, just at a time of potential supply problems as noted. Rubber for tires is a major use of this imported commodity. America is quickly shifting to use of radial from conventional type tires. Radial tires require over 25% natural rubber content versus 10% in conventional types.

Several prominent members of the U. S. rubber industry predict a crisis in natural rubber supply within three years.

Gentlemen, we believe you will agree with us that the answer to our deplorable and dangerous situation is to be found in the development of our own natural rubber in this country which we will control.

My firm, Pacific Rubber Growers of California, and colleagues have been involved actively with research, development and education about Guayule for over 30 years.

In 1944, Dr. Robert Millikan of cosmic ray fame, as a Nobel Laureate and former head of California Institute of Technology, in an article that was published at that time by the Associated Press enumerated the eleven most important things he considered essential following the second World War. Number 5 was Guayule. I quote, "Dr. Millikan thinks oil and the agricultural crops, (from which alcohol is obtained) from which our synthetic rubber is made will be needed for gasoline and food respectively and making organic products like plastics. He foresees Guayule rubber as perhaps developing into one of the world's great future industries."

My association with Dr. Millikan was fairly close in those days. His influence and encouragement have been long lasting. At the time, Dr. Millikan directed Professor Robert Emerson to seek out the scientific endeavors Cal Tech could sponsor in one of the Japanese relocation centers where he knew a number of Japanese-American scientists were confined. They determined on a program of assisting the Department of Agriculture in the development of Guayule rubber which was, of course, proceeding at Salinas, California, under the Emergency Rubber Project. The Department of Agriculture was charged with producing rubber. At the Japanese-American relocation center, the scientists had nothing but time, and their skills. They put their time towards the development of the new rubber for the world which we call Parthenium rubber from Guayule.

Two of their improvements which have great economic application were the new extraction process which recovers 99% of the rubber from the shrub as against the traditional 65% recovery. An examination of the process by Ken Taylor of the U.S.D.A., reports use of power by the new process cut to 7%. The quality of the rubber extracted was the most

important achievement. Rubber from the pre-war Intercontinental Rubber Company and from the Emergency Rubber Project had more than 10% so called insolubles (non-rubber items in the rubber). These were virtually eliminated in the new process. Government achieved maximum rubber tensiles of 3,720 P.S.I. Our Parthenium rubber from Guayule achieved 5,200 P.S.I., tensiles under standard formulation for gum rubber as tested by Uniroyal Company in their laboratory.

The second achievement was a new method of deresination. Guayule rubber has always been noted for a high percentage of resin which makes the old Guayule rubber superior as a cement but inferior historically as a rubber for tires. A more efficient method for removing the resin was developed. The new method is economical and makes the constituents of the resins highly available as by-products for industry, having a value according to Dr. Feustel (U.S.D.A.), as equal to the value of the rubber. We, therefore, describe our Parthenium rubber from Guayule as being different from any Guayule rubber previously produced by anyone and ready for the best and broadest possible industrial use. Five rubber companies have reported positively to me on the facility with which it can be handled in the factory. The new process also results in a high grade paper pulp by-product, which has been examined and approved for industrial use by one of the largest paper companies and several paper engineers.

At the end of the war, the recommendation of the big four rubber companies to maintain the Guayule program was overruled. Firestone was stopped from continuing the construction of two new extraction plants for the recovery of \$15 million worth of remaining rubber in the fields in California that had been planted by the Emergency Rubber Project. I was granted the right to buy the land and retain the last remaining 1150 acres of planted shrub by Paul Roberts, the second Director of the Emergency Rubber Project. Major Kelly, the first Director of the Emergency Rubber Project, left me his personal rubber library. With associates, I built a rubber extraction factory based on our new process which was entirely dependent on a purchase order my company had received from the Wrigley Chewing Gum Company, a war-time non essential user of rubber, on whom price control did not apply. Mr. William L. Batt, Director of the Inter-Agency Policy Committee on Rubber had arranged for the sale of 500 tons of our rubber to this company so that an adequate price would be obtained to insure our future success. The Wrigley Company agreed to pay a substantial amount for the rubber, more than 15 times the Government controlled price.

I appeared in Chicago with our first 200 pounds of rubber. Their purchasing agent commented he had never seen Guayule rubber so good and clean. I then learned that the Government had granted permission for Wrigley to buy rubber from the stockpile at a time of great rubber shortage. There was no other non essential user allowed to buy rubber at that time at the price of 17½¢ per pound. Though Wrigley was willing to pay us a premium, it in no way came close to matching his purchase order, nor could I get permission from the Government to sell to anyone else.

During 1960 I examined the Guayule plantings in Turkey and in Spain. Later they appeared to have been pressured and closed down by the economic forces which produced synthetic rubber. Later during the 1960s, I was invited to Western Australia to grow Guayule rubber and although fully financed on my last trip there, I was informed the Government would not be able to grant me title to the 200,000 acres they had previously committed. At the national capital, Canberra, I learned from Deputy Prime Minister John McEwan that my endeavors had caused the first synthetic rubber plant to be built one year earlier than planned. I began to quite clearly see that Pacific Rubber Growers could win no contests with the international synthetic producers. The overall factors and climate were not encouraging world wide for the development of Guayule until the recent several years.

The knowledge that synthetic rubber from fossil fuels would be limited encouraged me to work harder to get a better rubber than synthetic accepted. The only requirements for Parthenium production are non competitive agricultural land, sun, air, and water. (A small natural solar engine.)

In the mid 1960s, I was invited to Mexico by Dr. Zevada, head of the Foreign Bank of Mexico and with the encouragement of Tony Freeman, the U. S. Ambassador to Mexico, and a personal friend, I made a survey of the northern five states of their wild Guayule. I strongly recommended that they take advantage of their natural resources and suggested that, as of 1964, they had 35 million dollars worth of rubber at 30¢ per pound, growing in their country. Governor Aguirre closely questioned me at the time and again at a later visit to Mexico and he has become Senador Aguirre, head of the Arid Zones Commission of the country, sponsoring the good work that has been going on in the production of Guayule for the past four years at Saltillo in the state of Coahuila, where Senador Aguirre had been Governor.

The conference called by Mr. Bill Miller, Dr. William McGinnies, and Dr. Noel Vietmeyer at the University of Arizona in November 1975 signalled a new life and opportunity for my favorite drive, the development of Parthenium rubber from Guayule.

Recently the Goodyear Company and the Michelin Company of France have evidenced particular interest in Guayule. The Michelin Company recently examined a sample of our rubber and reported that it compares very favorably with Hevea rubber from trees and wish to have much more rubber from us. The past 33 years of research, development, and education have cost me, personally, over half a million dollars. I must now turn to others. I can only hope to set up equipment for producing rubber with outside grants and assistance to demonstrate the cultivation and extraction mill process.

My company has control of the only large commercial accumulation of standardized seed and fortunately for us, the only improved hybrid seed which was achieved by crossing Guayule, Parthenium Argentatum with Parthenium Stramonium, a 20 foot tree. This increases the size of the two foot Guayule shrub to about four feet and results in an estimated 40% improvement in the per acre yield of rubber. That seed, my company is expanding by planting acreage from whence harvests of seed will be possible during this year.

If we contract to do a demonstration planting of Guayule, I can assure you of the support of my associates, who know more about Guayule than anyone else in the world. We will make every effort to expand on our preliminary work of establishing areas, and will obtain staff to do an economical but complete job of delivering rubber equal to the worlds best quality natural rubber. The Emergency Rubber Project, under the difficult experience of wartime, planted 35,000 acres at a cost in excess of \$40 million, which would translate to \$80 million today.

We want to plant 10,000 acres at a cost of \$15 million, including the extraction plant. This is designed to be economical based on a harvest of one-fourth of the acreage (2,500 acres) each year of a four year growing cycle. The factory would be centered in the middle of the acreage to reduce hauling costs of baled Guayule. The only shipping expenses would be for the finished products from the extraction mill, namely: rubber, industrial chemicals, paper pulp, wax and fertilizers in the form of soil nutrients.

I agree with rubber industries that home production of rubber is far better than encouraging foreign production for our rubber needs. Domestic employment in the production of rubber will provide a very secure source of one of the world's great natural resources. What possible control did we have over Sukarno's rubber in Indonesia when he declared that none would be sent to the United States? What control did we have over supply and demand when, under a tight market situation from ever increasing demand, a large unexpected purchase was made in the 1950s from mainland China and this raised the price of rubber unexpectedly high? Surely we all, in this country, would appreciate a guaranteed domestic source of raw materials not subject to the political buffets of half a dozen foreign countries.

We implore you to encourage the development of this new domestic rubber industry which will also provide employment and utilize arid southwest lands, often minority or Indian held.

Each acre of Guayule growth yields approximately 16 tons of oxygen per year, environmentally a good contrast with industrial production of synthetic rubber. Furthermore, each ton of rubber so produced saves limited fossil fuels for valuable energy production. Lastly, the beginning of commercial production of rubber from Guayule will begin to ease our balance of payments and serious dependence upon questionable foreign sources for this critical commodity.

We request enabling legislation for the demonstration of Guayule's current more favorable prospects to become the worlds next source of natural rubber.

My colleagues and I, and our firm, Pacific Rubber Growers stand ready to assist in any way deemed appropriate. We are eager to work with the Congress.

Thank you for the opportunity to speak before you.

Mr. DE LA GARZA. Thank you very much, Mr. Anderson. We invite you to remain a few more moments.

I understand that Commissioner Douglass has arrived. We welcome you, sir. We appreciate your efforts to be here. We will be happy to hear from you at this time.

Mr. WAMPLER. Mr. Chairman, may I be recognized?

Mr. DE LA GARZA. Mr. Wampler.

Mr. WAMPLER. On past occasions, I have had the pleasure of presenting Commissioner Douglass to the committee. As you know, the great State of West Virginia does not have a member of its Congressional delegation on this committee. But Mr. Douglass has been before us on other occasions and always brings us a good message. And it is a pleasure to welcome him here again this morning.

Mr. DE LA GARZA. Thank you very much, Mr. Wampler.

You may proceed, Commissioner Douglass.

STATEMENT OF GUS DOUGLASS, COMMISSIONER OF AGRICULTURE, STATE OF WEST VIRGINIA

Mr. DOUGLASS. Thank you, Mr. Chairman and Congressman Wampler. We are glad to claim you as a West Virginian—even though you come from the great State of Virginia.

Gentlemen, it is a pleasure to be here again today. I do want to thank you for the opportunity to have input into your deliberations on the proposed demonstration farm act.

My name is Gus R. Douglass. I am the agriculture commissioner for the State of West Virginia, and a beef cattle and grain farmer in the Kanawha River Valley.

I wholeheartedly, and without reservation, support the concept embodied in the proposed act.

We have had some very good experience in West Virginia with a small demonstration farm geared to showing the profitability of intensive agriculture on limited acreages. This particular farm is the property of my Department. We acquired an appropriation to demonstrate how limited acreage could be totally family supporting, and enlisted the help of the Extension Service.

They were more or less placed in charge of it. It proved to be, unfortunately, a miserable failure since their philosophy at that time was geared to social aspects of rural life. We then asked for help from the scientists themselves—through the experiment station at West Virginia University. And since then, the farm has been an unqualified success story for us.

In my opinion, the USDA Extension Service is no longer the organization we historically can rely upon as the interpretative branch of Agriculture or as the close-working partner of the experiment station or the silent partner in family farming endeavors. And, again, one reason is the Extension's overriding philosophy that farming as a way of life is old fashioned and that only professionals deserve individual assistance.

I might add that there are still some few State Extension Services that resist this Federal philosophy of yesteryear. I point this out at

this time in the hope that the philosophy and direction of the Extension Service might come back to that which is much more favorable to the small farmers.

Another reason is the USDA's philosophy that because small farms do not provide a major portion of our national agricultural production, they are not worth helping—regardless of management. But perhaps the energy shortage which signals the end of the uncontrollable use of depletable resources will put us slowly back into a more unbiased view.

Whether this is so or not, however, this bill you have under consideration will set the stage for this to happen.

The USDA's approach—that of only large farming operations—has done irreparable harm to once magnificent rural areas. Over 30,000 people left the countryside for the city during the last two decades. Many are now starting to return. And with help such as demonstration farms to show the way, they will prove anew what every economist knows—that a well-managed small farm will give a higher turn per acre than will a large one.

I am thoroughly in accord with the provision which sets State Departments of Agriculture as the lead agencies. Most of these departments have personnel in regulatory activities, and nearly all have a marketing staff. This is a unique combination, and one which allows for a lot of interplay with various organizations. They can encourage the experiment stations' researchers along lines they and the people believe to be profitable. And they are uniquely situated to advise and help with the product from the soil to the consumer. Also, if all goes well on the small demonstration farm, it can undoubtedly be adopted to large acreages.

I do believe the planning committees established in the bill should have farmers and State department of agriculture personnel on them. Also, there are a few inconsistencies with the language of the bill. But, I say again, I believe that the concept is excellent.

I support it wholeheartedly, and I believe it addresses itself to the all-important matter of maintaining an efficient agricultural posture in this Nation.

By starting now, we can perhaps gain 4 or 5 years on the rapidly nearing energy and other crises. This headstart will help to take the sting out of recommendations which some of the undeveloped nations are receiving—recommendations to continue their farming as at present, but with better crop varieties—because in 10 or 15 years they will be better off than we are as our energy intensive system is necessarily stopped and we start back with the techniques they have helped develop.

I do not see this bill as overlapping with extension or, for that matter, with any other agency. In West Virginia, we work together. We have just recently transferred about 12,000 acres to start a program, such as this bill envisions. In fact, our program will go an additional step and include vocational agricultural training in processing.

Let me reiterate in closing that I believe State departments of agriculture are the only agencies which can effectively relate these

farms to all aspects of production, processing, and marketing without setting up another giant Federal bureaucracy—and one which would have to start by feuding with its parent, the USDA. And we consider ourselves very close to the U.S. Department of Agriculture.

I thank you and I would be happy to answer any questions you may have.

MR. DE LA GARZA. Thank you very much, Commissioner. If you would remain where you are, we would invite the other witnesses to come to the witness table for questions from the committee.

Mr. Wampler, do you have questions?

MR. WAMPLER. Thank you, Mr. Chairman.

I would like to express my personal appreciation to each of the witnesses this morning for what I consider to be, again, excellent testimony.

As you know, we had two sessions yesterday. And I think we have built a rather impressive record. We have received some specific recommendations and have heard some observations which I am sure will be helpful as we try to develop a bill which hopefully will become law.

As one who has had some interest in this general area of the need to accelerate agricultural research, I recognize that there is a large array of constituents who are interested in the agricultural research dollar. And this is understandable.

Dr. Gorman, I apologize for my late arrival. It was simply because there was a meeting of the full committee going on in the adjoining room.

Have you had an opportunity to study in detail the latest of my bills, H.R. 4394, which was introduced on March 2d?

MR. GORMAN. Yes, I have. I have this in my notes as well, but neglected to read far enough to express an opinion. Certainly, the AVMA can support this bill equally as well.

MR. WAMPLER. As you know, I am from Virginia. There has been a concerted effort for some years now to establish a school of veterinary medicine at our land-grant university at Blacksburg. As a matter of fact, we have a dean, but no college yet.

How many recognized or accredited schools of veterinary medicine are there in the entire country?

MR. GORMAN. There are currently 21 that are active and taking students. And with Mississippi State taking students in 1977, this would make 22.

MR. WAMPLER. For the last several years in Virginia, I am told, we have had well over 200 highly motivated and well-qualified applicants for admission to schools of veterinary medicine, but who simply have been unable to find a slot. Virginia, as do many States, does participate in a regional arrangement, but I think that fewer than 20 Virginians are accepted each year as participants in the regional arrangement.

And I am just wondering what we are going to do to supply the number of veterinarians that are obviously needed and also to train researchers to carry out this vital function of research. What does your association propose by way of increasing the capability of veterinary schools to accept these students?

Mr. GORMAN. Mr. Wampler, we are caught in between two forces: the need for veterinarians and the student pressure to study veterinary medicine. These are entirely separate, and we recognize both.

The AVMA will start this year a survey, which should be conducted and finished in 18 months, on the unbiased need for veterinarians. In terms of student pressure, there are about six students requesting to study veterinary medicine for whom we have slots—despite all of the enlargement of classes at new schools which have come aboard. So we do recognize this.

It is a shame that some of the highly motivated and very talented students cannot study the course of their career because we do not have institutions, and facilities, and faculty to support them.

On the other hand, we do have to be a little bit careful in that we do not establish so many institutions that we dilute the faculties of our country and the talents of our country; and, in so doing, degrade the profession and let it go downhill.

Mr. WAMPLER. I recognize that you are caught in the middle of these two forces. But in speaking for my part of Virginia, which is a major livestock-producing area, we are fortunate in having the quality of veterinarians that we have. But, unfortunately, I don't think we have enough, particularly of those who are willing to practice with large animals. We have those who specialize in small animals and pets, and understandably so; but, it just seems to me that the demand is there. So I would be interested in the conclusions reached through your study.

The testimony here this morning as well as testimony that we have received throughout the years that I have been on this committee indicates that the economic losses to the livestock industry runs into millions of dollars simply because we have been unable to carry out adequate research in animal diseases and other aspects of animal research. And we simply have to have the trained personnel to do it. So to the extent that we deprive the livestock industry of a practicing veterinarian who goes into research, it simply tends, I think, to complicate the problem. And this is an area in which this subcommittee is deeply concerned.

Mr. DE LA GARZA. Will the gentleman yield?

Mr. WAMPLER. Surely.

Mr. DE LA GARZA. I now can understand why my Republican colleague is so interested in getting more veterinarians. In 24 years of public office, I have only had Republican opposition twice. And both times it was a veterinarian.

[Laughter.]

Mr. WAMPLER. That was purely coincidental.

Mr. GORMAN. May I just respond, Mr. Wampler, for just a moment? We have a distribution problem, of course, with veterinarians—as we do with other professionals. And we do have two counties in Colorado which are void of veterinarian services. And we have a school in Colórado. That is a problem of distribution.

It is very difficult to get somebody to go to outlying areas. And those areas do not have a physician, or a dentist, or minister either.

We are trying and probing and experimenting with subsidy-type enticements to get veterinarians into areas where there are many livestock numbers.

Mr. WAMPLER. I commend you for that. I might say that I recognize that the practice of veterinary medicine is not an easy profession. You are called upon at all hours of the night and in all types of weather.

I suppose the same thing would hold true for medical doctors and others, as you point out, where there are areas that we could classify as being medically deprived simply because there is not adequate personnel there for one reason or another.

I am sure that you are aware that the bill which I have introduced, as well as the bill my colleague has introduced, recognizes the need for an increased emphasis in this area. We have come forth with some suggestions as to how the Federal Government might help those States that do not have schools of veterinary medicine, or might help those that are in place.

So we do recognize this as being a very high-priority need. And we look forward to the help of you and your association in filling this need.

Mr. GORMAN. I personally am in favor of expansion. Speaking for the AVMA, we take no stand at this time—pending the investigation of the need of veterinarians throughout the country.

But as a person, I am in academia; and, it is heartbreaking to see so many good students turned away.

Mr. WAMPLER. I appreciate that.

Mr. Chairman, I do not want to prolong my time, but I would like to make one other observation. Mr. Dahl was somewhat critical, although in a constructive way, I am sure, of the makeup of the Policy Advisory Board. I would simply point out that when we began drafting similar legislation well over 1 year ago, we started out with a board of 15 members. We are now up to 33, I believe. And it is possible that will expand beyond that.

Part of the rationale we followed in trying to make up the constituency of this board was to recognize the need for producers and members who would be supportive of producers. And as I would envision the makeup of board—at least as it constituted in the latest bill that we introduced—there would be at least nine members of the board who were either directly producers, or represented producer groups, or who would be supportive of producers.

Now I want to point out and to emphasize that we have added membership to the board from groups who normally have not been privy at the policymaking level of where agricultural research goes. This is why we have added a consumer organization representative. We have also added one from a national labor organization who would be primarily concerned with the production processing or distribution of food and fiber.

We have also added one from a private sector organization involved in development programs and issues of developing countries.

We are trying to get a broad enough constituency that we can get the input that is needed. Environmentalists, for example, who heretofore have contended that they have been denied a voice in the policymaking decision, have been added.

So we are hopefully trying to recognize these elements. And while reasonable men may differ on exactly what the makeup should be,

this board, obviously, or any other board, would function only as well as the collective talents of the constituency of that board.

We recognize what you are saying. But we have tried, at least to the degree that we could at this point in time, to give recognition to the producers.

I think in the past that you haven't had the input that you should have had. We recognize this. And I accept your recommendation and criticism in the constructive sense in which I am sure it was tendered. But on the other hand, I wanted you to know that we were aware of that.

MR. DE LA GARZA. Mr. Jenrette, do you have questions?

MR. JENRETTE. Thank you, Mr. Chairman.

DR. GORMAN, as president of the AVMA, could you tell me what percentage of those in your organization make house calls?

MR. GORMAN. About 50 percent of the veterinarians in the United States are in practice in the so-called large, small, or food animal group. And of that group of about 15,000, I would say that probably less than 1,000 make house calls within the urban areas. Now, of course, those in the large animal practice make house calls because of the farms. But not very many house calls are made now in the city areas.

MR. JENRETTE. They are doing the same thing as the regular medical doctors, I see.

MR. GORMAN. Yes.

MR. JENRETTE. In your testimony you quoted the figure of 20-percent losses in the swine category due to disease. I don't recall your giving any figures for beef or for poultry.

Do you have any idea what we are losing because of disease in those categories?

MR. GORMAN. In the beef industry, we are losing about \$1 billion per year due to disease processes or non-thrifty loss in reproduction figures. In poultry, it runs about \$600 million per year in productivity. Much of that is in insidious loss of egg production or poor meat production.

MR. JENRETTE. Dr. Bogorad, you stated that people were scarce. If this amount of money is authorized and appropriated by Congress—and I certainly support the concept, no matter which of the bills I end up supporting—will we, in your opinion, be overspending?

Will there be a movement to immediately start up programs that are not needed or which cannot be completed?

MR. BOGORAD. No; I don't think that is the case. First of all, the numbers are small; but, so is the money. When you consider the costs of doing research, the amounts are not terribly great. So I think that that is not a very serious problem.

I think one of the things that would happen would be positive. For example, a person who is interested in the chemistry of protein could either study muscle or he could study the proteins involved in the enzymes of photosynthesis.

But what happens now is that even somebody who is trained in plant sciences and in these kinds of problems looks at the situation and sees that if he works on the muscle he can get the money for

research. So he will concentrate on the research where the money is available. But if he starts to work on plant things, he can't do it very easily because there are really relatively small amounts of money there.

So I think it would be positive in that people who are now leaving the field would continue with the work they have been doing. And that would help too.

Also, I think we would begin to get some of the interest from other kinds of scientists who are now addressing other problems and that they, perhaps, might look into the agricultural problems. I think this would be a very beneficial thing.

And again, if we are talking about \$100,000 in research and for additional research people, that is after you take \$27 million or so and cut off a little for running the program. So that is about 250 people. And you are spreading that not only across the physiological side, but also more or less across conventional genetics. And that really needs a lot of additional support.

Certain aspects of agronomic research dealing with soils and the physiological responses to stress and so on also come into this. So it is not going to go terribly far.

So in answer to your question, I don't think it would have the effect of generating things which we have no business going into. In fact, I would quite agree that we are better off not spending money in such areas. And I think that one needs hard-boiled reviews—but reviews by scientists who understand what is possible. And I think this is a kind of thing in which one has to be very careful.

Mr. JENRETTE. You seemed quite excited about what is happening today. Do your colleagues in your profession share that degree of enthusiasm?

Mr. BOGORAD. I think so. And I would cite an example in the field I am in. Eight or nine years ago, we were interested in whether or not there were any genes in organelles. And we were having big debates and trying to get any information we could on whether or not there was anything there.

Today, we understand how all of these pieces are put together. And in all of these situations, we are beginning to see that it is possible to address questions which we had thought about for 25 years or so with respect to higher organisms—higher plants and higher animals.

And the problems which we thought about and tried to figure out, we now think are soluble. And it is really a very extraordinarily exciting time. And I think this view is shared generally by my colleagues.

Mr. JENRETTE. How do you translate this information to Guy Douglass over in West Virginia so that he can take it to his producers?

Mr. BOGORAD. The intermediate step, of course, is the applied research. And, certainly, the USDA is an extraordinary organization for doing that very thing. They do it very, very well. The health of our agricultural enterprise is an indication that that really works.

So one cannot cut out the middle. Instead, one has to continue and one has to strengthen the kinds of research which the USDA is cur-

rently doing. Also, one has to continue and strengthen the kind of research that is going on in the land-grant colleges and the experiment stations. It is absolutely essential to do that.

But we must also have the basic research which is going on and which will feed into these connections. And we must view this as a long-range problem. I didn't say that we would do these things tomorrow. I indicated that this is a problem which is going to take 15 or 20 years, perhaps, before we see a lot of it coming in. And part of that long-range problem is getting these practices filtered through to the people who are interested in the applied problems.

One of the difficulties in some of the institutions we have talked about is that we don't have enough connection to agriculture. We have been considering, for example, a small program in which we would try to bring in people who have been practicing agriculture and who have been research workers on the applied level to help us and to tell our students what those problems are that they see. And we would try to get more attention that way. That is a very important kind of contact to have there.

Mr. JENRETTE. Have you done any studies on moths at your school?

I realize that this is changing the subject a bit, but I would like to know if any of you have studied moths?

A constituent at home has spent his life studying them, and he gave me some astronomical figures of the destruction that moths were doing.

Gus, do you have moths in West Virginia—or, do you give them brown lung so they leave?

Mr. DOUGLASS. Congressman, we have a buffer zone around Virginia and West Virginia on the gypsy moth. You may be alluding to the gypsy moth. It is very destructive to forests, in particular. It has an appetite of about 24 square inches of leaves a day. So that will give you some idea.

We are trying to prevent its spreading elsewhere in the country, but I understand that there are some identified in the Midwest. But it did start in the Northeast; and, it is a big problem.

Mr. JENRETTE. Would your bill take care of this problem, Bill?

Mr. WAMPLER. It certainly would.

Mr. JENRETTE. What about fire ants? I have an awful lot of fire ants. Will this also take care of the fire ants?

Mr. WAMPLER. It will help. But EPA is our main obstacle there.

If the gentleman will yield, this is exactly what this bill contemplates. It puts in place the mechanism whereby we can recommend to the Secretary of Agriculture that existing funds be used for these types of research.

Now some of it would have come under the category of applied research, but a great deal of it is going to have to be in the area of basic research. And that will ultimately give us the applied technology of addressing ourselves to the controlling of these types of insects.

Mr. JENRETTE. Would you accept an amendment, or a disclaimer, as far as EPA is concerned in doing anything with these guys while they are using this money on your bill—if we support it?

Mr. WAMPLER. I don't know whether I can support that type of amendment, but I am not altogether unsympathetic.

Mr. JENRETTE. Mr. Anderson, your growing of rubber interests me. Obviously, you are making money. So why is there not a greater number of people in your profession?

Mr. ANDERSON. This is a pretty complicated subject. We are not making any money because we don't have the capital to get started. It is going to take \$15 million to get off the ground.

To do an economical project and to have a mill large enough that it will be economical, we have put together a number of small units. But they are labor intensive and they are not in any sense of the word economical.

If we are going to do a demonstration which will provide the basis and interest some farmers in the Southwest, we have to get it off the ground. And this is absolutely inevitable. There are going to be 20 million acres of this grown in the world just to produce the rubber that was used in the world in 1973. And we want to do it right. We don't want to do any more of the kind of picayunish things we have been doing in the laboratories and that sort of thing.

We will do a better job than they are doing in Mexico because Mexico is basing their operation on what they have learned from us.

If we can do a demonstration program to demonstrate to both the large and small farmers of the Southwest, we will then attempt to operate the, shall we say, cotton gins for extracting the rubber for the small or large growers.

And this will obviously be a great thing for the country, as well as a great thing for the Southwest. It is very difficult to think of anything negative about it except that I don't have any money.

Mr. JENRETTE. What support have you been getting from USDA?

Mr. ANDERSON. The USDA was put out of this business for political reasons at the end of the war. So at the political level, this has been looked on as kind of a negative thing.

In 1975, as I mentioned and as the two gentlemen mentioned yesterday, a meeting was held at the University of Arizona in November, and the return to the growth of Guayule was very strongly called for.

Now all of these men were people who operate right at the level of growing it. And they knew what they were talking about. They are for it. But at the top levels, we have had a lot of resistance.

One has to make his own judgment as to why that is. I am certainly not in a position to say.

Mr. JENRETTE. Obviously you don't have a great deal of competition in it right now.

Mr. ANDERSON. Well, I can't throw any rocks because it probably is not discrete to do that. But we do not have Guayule, and we should have had it beginning at the end of World War II.

Dr. Millikan only recommended that it be done because he knew it was feasible and he knew it was a good thing. The work was done on the development under the aegis of Cal Tech; but they haven't followed through on it, apparently, because it wasn't politically viable.

Mr. WAMPLER. Would the gentleman yield? If I may, I would like to pursue a question.

Mr. JENRETTE. I would be happy to yield.

Mr. WAMPLER. Have you made any studies which indicate how many barrels of oil, or the equivalent, for example, we could save if you really developed your industry?

Mr. ANDERSON. Yes. There are varying figures on that, and I would rather not take a position on what that is.

Mr. WAMPLER. It would be substantial, would it not?

Mr. ANDERSON. It is a significant figure. You see, 10 million tons of rubber are used in the world. And it takes something in the neighborhood of 14 times the weight of the rubber to produce the derivatives of the oil that are used.

Mr. WAMPLER. Have you or your associates at any time discussed the possibility of a grant with the Cooperative Service of the Department of Agriculture to establish the feasibility of a marketing cooperative to produce and market Guayule?

Mr. ANDERSON. If I understand you correctly, no; we haven't made any arrangements with them. And I don't think we have discussed it as such with the Department.

Mr. WAMPLER. It would seem to me that this might be a very fertile field for you. If you are going to involve a lot of producers—and I would gather that you would—this is an area you might want to pursue. It seems to me that the whole subject of the production of Guayule offers great hope.

Some years ago I was privileged to visit in Africa with the then-Secretary of Agriculture, Dr. Hardin. And we visited the Firestone Rubber plantation in Liberia. That, it seemed to me, was a highly labor intensive process.

Mr. ANDERSON. It is.

Mr. WAMPLER. And as you pointed out so well in your statement this morning, it is one that makes us susceptible to all types of blackmail when there is a limited amount of it—not the least of which is the projected increase in costs.

So for many, many reasons, this ought to be pursued. As you know, we had two outstanding witnesses yesterday. And it seems to me that this is one of those areas where the bills before us would clearly permit research into what is a new and intriguing crop.

I was curious as to whether you had pursued that route. And I hope that you will because that possibly could be an area where you could have a demonstration project to demonstrate the feasibility of the growing and of the marketing of that product.

Mr. ANDERSON. Your suggestion is well noted. Thank you.

Mr. JENRETTE. Dr. Bogorad, I may have interrupted you earlier. Did you have an additional comment?

Mr. BOGORAD. You were asking of the interest of my colleagues. I would say that two of my colleagues are very involved. In fact, Professor Carroll Williams discovered one of the hormones which affects the growth of certain stages of insects.

And he is deeply involved in what he calls second or third generation insecticides. And these are taking advantage of altered forms of insect hormones, which can in fact be used to kill the things. And that again is the kind of basic research which is probably going to have a great effect on our ability to regulate these kinds of pests.

If I may make one additional peripheral comment, I would comment with respect to the advisory committees. I didn't get to the end of my statement where I wanted to say that one of the things that seems to be missing is the working scientist.

There are administrators; but, it seems that you need somebody around who either is on the committee or who is readily available to help judge what is possible and what is or is not worth investing in. So I would strongly urge that there be, either in that complex or satellite to it, some working scientists.

Mr. JENRETTE. The point is well taken.

Gus, let me ask you one last question. Do you feel that the money that is being spent now for the land-grant colleges and the research centers has a great degree of duplication of effort throughout the United States?

Mr. DOUGLASS. At one time I had some criticism of this. And one of the reasons I like this proposed committee amendment is that it addresses itself basically to determining what sections of the country will do research.

I have been critical of some of the research in the State of West Virginia; but fortunately, I can put this in the has been category. We have new leadership now.

But we were duplicating research in row crops that was being done in the Midwest. And there is no rhyme or reason for this.

But if there is any way that I can emphasize research, and put the proper emphasis on it, it is that we must have it in agriculture. But we cannot enjoy the luxury of duplication. And we must have, as the gentleman over here alluded to again, an avenue of getting this research applied. And too often, we are not getting it to the people who will benefit most from it.

If you are a large operator, you get attention. But if you are a small, individual farmer—what we might call a subsistence farmer—you are neglected. And this is the man I am trying to help. And I am following the theory of seeing is believing, because this is one of the theories that we farm folks follow.

Mr. JENRETTE. Are you elected or appointed?

Mr. DOUGLASS. I am elected in West Virginia.

Mr. JENRETTE. Then I know why you want to look out for the small farmer.

Thank you, Mr. Chairman. I certainly want to conclude by saying that I appreciate the testimony given by each of the witnesses.

Mr. THORNTON. Thank you, Mr. Jenrette.

I would like to ask a couple of questions and to express my appreciation to each of the witnesses for his testimony.

I had to absent myself briefly from the hearing this morning in order to present to the Rules Committee a request for a rule for the National Science Foundation authorization of \$868 million—a portion of which does include some of this Nation's greatest emphasis upon basic research.

And I am pleased to be able to report that the Rules Committee did receive our presentation favorably, and that a rule has been granted. That measure will come on the Floor of the House on Thursday of this week unless something intervenes.

Dr. Bogorad, I would like to address a question to you which follows up the very fine line of questions asked by my colleague Mr. Jenrette.

You have emphasized that the thrust of the legislation toward basic research is the thing that is needed to develop an inventory of new scientific knowledge which can be disseminated through strong structures of applied research and extension to benefit American agriculture and to solve problems.

The problem of pest control, particularly, is enormous. Between one-third and one-half of all of our food products are destroyed by pests—either after they are harvested or through interference with the growing process.

And it seems to me that biological controls offer some of the greatest potential for pest control. This is not only true with respect to moths, but with respect to fire ants as well.

I understand that there is under development now a study of a hormone for the fire ants which mimics the odor of the queen of the colony. So that perhaps could be used as a bait and developed.

Do you have any further comment with regard to the applicability of basic research in this area of pest control?

Mr. BOGORAD. I think the example of the hormone is really an extraordinary example of studying how organisms develop, commenting upon the hormones which are involved, and then going to the next step of modifying these hormones so that you really jam the works and use this in a very specific way which is not toxic to us, to other animals, or to plants. And this is just a perfect example of this kind of extension of basic research.

By now, some of that is in the hands of chemical firms who see that there is a dollar potential in getting that going.

Another colleague in my department is trying to understand how specific genes in other insects are turned down—how those things go off and on. That will eventually be related to the hormone thing.

And one has the possibility, I suppose, in the long run of tailoring producing insects—just as we think in terms of tailoring producing plant cells or producing plants to do the kinds of things we want.

Mr. THORNTON In veterinary medicine, certainly, there has been a very successful example of using natural means to eliminate pests—or at least to control them. That is the case with the screw worm, I believe. Is that not correct?

Mr. GORMAN. Yes; this is true. The male screw worm is neutralized and then is released. When they mate with the female, they mate once and then the female dies. And of course it is nonproductive to perpetuate the screw worm. This has been very successful around the Southwest area and the Mexican border.

Mr. THORNTON. Mr. Gorman, I want especially to express my appreciation to you for your endorsement of the idea of having some funding available for veterinary schools and facilities in those areas where they may not presently be adequate. I did understand you to say that in your response to a question to Mr. Wampler, did I not?

Mr. GORMAN. Yes; you did.

Mr. THORNTON. And, Mr. Anderson, I am very happy that we have a specific reference to Guayule in my bill and that we call for research on that subject.

It seems to me that a point that has been made several times today is that this research effort, though focused on agriculture and biology and the structure of life, can have benefits which flow beyond merely producing food and fiber—to conserving energy, to finding alternatives to replace depleted resources with renewable resources such as forests, and to finding ways of replacing nitrogen fertilizers.

And, Dr. Bogorad, I believe that when nitrogen is fixed in the root system of a plant, most of it is used right there. Is that right?

Dr. BOGORAD. It is used right there. It turns into more plant. That plant dies and that nitrogen is reused. That is the natural cycle.

Mr. THORNTON. In my Science, Research, and Technology subcommittee, we are going to be conducting a series of hearings right away on recombinant DNA research—and those are scare words in certain areas.

But I think it might be useful for all to know that the area of developing nitrogen fixing bacteria to live in symbiosis with corn and wheat and other cereal grains is a part of that work. Is that not right, sir?

Mr. BOGORAD. That is correct. It is a very useful part of that kind of work.

Mr. THORNTON. And there are many areas of that work which are very low risk, are there not?

Mr. BOGORAD. Yes. And I think that is one of the very low risk ones. In fact, the present guidelines recognize that the use of plant DNA in recombinant experiments is at a level called P-2, and which is a relatively low-risk level not requiring very special kinds of environments. So it is a sort of a standard microbiological laboratory.

In fact, that is a very great advantage to us, I think, in our being able to meet the needs. It means that we can go forward with some of the kinds of experiments that we have been talking about with respect to nitrogen fixation and with respect to other kinds of plant engineering possibilities.

Mr. THORNTON. Thank you very much.

Do you have questions, Mr. Breckinridge?

Mr. BRECKINRIDGE. I have no questions, Mr. Chairman; but, I would say that I am sorry that I missed the testimony. I seem to have too many committees this morning. But I am glad I was able to get here for a little of it.

Thank you very much, gentlemen.

Mr. THORNTON. Mr. Wampler.

Mr. WAMPLER. I have no further questions, Mr. Chairman.

Mr. THORNTON. Mr. Jenrette.

Mr. JENRETTE. I would just follow up on one thing which Dr. Bogorad has said. As some of you may know, EPA banned M-44, which was used for controlling coyotes out West. The coyotes were killing the sheep, and M-44 was the product that was doing a very good job of controlling the growth of the coyotes.

We had Russell Train and some others up before the committee one day. And Mr. Poage, the vice chairman, was really coming down on why they had banned M-44. And a very attractive young attorney was asked to answer the question of what they were going to do about it.

She said that there was all sorts of research in genetics, and that one way was to sterilize the male coyote so that the male coyote wouldn't reproduce.

And just then an Old Texas farmer from the back jumped up and said "Listen here, lady, apparently you didn't hear me earlier today. I didn't say that those coyotes were raping our sheep; I said that they were killing them."

But maybe with your neutralizing the screw worm, and if we can neutralize the male coyote through your research, we will have done a good job.

Thank you, Mr. Chairman.

Mr. THORNTON. I do want to express my appreciation to each of the witnesses today for your excellent testimony. Your idea, Mr. Douglass, of the experimental farms to disseminate agricultural ideas was a particularly good one.

Mr. ANDERSON. May I add one little word to a question posed by Mr. Jenrette?

Mr. THORNTON. Mr. Anderson.

Mr. ANDERSON. I pointed out, as did Dr. David Spence who was chairman of the Advisory Committee on Rubber during the war, that politics has been one of the problems of guayule.

One of the reasons that guayule was not carried on at the end of the war was a political reason. At that time, England was very short of dollars. And one of the best ways we could feed dollars into England was to buy rubber from them. That affected the thinking of the day. And we paid again for not having rubber in our country.

Mr. THORNTON. Thank you very much. Unless there is something further, this hearing will be adjourned, subject to the call of the chair.

[Whereupon, the hearing was adjourned at 11:52 a.m.]

[The extraneous material submitted to the committee follows:]

STATEMENT OF THE AMERICAN REGISTRY OF PROFESSIONAL ENTOMOLOGISTS IN SUPPORT
OF HR 4863 TO STRENGTHEN AGRICULTURAL RESEARCH AND RESEARCH EDUCATION.

My name is Perry Adkisson. I am President of the American Registry of Professional Entomologists, a national organization whose members are all graduate entomologists with several years of professional and practical experience in private, state and federal sectors. Most of our members are involved in some way with the protection of people, property, crops and livestock from insect pests. All are concerned with protection of the Nation's agricultural productivity and the development of new technology for increasing productivity. The present statement is submitted on behalf of the American Registry of Professional Entomologists in support of HR 4863.

Agricultural productivity in the United States is completely dependent on a technology based on a cheap and readily available supply of fossil fuels and petrochemicals including fertilizers and pesticides. The crop yield index indicates that we have almost reached the limits where yields may be increased by the use of fertilizer. Most farm land is already in cultivation and we are losing more land each year to urbanization and industrial sprawl than is being brought into new production. Thus, the only way the Nation will be able to maintain and increase agricultural production in the future is through new research to improve present technology and to lessen our dependence on petroleum and natural gas.

Specifically we need to develop crop plants that are more efficient users of energy and water and which are resistant to pests. Once these plants have been developed, improved integrated pest management systems must be devised for their protection. New basic research on biological and nitrogen fixation, photosynthesis, plant breeding and integrated pest control is urgently needed if we are to meet human demands for food. Basic and applied research also must be expanded to improve productivity of livestock and to protect them from diseases and pests. We believe that HR 4863 will help to meet these needs and therefore support passage of this legislation.

Statement of National Milk Producers Federation

On behalf of the dairy cooperatives which comprise our membership and their dairy farmer member-owners, we wholeheartedly support H.R. 4394, the National Agricultural Research, Extension and Teaching Policy Act of 1977 and other similar bills which the committee is considering.

American agriculture has a record of which we can all be proud. It has provided an abundance of food and fiber for an ever-expanding population at an ever-decreasing percent of the consumer's income. In addition, it has produced commodities for export trade and to feed people in areas which have not been as fortunate as we in their agricultural production.

Our nation has fertile soils and a good agricultural climate -- both from the standpoint of temperature and of rainfall. We have farmers who utilized these conditions to the greatest advantage, changing their operations as times dictated change. Throughout our nation's history we have had governmental policies, most of which were developed within this committee, which have encouraged our present type of productive agriculture.

Governmental policy, too, has always encouraged agricultural research and education. It is no coincidence that many of our great public universities of today started out as land grant colleges, fostered by the government with their original emphasis on the development of agriculture. The entire agricultural extension program was designed to bring the latest in agricultural technology to the farm level.

These policies have paid off. Improved technology and expanded knowledge are the bases of the production increases we have witnessed in agriculture, particularly during the past several decades. Our land and climate are unchanged but improved techniques are making it produce more, while at the same time preserving our land resources for future generations.

The dairy industry is an apt illustration of what has occurred. Since World War II there have been so many changes that in a brief presentation such as this one

finds it difficult to decide which to use to illustrate this point.

We could mention the bulk milk tanks, now used on most of the nation's dairy farms, which provide the consumer with a better quality milk. We could point to the over-the-road tank trucks, which permit milk to be moved in excellent condition hundreds of miles.

On the farm we have seen the installation of pipe line milkers which have permitted greater labor efficiency (and thereby a lower-cost product).

But we prefer to point to the tremendous improvement in milk production during the past 30 years.¹ We do so because in our opinion it epitomizes the beneficial joining of research in a number of areas which have benefited the dairy farmer and which he, individually, would not have been able to carry out alone.

Since World War II, milk production has been in a production range of 115 to 125 billion pounds. In fact, the 1945 production of 119.8 billion pounds is remarkably close to the 1976 production of 120.4 billion pounds. But here the comparison ends. In 1945 it required 25 million cows to produce this milk supply. In 1976 it was 11 million. In 1945 the average milk cow produced less than 4,800 pounds; in 1976 her counterpart produced nearly 11,000 pounds.

This production change is not an accident, nor is it a mere evolution. It is the outgrowth of agricultural research in a number of areas -- in breeding and genetics, in feeding, in housing, in equipment, in herd management.

And while the farmer has benefited from this improved efficiency, so has the American consumer, in a better product at a lower comparative cost.

Agriculture, like everything else, must change with the times. It cannot rest on its present plateau. And today it must have some cause for concern, for there are new challenges to it.

An expanding population, here and throughout the world, is placing increasing pressures on our ability to produce. As we continue to move from a labor-intensive

agriculture to one which calls for an ever-greater amount of purchased inputs, difficult decisions must be made by farmers. Farmers have serious challenges, unique to their type of business enterprise, in meeting the demands to maintain our environmental quality. No other business group, for example, must give as much attention to non-point source discharges into our navigable waters as must the nation's livestock farmers.

This same transition toward mechanization creates special problems in the field of energy.

These are a few of the known areas in which further research is necessary. Beyond this there are vast unknown areas; yet it is in the unknown where research has always been important, such as in substituting bulk tanks for the long-accepted milk can.

It is on this background that we wholeheartedly support the efforts of Congressman Wampler and others in developing this legislation. It is first of all a recognition of the need to give a high priority to agricultural research. Along with that, it is an effort to coordinate these research activities, to avoid duplication and to utilize them most effectively.

A year ago we supported H.R. 11743, the National Agricultural Research and Policy Act of 1976. We consider H.R. 4394 a better bill because of the additions, covering extension, teaching and animal disease research, which have been added. These are particularly significant to the dairy industry.

Animal disease research is particularly worthy of note from our standpoint. While progress has been made, the dairy industry, for example, has not completely eliminated two long-time problems in this area -- brucellosis and mastitis. Ultimate elimination of these would be of immeasurable benefit to the dairy industry.

We wholeheartedly support the proposed five-year program as detailed in this legislation for animal disease research.

Significant, too, is the addition of extension and teaching as a part of research legislation. There are no well-paid scientists reading the latest technical publications, translating them into corporate needs, on a typical American farm. A different methodology has always been necessary to bring research to the farmer. We have had it in the extension service. It is fitting that this legislation recognizes the role which is played in putting research to practical use.

As mentioned, agricultural research has been vital to our improved agriculture throughout the past. It has been the base for our technological advances. We can -- and must -- make further advances in the future to meet current and future changing conditions.

H.R. 4394 represents a new commitment to this purpose. It provides a new stimulus and a new priority for the future to the agricultural research efforts which have given this nation such great benefit in the past.

CHARLES F. KETTERING FOUNDATION / SUITE 300 / 5335 FAR HILLS AVENUE / DAYTON, OHIO 45429

E. H. VAUSE, Vice President, Science and Technology

March 24, 1977

The Honorable E. de la Garza
Chairman
Subcommittee on Department Investigations,
Oversight, and Research
Room 1301, Longworth House Office Bldg.
Washington, D. C. 20515

Dear Mr. de la Garza:

We are pleased to submit a written statement on
the following House bills in response to your letter
of March 16, 1977:

H.R. 78
H.R. 2223
H.R. 4394
H.R. 4863

A condensed tabulation of facts concerning the
Charles F. Kettering Research Laboratory is appended to
our statement. We are one of the largest, if not the
largest laboratory, in the United States, working on
mission-oriented basic research in nitrogen fixation and
photosynthesis to enhance crop productivity. These research
missions have been in progress since 1933 under Charles
F. Kettering Foundation sponsorship. Some 70 scientists and
supporting personnel in our laboratory are expending over
one and three quarter millions of dollars annually on research
aimed at increasing food production.

CHARLES F. KETTERING FOUNDATION

The Laboratory is organized into an integrated team of multi-disciplinary scientists, with 28 scientists holding a Ph.D. degree and a like number with lesser professional degrees. All research work consists of problem-solving projects directed toward two basic research missions. All of our research results are freely and promptly published in the recognized scientific journals and publications and thereby placed in the public domain.

All of this is to say our experience and long involvement with scientific research gives us a sense of the value and need for more support of this nation's basic research efforts, particularly those which are oriented toward missions to enhance food production. What follows here are our thoughts on the issues dealt with in the bills before the Subcommittee.

A very strong, effective agricultural research bill will result from integration of the best features contained in the several pending bills. Therefore we shall confine our comments to general concepts we believe should be included in the House legislation. As researchers working to increase crop productivity, we do believe legislation is needed to strengthen and extend national agricultural research. There are four main ways in which legislation may effectively be designed to implement this goal.

CHARLES F. KETTERING FOUNDATION

The four legislative thrusts should seek respectively to: 1.) coordinate formulation and monitoring of federal policies guiding support of agricultural research; 2.) provide for the establishment and operation of a broadly based, national agricultural research advisory group; 3.) strengthen the existing agricultural research system and, 4.) expand and deepen the nation's agricultural research effort. These four tactics can be effected in a number of ways, but we think a combination of features found in the bills introduced in Congress will best do the job.

Formulation, coordination, and monitoring of federal agricultural research policy must be improved if new initiatives in agricultural research are to occur. A new group should be created within the executive branch of government and be charged with carrying out these responsibilities. Whether this group is called a counsel, a board, or a committee, seems irrelevant to us so long as it is advisory to the President, and is mandated to review, recommend, and report on agricultural research policies annually to the Secretary of Agriculture and to the Congressional committees charged with science and technology and agriculture oversight responsibility.

The composition of the group should include representatives of the several federal agencies involved with or affected by agricultural research. The federal agency advisory group

CHARLES F. KETTERING FOUNDATION

should meet at least twice a year and probably could meet quarterly with good result.

It seems both logical and desirable to have the Director of the Office of Science and Technology Policy chair this group and to have his office provide clerical and staff assistance to the group.

The Assistant Secretary responsible for agricultural research should serve as Vice Chairman of the group. This leadership arrangement would maximize the opportunity for objective discussion of federally supported agricultural scientific programs. The tremendous importance of agricultural research outcomes to the nation means that such policy matters should be framed at the highest levels of the executive branch of government. Coordinating the drafting of agricultural research policy under the auspices of the Office of Science and Technology Policy will provide high visibility to agricultural research. Moreover, locating the responsibility under the chairmanship of the Director of the Office of Science and Technology Policy, should facilitate scientific research communication between the agencies involved with science and technology.

Another important feature legislation should provide for is creation of a second new group to render advice on national agricultural research priorities and programs. We believe this group, as distinguished from the federal agency advisory group, should function within the U.S. Department of Agriculture. It should be constituted to advise the Secretary

CHARLES F. KETTERING FOUNDATION

of Agriculture, and its primary functions should be to review, evaluate and recommend food and agricultural research programs conducted and supported by the U.S. Agriculture Department.

The outcome of the group's ongoing reviews and evaluations should be recommendations for new programs of research and for the tactical means to implement national agricultural research policy. The group should also serve as a forum for agricultural research information exchange and should provide strategies for dissemination of research outcomes. The group must be large, and therefore would best function in working subgroups meeting as frequently as four to six times a year. The entire group would, of necessity, have to convene in plenary session twice a year.

We are unfamiliar with the day-to-day functioning of the Department of Agriculture, but it seems appropriate to us for the Assistant Secretary for Administration of the Department to be designated to provide an administrative director, staff, and clerical assistance to the group and its several working subgroups. The Assistant Secretary of Agriculture responsible for research undoubtedly should chair the group which would direct its annual report to the Secretary of Agriculture and to the federal agricultural research policy group.

As to the composition of the national agricultural research advisory group, we think it should consist of

CHARLES F. KETTERING FOUNDATION

representatives drawn from three distinct parties to agricultural research. They are: a.) the performers of agriculturally oriented scientific research, b.) the users and beneficiaries of agricultural research outcomes, and c.) those who support the research. Clearly the USDA performers of scientific research should be included. The Agricultural Research Service, the Cooperative Research Service, the Economic Research Service, and the Forestry Service should be represented.

Others should come from the land grant colleges and universities, the agricultural experiment stations, private colleges and universities, independent research institutes and organizations and national scientific groups like the Board on Agriculture and Renewable Resources of the NAS/NRC, the American Chemical Society, American Society of Microbiologists, American Society of Biological Chemists, American Society of Plant Physiologists, etc.

The users and beneficiaries of agricultural research outcomes would include representatives from agribusiness and industry, farm and agricultural organizations, consumer interest groups, environmental interest groups, rural development interest groups and the National Fertilizer Development Center.

From among those who support agriculturally oriented research and services, we suggest there be representation

CHARLES F. KETTERING FOUNDATION

from the Agency for International Development of the U.S. State Department, the National Science Foundation, the Energy Research and Development Administration, the National Oceanic and Atmospheric Administration, the Food and Drug Administration of the Health, Education, and Welfare Department, the Environmental Protection Agency and the few private foundations supporting agricultural research.

The effectiveness of the American agricultural research system has been proven over time, and there exists much Congressional testimony to this effect. Nonetheless, numerous reports issuing in the recent past speak to the unmet needs in agricultural research. Research imperatives for enhanced crop productivity repeatedly have been determined and set forth prominently. From these reports it is possible to see several ways in which the existing agricultural research system can be strengthened. For one thing it would be highly desirable for the sense of Congress to be expressed that the USDA inhouse research laboratories should perform substantial amounts of basic biological research oriented toward agricultural outcomes. In addition to such an expression, more funds should be authorized and earmarked for such a basic research program to be conducted within the Agricultural Research Service of the USDA. Moreover, the legislation should stipulate the ARS be guided in the selection of research programs

CHARLES F. KETTERING FOUNDATION

and projects by the recommendations of the national agricultural research advisory group.

A further provision we suggest is for Congress to express its sense that the present formula funding for the land grant colleges and universities and the agricultural experiment stations be adjusted annually at such a rate as to prevent erosion of their research purchasing power. The capacity to sustain a strong effective system of agricultural research is gradually lost when annual appropriations do not match the rising cost of performing research. If we are to preserve the national agricultural research system, which has served us so well, we must maintain its financial integrity. And, if we wish to strengthen and improve the system, we must infuse additional support and provide new incentives for people performing the research.

We believe therefore real research gains will result from new funds made available through a program of grants open to all institutions, both public and private, involved in the education and training of undergraduate, graduate and postgraduate agricultural students. A program to train more agricultural scientists and engineers should be established and operated by the Assistant Secretary of Agriculture responsible for research and education. We must emphasize, however, that this program should not be restricted only to the land grant colleges and/or agricultural experiment

CHARLES F. KETTERING FOUNDATION

stations. Rather, funds should be available to assist all institutions deemed capable of educating or training researchers and engineers. Moreover, we wish to make clear that especially for the pre and post-doctoral levels of education there are private research institutions and organizations like the Charles F. Kettering Research Laboratory and the Carnegie Institution of Washington which provide a unique multi-disciplinary, problem-oriented type education and training not readily found within the universities of this country. They too should be eligible to participate in this grant program.

Of paramount importance in the training of researchers is access to and provision of appropriate facilities and equipment. Therefore, the program of grants should provide funds for new facilities and modern research equipment. Here too, the Assistant Secretary of Agriculture responsible for research and training should be guided in administering the grant program by a consideration of the research priorities emanating from the National Agricultural Research Advisory group.

The Assistant Secretary should be empowered to undertake a comprehensive study of the agricultural research materials and facilities needs of the country. The study group constituted by the Secretary ought to include scientists currently active in molecular and cellular biological research which is oriented toward agricultural outcomes as well as scientists trained in the more agronomically-oriented

AN EQUAL OPPORTUNITY EMPLOYER

CHARLES F. KETTERING FOUNDATION

disciplines. Researchers located in private universities and colleges and in independent research institutions or organizations can profitably be included in the study group along with researchers from the public universities and colleges and the agricultural experiment stations.

The fourth and possibly the most important provisions in the legislation should be designed to expand and extend the national agricultural research effort. This can best be done, in our view, by having the USDA implement a new competitive grants program to fund mission-oriented basic research directed toward enhancement of food production. We do not believe it productive, or in fact realistic, to try to distinguish between different types of research by the use of adjectives conventionally used to describe researchers. Instead the range of activities and aims of the competitive grants program need only be specified by a general description of the nature of the work and the extent of goals which Congress wishes to be supported. This Congress can insure the participation of a greater number of highly qualified scientists who currently are not within the USDA-SAES system by creating a competitive grants program open to all. This is a proven way to draw scientific personnel to a research area and thereby extend and improve the national agricultural research effort.

Much Congressional testimony of the last two years, and a veritable blizzard of reports from prestigious

CHARLES F. KETTERING FOUNDATION

organizations have indicated the research areas considered to offer important opportunities for enhanced food production. These can and should be named in the legislation, Nitrogen fixation, photosynthesis, and cell culture have been recommended universally as high priority promising research areas. Moreover, world leadership and research in these areas is considered not to rest with the United States. A further decline in the relative position of the United States in these crucial areas of research will occur unless there is a major change in our agricultural research policies and levels of support.

A new office or division of the USDA under the jurisdiction of the Assistant Secretary of Agriculture responsible for research, should be created to house and operate the competitive grants program. There are several good ways to organize and place a competitive grants program within the Department of Agriculture, but we are persuaded the overall importance of such a program warrants the creation of a separate, distinct office or division charged with this responsibility. An office separate and distinct from the present divisions and reporting to the Assistant Secretary of Agriculture responsible for research, precludes conflict of interest between in-house USDA research needs and the extramural researchers which the program is primarily aimed at drawing into the agricultural research system of the nation. It also locates responsibility for coordination of all USDA research interests at the Assistant Secretary level.

There is another reason of paramount importance to the proper functioning of a competitive grants program which argues for making a new office or division responsible for the program. This is that there be a peer review of all grants. Appropriate panels of scientists should be constituted to review and judge the scientific merit of all proposals and awards should be made on the basis of merit ranking of proposals by the peer panels. Members of the panels should be scientists working in colleges, universities, experimental stations, and private research institutions or organizations.

The new office or division should be headed by a senior scientist having demonstrated competence in a basic chemical or biological research discipline. He or she should have administrative competence, of course, and should understand the advantage of integrating basic research outcomes with agricultural development and field research. He should be responsible for selecting a professional staff to operate the competitive grants program. The professional staff should consist of managers trained in specific scientific disciplines and each person should have had active research experience appropriate to their grant program responsibility.

Mission-oriented basic research is by nature long term work. Accordingly, competitive grants in this program should be approved for periods of up to five years. Grants covering longer periods of time are more appropriate for mission oriented basic research than are the one or two year approvals usually given many research projects. If a grant is

given for an extended period, say of five years, annual renewal dates can be built into the grant as a way of insuring that adequate progress is occurring as time passes.

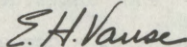
Another extremely important feature we should like to see included in the competitive grants program is "block" or "institutional" grants to support major mission research teams. "Block" grants can be very cost effective and sometimes are the only way to generate a multi-disciplinary team to attack difficult, but crucially important scientific problems. All types of research organizations should be eligible to apply for these grants. This would include all universities, colleges, and private research institutions and organizations actively pursuing mission-oriented basic research directed toward enhancement of food production. It should be possible to include scientific equipment items as well as operating expense items in "block" and "institutional" grant requests.

Because the intent of a competitive grants program is to extend the national agricultural research effort, state matching of grant funds need not and should not be required. A state matching requirement for private colleges and universities and for private research institutions and organizations, would make them ineligible for the program and thereby prevent their entry into the national agricultural research effort. Institutions applying for grant funds under the competitive program undoubtedly will already be providing considerable support to their scientific personnel anyhow.

CHARLES F. KETTERING FOUNDATION

Finally, we should like to see the authorizing legislation relate annual appropriations for the competitive grant program to some measure of the value of our national agricultural production. Congress would thereby concretely tie the contribution agricultural research makes to the national economy. Were a system of support for agricultural research to be based on the value of agricultural production, a floor or minimum would be established below which the appropriation for agricultural research should not drop. Congress would thereby signify in another way their intent to prevent erosion of our national capacity to perform research for food production. Protection of mission-oriented basic research in agriculture will pay the nation handsome dividends in enhanced food production for us and for the rest of the world as well.

Sincerely,



E. H. Vause

HEV:jl

**SOUTH DAKOTA
SCHOOL OF MINES
AND TECHNOLOGY**



RAPID CITY, SOUTH DAKOTA 57701

OFFICE OF THE PRESIDENT
PHONE (605) 394-2411

March 24, 1977

Representative Thomas Foley
U. S. House of Representatives
Washington, D.C. 20515

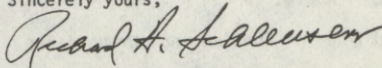
Dear Representative Foley:

I am in receipt of information from the American Association of State Colleges and Universities that a variety of bills are now under consideration in Congress related to new agricultural research legislation. It has been a source of frustration for me to note that on some occasions institutions other than land grant institutions have been at a disadvantage in competing for some agricultural research programs. I therefore request that future legislation related to agricultural programs include the following principles:

1. That non-land grant institutions should be eligible to compete for agricultural research grants under whatever law is passed.
2. That non-land grant institutions should be named specifically to serve on appropriate advisory councils, boards, etc. when new programs are being implemented.
3. That non-land grant institutions should be eligible to apply directly to the USDA rather than funneling their proposals through the various state agricultural experiment stations first.

Thank you for your consideration in this matter.

Sincerely yours,


Richard A. Schleusener
President

RAS:sg

CENTRAL WASHINGTON STATE COLLEGE

ELLENSBURG, WASHINGTON
98926

March 28, 1977

The Honorable Thomas Foley
Representative, State of Washington
Chairman, House Committee on Agriculture
United States House of Representatives
Washington, DC 20515

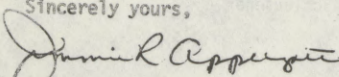
Dear Representative Foley:

Central Washington State College serves the central one-third of the State of Washington where some of the major agricultural areas in the state are located. We believe that to provide an increased level of service to our many publics in these large agricultural areas, non-land-grant institutions should be eligible to compete for agricultural research grants; non-land-grant institutions should be named specifically by law to serve on relevant advisory councils, boards, and grant review committees; and that non-land-grant institutions should be able to apply for grants directly to the United States Department of Agriculture rather than going through state agricultural experimental stations first.

We believe that there is a central issue involved in our position. The issue is that federal programs should be open for competition to all qualified applicants. Certainly, land grant institutions are not the only ones competent to conduct agriculturally oriented research in today's world.

Thank you for considering our position.

Sincerely yours,



Jimmie R. Applegate
Special Assistant to the
President

JRA/so



RECEIVED

1977 MAR 30 AM 12:00

COMMITTEE ON AGRICULTURE
U.S. HOUSE OF REPRESENTATIVES

Allendale, Michigan 49401 • 616/895-6611 • An Equal Opportunity Employer

March 25, 1977

The Honorable Thomas Foley
Chairman
House Committee on Agriculture
United States House of Representatives
Washington, D.C. 20515

Dear Representative Foley:

As your committee discusses bills relating to agricultural research, we hope you will consider the points outlined below:

1. Non-land-grant institutions should be eligible to compete for agricultural research grants, under whatever law is passed;
2. Non-land-grant institutions should be named specifically in the law to serve on whatever advisory councils, boards, and grant review committees are created to implement such programs;
3. Non-land-grant institutions should be able to apply directly to the U.S. Department of Agriculture, rather than having their proposals go through state agricultural experimental stations first.

As a matter of principle, we believe that all federal programs should be open to all qualified applicants and not restricted to particular types of institutions.

Sincerely yours,

Robert J. Toft
Director of Federal Relations

RJT/mtm

ASSOCIATION OF
AMERICAN RAILROADS
OPERATIONS AND MAINTENANCE DEPARTMENT · CAR SERVICE DIVISION
AMERICAN RAILROADS BUILDING · WASHINGTON, D. C. 20036

W. H. VAN SLYKE
Executive Director and Chairman
H. GORDON RANDALL
Vice Chairman

April 1, 1977

Honorable E. dela Garza, Chairman
House Subcommittee on Department
Operations, Investigations, and
Oversight of the House Committee
on Agriculture
Washington, D. C. 20515

Dear Chairman E. dela Garza:

Please refer to H.R. 4394 cited as the "National Agricultural
Research, Extension, and Teaching Policy Act of 1977" introduced by
Congressman Wampler March 2, 1977.

The Association of American Railroads supports the objectives of
this bill.

Research, study and experimentation is needed in the distribution
and transportation of agricultural products. We believe transportation is
a vital link in the world food supply.

The attached Statement examines and discusses the merits of
H.R. 4394 and suggests changes in the National Agricultural Research,
Extension, and Teaching Policy Advisory Board.

Respectfully submitted,

W. H. Van Slyke

STATEMENT OF
WILLIAM H. VAN SLYKE
EXECUTIVE DIRECTOR & CHAIRMAN
CAR SERVICE DIVISION
ASSOCIATION OF AMERICAN RAILROADS

BEFORE THE

HOUSE SUBCOMMITTEE ON DEPARTMENT OPERATIONS, INVESTIGATIONS, AND
OVERSIGHT OF THE HOUSE COMMITTEE ON AGRICULTURE

ON

H.R. 4394 "NATIONAL AGRICULTURAL RESEARCH, EXTENSION, AND TEACHING POLICY ACT OF 1977"

My name is William H. Van Slyke. I am Executive Director and Chairman of the Car Service Division, Association of American Railroads (AAR), with offices at 1920 L Street, N. W., Washington, D. C. 20036. I have held this position since September, 1969. Prior to that time, I was employed by the Evergreen Freight Car Corporation where I was Vice President and General Manager. My railroad experience includes 17 years with the Southern Pacific Transportation Company during which time I served as a Station Agent, Assistant Trainmaster, Car Distributor, and Supervisor of Car Service for the entire system. Throughout my entire railroad career, including my present responsibilities, I have been involved in matters pertaining to car handling and car distribution.

The AAR Car Service Division's responsibility is relocation of railroad-owned freight cars among the Nation's railroads to provide an equitable supply based primarily upon the railroad's ownership of cars. We also share responsibility with the railroads for obtaining maximum utilization of freight cars, both system and foreign. The distribution of cars to shippers within a particular railroad system is the responsibility of that railroad.

The Car Service Division has approximately 100 employees working out of our Washington headquarters and eight district offices. These people devote their entire time to the responsibility of distributing freight cars equitably among railroads and improving freight car utilization. This

distribution is accomplished through the administration and enforcement of a Code of Car Service Rules governing the use of foreign cars, and through the issuance of orders and directives which restrict, in greater or lesser degree depending upon the urgency of the situation, the use of certain cars by railroads other than the owner. These orders and directives are policed by our field force of transportation inspectors.

I have read H.R. 4394 introduced during the 1st Session of the 95th Congress by Mr. Wampler (for himself and Mr. Foley) to enact the "National Agricultural Research, Extension, and Teaching Policy Act of 1977."

This Act promotes a unified, integrated approach to agricultural research and development. It points out the importance of nutrition and animal health and takes steps to solve such problems as reduction of food, fiber, and wool products losses. The AAR commends H.R. 4394 on increasing research and development efforts together with the coordination and extension of teaching activities in the food and agricultural sciences.

One of the stated purposes of the Act is to facilitate research, extension, and teaching in the "food and agricultural sciences." The "food and agricultural sciences" are defined to include "the processing, distributing, marketing, and utilization of food and agricultural products." Crucial to the successful distribution, marketing, and utilization of food and agricultural products is the efficient use of railroad transportation.

In 1971 the Secretary of Agriculture submitted testimony to the House Subcommittee on Departmental Operations, defining the Agricultural Research Service said: "Marketing costs involved in bringing food from the farmer to the Consumer far exceed the costs of producing agricultural commodities."

This fact is as true today as it was in 1971. Innovative and dramatic policies by Congress are needed to promote, through research, study, and experimentation, a scientific approach to the problems of transportation and distribution of agricultural products similar to the methods used so successfully in the production of agricultural products.

The AAR is generally in accord with the "Wampler Bill." However, we believe the Board representation should be changed as follows:

1. Reduce U.S.D.A. representatives from five to four members.
2. Reduce representatives from U.S. Universities from six to five members.
3. Delete (4)(F) one from a National organization primarily concerned with transportation of food and agricultural products to domestic or foreign markets.
4. Add under (3) one representative, serving in an executive - level position, from each of the following organizations upon the recommendation of the head of such organization --
 - A. Association of American Railroads
 - B. American Trucking Association
 - C. Waterway Transportation Association.

Such action will assure that a major element of marketing agricultural products, the three principal modes of transportation, will have a voice in decisions affecting the future of agricultural marketing and distribution.

Smathers, Symington & Herlong
Attorneys and Counsellors at Law
1700 K Street, N.W.
Washington, D. C. 20006
Telephone 202-785-5300
Cable Address: Smathers

Florida Offices
Alfred J. Dupont Building
Miami, Florida

Independent Square
Jacksonville, Florida

April 1, 1977

The Honorable E. de la Garza
 United States House of Representatives
 1434 Longworth House Office Building
 Washington, D. C. 20515

Dear Congressman de la Garza:

We are writing on behalf of the American Horse Council in support of H.R. 78, the Agricultural Research Policy Act of 1977.

As you know, the definition of "agricultural research" in the bill is broad and includes equine research. This was emphasized in the last session of Congress when a similar bill was passed by the House. We understand it is not the intent of this bill to curtail present equine research programs or eliminate future programs.

Nonetheless, based upon past experience, the American Horse Council is concerned that equine research may suffer because of the apparent emphasis on food and fibre research. For this reason we hope that the Act or the accompanying legislative history will indicate that research on horses is expected to be continued and expanded by the USDA as the Committee Report did last year.

Our fears regarding the future status of equine research are founded upon the past. Equine research funded by the USDA has declined as the horse declined in use as a farm animal. Following World War II, however, horses began a resurgence in popularity that has yet to subside. Notwithstanding the renewed interest and popularity of the horse,

The Honorable E. de la Garza
April 1, 1977
Page Two

there has not been a similar response by the government with respect to necessary research.

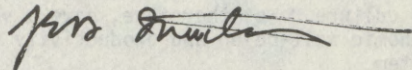
Our knowledge of equine disease has not kept pace with the expanding horse industry. Additional research is essential if we are to cope with the problems this expansion has brought.

The USDA needs more funds for equine research. Equally important, the USDA needs a reaffirmation from Congress of the importance and necessity of equine research.

The importance of equines to the American economy cannot be overstated. Combined investment and annual expenditures of the horse industry amount to more than \$13 billion, with horse owners spending nearly \$7 billion annually on feed, equipment, drugs, services and related items. Total federal, state and local revenues from racing and related industries approach \$1 billion annually. 320,000 boys and girls are engaged in 4-H horse projects, more than the number in cattle and swine projects combined. We believe that these figures justify our asking that the importance of continued equine research be reaffirmed in the 1977 Act, or the report accompanying it.

We believe the proposed Act is an important step in providing coordination and stimulus to agricultural research and support it. We trust, however, that the intent of the bill is to expand all agricultural research, including equine research, and the Act itself or the accompanying report will so indicate.

Very truly yours,



George A. Smathers

GAS/ct

Sea-Land Service, Inc.

P.O. BOX 900, EDISON, NEW JERSEY 08817

C. I. HILTZHEIMER

CHAIRMAN

April 4, 1977

The Honorable Eligio de la Garza
Chairman, Subcommittee on Departmental
Investigations, Oversight and Research
Committee of Agriculture
U. S. House of Representatives
Washington, D. C. 20005

Dear Sir:

Please include this letter of support in the record for H.R. 4394.

As you may recall, Sea-Land Service, Inc. is proud to be the pioneer and innovative American flag container transportation company. Since 1956, we have grown to become the largest such American company, operating 45 U. S. flag containerships, 18 container feeder ships, more than 62,000 containers, 39,000 chassis and about 1,000 tractors and trucks with a total capital investment of about \$1.5 billion. Included in that equipment is over 6,500 refrigerated containers or about forty percent of the total U. S. refrigerated container population. We serve 137 ports in 51 countries.

Among the many different products of the American economy we carry to various world markets in our containers is a substantial and increasing volume of various products of American agriculture. We, therefore, have a very real stake in the economic well-being and productivity of the American agricultural system.

For this reason we wish to inform your subcommittee of our wholehearted support of H.R. 4394. We particularly support those provisions of the bill which may lead to the strengthening and expansion of research by the U. S. Department of Agriculture on ways to improve the transportation and physical distribution systems for agricultural and food products to both domestic and foreign markets.

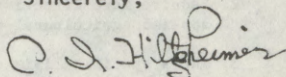
The Honorable Eligio de la Garza
Page 2
April 4, 1977

For almost two decades we have worked closely with the USDA's Agricultural Research Service on a number of cooperative projects aimed at improving containerized transport of various agricultural products to overseas markets. During the past decade, and particularly during the past 5 years, we have watched with considerable concern as the level of support for this vitally important research program of the Department has been steadily eroded by both a lack of adequate funding and an apparent lack of concern for the program in the higher echelons of both the Agency and the Department.

While expressing our support for H.R. 4394, we feel compelled to stress our concern about a situation in the national agricultural research area. We are particularly disturbed by the reorganization of the ARS in 1972 which regionalized or, more appropriately, balkanized the Agency. This development has greatly impeded ARS's ability, in our judgement, to respond to and deal effectively with the research and development needs of physical distribution and transportation systems which are both national and international in scope.

We respectfully request, therefore, that H.R. 4394 will correct this crippling organizational structure in the ARS.

Sincerely,



Charles I. Hiltzheimer

CIH:ms

ADVANCING VOLUNTARY LEADERSHIP IN A CHANGING WORLD

Chamber of Commerce of the United States

LEGISLATIVE ACTION VICE PRESIDENT
HILTON DAVIS

202 - 659-6140

1615 H STREET, N.W.
WASHINGTON, D.C. 20062

April 6, 1977

The Honorable E. de la Garza, Chairman
Subcommittee on Department Investigations,
Oversight and Research
Committee on Agriculture
House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

We are pleased to note the attention your Committee is giving to legislation for strengthening programs for agricultural research, extension and teaching. The National Chamber believes that we must put renewed emphasis on agricultural research if we are to meet the needs of expanding markets for food and agricultural products.

The following recommendations, if implemented, would result in improvements in the performance of our agricultural research programs:

1. Extend the administrative coverage to include all indirect, as well as direct, Federal research activities through coordination with other Federal agencies and private research organizations.
2. Require more effective classification and coordination of basic and applied agricultural research programs.
3. Set a specific limit on the amount of research funds to be authorized annually. We oppose legislation which authorizes open-ended funding on a multi-year basis without regard to oversight, review and evaluation. This is "backdoor spending" and is contrary to the intent of the Congressional Budget Control Act of 1974.
4. Limit the basic authority for agricultural research to not more than four or five years. While there is need for planning in research and development projects, the programs and level of funding should be justified or modified annually through the oversight and review process of Congress. The Chamber supports the concept of zero-base review and evaluation on a periodic basis -- at least every four or five years.
5. Provide for appropriate advisory groups on research, extension and teaching on such matters as recommending research programs (both short-term priorities and long-range plans), establishing priorities, allocating funds, etc. The users and beneficiaries of research projects, as well as the scientists and organizations responsible for conducting the research, should be consulted.

6. Expand scientific participation through the use of mission-oriented research grants and award grants on a competitive basis.

The provisions of H. R. 4394 are more in line with our recommendations than are other legislative proposals under consideration by the Committee. We are not prepared to recommend the level of funding for agricultural research, extension and education activities.

The amount of land resources for the production of food and fiber in this country is finite. The trend line for increasing yields per acre appears to be leveling off while the trend line for food consumption continues to rise. The need for higher priorities for agricultural research, extension and teaching to produce and market more and better quality food and fiber products is recognized. However, an increase in research funds by itself will not accomplish this objective. Better coordination of research needs, dissemination of published information, setting of priorities and incentives for competition are also prerequisites to more efficient and effective agricultural research, development and implementation programs.

Cordially,

Hilton Davis
Vice President
Legislative Action



The first of these is the fact that the
the first of these is the fact that the

the first of these is the fact that the
the first of these is the fact that the

the first of these is the fact that the
the first of these is the fact that the

the first of these is the fact that the
the first of these is the fact that the

the first of these is the fact that the
the first of these is the fact that the

the first of these is the fact that the

the first of these is the fact that the

the first of these is the fact that the

the first of these is the fact that the

