

Testimony of

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Representing the Board on Agriculture Assembly National Association of State Universities and Land-Grant Colleges

before the

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"Investing in Our Nation's Future through Agricultural Research"

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Mr. Chairman and members of the committee, I am pleased to appear before you this morning representing the National Association of State Universities and Land-Grant Colleges to discuss our CREATE-21 proposal for the Research Title of the Farm Bill.

As you know, NASULGC and our partners have been working diligently over the past two years to reach consensus within the land-grant community and among our external partners about how the Federal-State Partnership<sup>1</sup> in food, agriculture, and natural resources research, education, and extension could be updated and improved to meet the needs of the 21st Century.

The land-grant system traces its roots to the First Morrill Act of 1862, with major statutory authorities enacted in 1887, 1890, 1914, 1962, 1977, 1994, and 1997. Although we have a long history and many proud traditions, we have looked hard at how we have been doing business, listened to our critics, and embraced change.

Specifically, we have decided that future funding increases for both fundamental research and integrated activities (projects that integrate research with extension and/or education) should be distributed primarily through competitively-awarded, peer-reviewed grants. However, for reasons explained in a moment, this cannot be done by reducing the funding streams that sustain the basic capacity of U.S. Department of Agriculture (USDA) intramural research units (ARS, ERS, and Forest Service R&D), land-grant universities, state agricultural experiment stations, or cooperative extension offices. In fact, just the opposite is true; these capacity programs need greater funding too!

As chair of NASULGC's Farm Bill Committee and one of three co-chairs of NASULGC's CREATE-21 panel, I have had the opportunity to visit with federal and state decision-makers, stakeholders, and land-grant officials over the last several years. At every meeting I have fielded a variant of the same question: "How can you ask for more money at a time like this?" My answer is always the same: The challenges and opportunities we face are both prodigious and generational in scope. If we cannot put forward a plan that directly addresses the inefficiencies in the present system of small and separate agencies with dozens of funding

"stovepipes" (or "silos" -- to use an agricultural term) and one that demonstrates the essential value of increased funding for research, education, and extension, then we get what we deserve.

#### CREATE-21: A Bold and Comprehensive Plan

CREATE-21 is, as I said, the result of a deliberative process to rethink the basic structure of the Federal-State Partnership that guides, manages, and funds America's food, agriculture, and natural resources research, education, and public outreach. The acronym we've chosen stands for "Creating Research, Extension, and Teaching Excellence for the 21st Century," and we believe that ours is the only plan on the table that will truly accomplish that objective.

The CREATE-21 proposal is a direct response to the efforts over the last three years by the Office of Management and Budget (OMB) to either eliminate entirely or redirect to competitive mechanisms a portion of appropriated research funds that flow through the USDA to state agricultural experiment

1 The unique partnership arrangement between the Federal Government and the governments of the several States is described in Section 1409A (a) of the National Agricultural Research, Extension, and Teaching Act of 1977 (as amended).

stations, forestry schools, and veterinary medicine schools. OMB's objections stem not from the quality of the research performed -- after all, these programs routinely garner high OMB program evaluation scores -- but rather from the fact that the funds are distributed by statutory formulas and not competitive processes. We recognize what worked 50 years ago does not work efficiently now, much less 10 years from now. These realities have led us to today's proposal.

CREATE-21 is much more than just a response to criticism. It is a bold and comprehensive plan to: (1) bring together in a single organization the many research agencies, offices, programs, projects, personnel, and facilities currently spread across USDA; and (2) more tightly integrate this intramural research capacity with the extramural research, teaching, and extension capacity within land-grant universities and related institutions. (See Fig. 1, Page 9.)

The other fundamental purpose of CREATE-21 is to double authorized funding levels for intramural and extramural food, agricultural, and natural resource research, teaching, and extension programs at USDA. This element is included within the CREATE-21 proposal because there are dozens of critical and urgent national problems that will not be solved in an acceptable timeframe unless USDA science program levels are substantially and immediately increased.

#### CREATE-21: Details and Benefits

Food, agricultural, and natural resources research, extension, and education programs are spread over four USDA agencies: (1) Agriculture Research Service (ARS); (2) Cooperative State Research, Education, and Extension Service (CSREES); (3) Economic Research Service (ERS); and (4) Forest Service R&D. As a result, there is frequent programmatic duplication, no "lead-agency" to address critical national issues, and a lack of clear and simple integration

across agencies.

CREATE-21 addresses the shortcomings of this situation by integrating ARS, CSREES, ERS, and Forest Service R&D (including their functions, personnel, programs, and activities) within a new organization to be called the National Institutes for Food and Agriculture (NIFA):

? NIFA will be an independent agency reporting directly to the Secretary of Agriculture and headed

by a Director who is an acknowledged expert. The Director will be nominated by the President, confirmed by the Senate for a single six-year term, and guided and assisted by a Council of Advisors. (This is loosely modeled on a structure similar to those successfully employed by the National Institutes of Health (NIH) and the National Science Foundation (NSF).)

? The Director and his team will manage a broad and integrated portfolio of programs organized by problem/solution areas and will include six national institutes:

(1)

Economic Opportunities in Agriculture and Natural Resources;

(2)

Nutrition and Health;

(3)

Rural and Urban Community Development;

(4)

Natural Resources and Environment;

(5)

Food Safety and Agricultural Security; and

(6)

Families, Youth, and Communities.

? NIFA's "competitive" programs will be open to all qualified universities/investigators and will be aimed at solving problems of pressing multistate, national, or international significance.

? NIFA's "capacity" programs will maintain and expand the intramural research capabilities within USDA (e.g. ARS, ERS, and USFS R&D) and the research, extension, education, and international capabilities within land-grant universities and related institutions.

? Finally, NIFA will have special funding provisions to enhance the capacity and competitiveness of the 1890, 1994, small 1862 land-grant institutions, and related agricultural

colleges.

Consolidating ARS, CSREES, ERS, and Forest Service R&D into one cohesive organization will, we believe, have many advantages:

? Program integration will be strengthened by integrating the research capacity of ARS, ERS, and Forest Service R&D and aligning these intramural resources more closely with the research, education, and extension capacity of America's land-grant universities and related institutions.

? Budgetary efficiency will be improved through elimination of duplicative programs and activities and a streamlined bureaucracy.

? Organizational flexibility will be increased through a variable structure organized around six major problem-solution areas (the six institutes listed above).

? Stakeholder participation will be enhanced through a Council of Advisors and other mechanisms for improved and increased input at all levels.

In addition to the organizational elements described above, CREATE-21 envisions increased funding (compared to current agency baselines) for NIFA's competitive and capacity programs:

? Competitive funding will (after seven years) reach \$2.1 billion per year, with fundamental research constituting 55 percent of the total and integrated programs the remaining 45 percent.

? Capacity funding will (after seven years) reach \$2.9 billion per year, enabling intramural USDA research and extramural programs at land-grant universities and related institutions to maintain and extend their base operations.

? If CREATE-21 is enacted and fully funded, after seven years the competitive/capacity ratio -- considering existing funds (\$2.7 billion) and new funds (\$2.7 billion) -- would be 42 percent competitive and 58 percent capacity funding. Currently, the ratio is approximately 10 percent competitive and 90 percent capacity. (See Fig. 2, Page 9.)

? However, to "jump start" the funding enhancement program, \$200 million per year in mandatory funding would flow immediately to NIFA from the statutory authority for the Initiative for Future Agricultural and Food Systems (IFAFS) program.

**CREATE-21: Biofuels and Bioproducts -- a Paradigm Example of Need**

Mr. Chairman, the land-grant community realizes that CREATE-21 is ambitious in its objectives and audacious in its scope. We have coalesced behind this proposal because we believe that neither the status quo nor halfway measures are acceptable. The status quo is not bad. It's just not as good as it should be. And, as I will discuss later, some of the other proposals your committee may have under consideration are not bad either. They are just not as bold, integrative, and comprehensive as they ought to be. In fact, our proposal includes each of the other proposals!

To illustrate why a comprehensive approach (in both organizational structure and funding) is

absolutely necessary, let me present a single, detailed example of an urgent national problem area that would be better addressed if CREATE-21 were enacted. But, before I do that, let me say that although this example focuses on bioproducts (including biofuels), there are many other problem areas that could illustrate our case (such as avian influenza, human health and obesity, international competitiveness, animal health and disease, climate change, sustainable agriculture, etc.).

As members of this committee are aware, a wide variety of innovative bioproducts are currently under development. While ethanol production from corn has been highly publicized, scientists are working on hundreds of promising value-added, bio-based products including:

? soybean-based biomaterials with desirable, rubber-like properties;

? biodegradable products from corn, such as plastics, solvents and disposable foam for packaging, plates, and other uses;

? antibodies and other protein therapeutics produced in corn, tobacco, and alfalfa for the treatment of human disease;

? textiles made from corn and other plants that may be used in clothing, bedding, carpeting, and automobile interiors;

? new fluids developed from oil-seed crops that have excellent sun-protective qualities and many potential industrial uses; and

? products with unique performance characteristics, such as sturdier cotton or harder or softer wood.

In addition, more than half of the next generation of new drugs is likely to be derived from human proteins in a process that is lengthy, complex and expensive. The drug industry has no quick or economical way to get these critical drugs from the microscope to the marketplace. The answer to these problems may come from chickens. Genetically modified chickens can produce human protein in their eggs. If such a process can be made commercially viable, biological medications could be produced less expensively and in higher volume.

Innovative products such as these can provide important economic benefits to producers and bring new opportunities to small farmers. They also can serve as the basis for new regional industries in rural areas. And then there is ethanol.

The United States has a goal of producing 20 percent of its transportation fuels from biomass by 2030 and efforts to achieve that objective are well underway. However, this is a very ambitious undertaking, requiring the dedication of millions of additional acres to the production of ethanol and biodiesel; the development of entirely new methods to produce bioproducts from cellulosic materials; and the recovery of huge quantities of waste biomass from fields, farms, forests, mills, and landfills.

A recent report issued jointly by USDA and DOE (Biomass as Feedstock for a Bioenergy and

Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply) notes that at least five advances will be required to reach this goal:

? Yields of corn, wheat, and other small grains must be increased by 50 percent.

? Agriculture harvest techniques must be capable of recovering 75 percent of annual crop residues.

? Some 55 million acres of cropland, idle cropland, and pasture must be dedicated to perennial bioenergy crops.

? All manure in excess of that which can be applied on-farm for soil improvement must be used for biofuels, and all other available residues must be similarly utilized.

? The quantity of wood recovered from forests, processing plants, municipal solid waste, and other sources must double.

As a country, how are we going to get from here to there without negative impacts on other parts of the system? The answer lies in CREATE-21.

Last year, Senators Stabenow and Levin visited the lab of Michigan State chemical engineer Bruce Dale to learn more about renewable fuels with emphasis on cellulosic ethanol. At the end of the tour, Senator Levin said: "Professor Dale, you've told us that cellulosic ethanol isn't ready right now because the cost is too high. What is it going to take to accelerate this technology and get it to market within five to ten years versus ten years or more?" Professor Dale thought for a moment and then carefully replied. "Senator," he said, "it will take a two-pronged approach. We need about \$1 billion for fundamental research and another \$1 billion for an integrated, systems approach -- including outreach through Extension -- to help us understand and deal with the profound dynamics of this new paradigm."

This advice from Dr. Dale is consistent with the report that this committee recently received from the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board. As that report makes clear, technology development and scientific progress in the bioproducts arena are neither simple nor linear. Success depends upon two critical ingredients: translational research and a systems approach. Yes, we need fundamental research into cell-level mechanisms and enzymes, but we can't stop there. We need a total systems approach that integrates traditional agricultural research, economics, and extension while considering the larger social and environmental impacts.

Let me digress for a moment. The current Federal-State Partnership has been successful in the past, but it was not built for the complicated opportunities and threats that we increasingly face. Nonetheless, bioproducts represents a tremendous opportunity for USDA and its collaborators to show that research, education, and extension can continue to contribute to economic prosperity and quality of life, which are at the very heart of the land-grant mission. But we need one, single, well-funded organization to develop programs like this and not four smaller agencies with limited budgets!

Now let me go back to Professor Dale. A few months after the senators visited his lab, I asked him this question: "If the Federal-State Partnership had put adequate funds, especially competitive funds, in place 20-25 years ago, where would we be today?" His response was immediate and unequivocal. He indicated that we would have fuel costing less than a dollar a gallon and that other public benefits -- measured in terms of rural development, farm income, and quality of life -- would be equally profound.

Parenthetically, I would also add that competitive dollars invested in a systems approach that includes extension and integrative research (not just fundamental research) would deal with many of the questions of today, including agriculture's impact on the environment, fuel vs. food, and of course, the unintended impacts of grain-based ethanol on animal agriculture.

CREATE-21: The Time is Now!

The rate of change in the world accelerates daily. So, let's not look back 20 years, but forward ten years. Mr. Chairman, when your successors write the 2017 Farm Bill, what will they say? Will they wonder why you and your colleagues missed the chance to embrace the great opportunities and address the enormous problems that lie ahead, or will they thank you profusely for your foresight?

Or, to use a specific example, I know that Senator Stabenow has worked hard to educate this committee about the value of specialty crops. Ten years from now, will we have a thriving and profitable specialty crops industry in states such as Michigan, or will members of this committee be talking about how to reduce America's dependence on foreign food just as we are now talking about reducing our dependence on foreign oil?

The leadership of the land-grant system believes that USDA's food, agriculture, and natural resource science programs are at a critical juncture. Those of us who care deeply about these programs can either resist change or seize the opportunity to shape that change.

As a scientist and representative of a state with a \$60 billion agricultural economy, let me use dairy -- one of the fundamental components of this thriving part of Michigan's economy -- to make two final points. When it comes to this industry, we have no choice but to take a systems approach, that is to consider the business in the broader context of its societal and environmental impacts. And, we have to address the questions that citizens want answered. They want to know if their milk is safe and nutritious and if it is produced in a humane manner with appropriate concern for the environment.

And my second dairy point is this: If we don't do something right now to greatly increase competitive funding for research, education, and extension, we are going to lose numerous faculty with a direct connection to agriculture.

At Michigan State, there are many dairy researchers conducting leading-edge research. If we don't change the USDA system and increase competitive funding to support them, these researchers will gravitate to different models, looking, for example to grants from NIH or NSF, which use mice and rats to model to human health. This capacity will be lost, and I contend, it will never come back. While our land-grant university will survive, without the positive changes inherent in CREATE-21, we will become more and more detached from the very

people our institutions we were created to serve.

#### CREATE-21 Compared to the Other Leading Plans

As described above, the CREATE-21 proposal addresses both the organizational and funding issues that this committee must tackle as you craft the Research Title of the 2007 Farm Bill. The two other major proposals before you have much to recommend them, but neither represents a truly comprehensive approach. Before closing, let me take a moment to spell out where our proposal differs from the others.

Now, this is not to say the other proposals are bad. They are both sound and would serve to improve upon the system we have now, but we believe there is only one opportunity to recraft the framework of the Federal-State Partnership. We must be bold and create a structure that will lay the foundation to serve our stakeholders for the next 50 years. If we do not adjust to the new economy and environment, then we will fail in our core responsibility to provide America's farmers, ranchers, foresters, families, and children with the service, science, and education they so rightly deserve.

USDA Research, Education, and Economics Task Force (Danforth) Plan. First, on behalf of NASULGC, I want to thank Dr. Danforth for lending his tremendous credibility to this important discussion. His October 13, 2006, editorial in *Science* magazine provides a strong rationale for bolstering agricultural research. A close examination of the proposal arising from the July 2004 report of the his Task Force reveals that the major similarity to CREATE-21 is funding authorization for a new fundamental research program that will grow to \$1 billion per year over a five- or seven-year period. Thus, the Danforth Plan is included within CREATE-21.

However, the Danforth proposal would only exacerbate some of the problems that are inherent in the current organizational structure at USDA (where programs are spread across numerous agencies), and it cannot, therefore, enhance the integration, efficiency, flexibility, and accountability of programmatic efforts in research, extension, and education (as CREATE-21 does). Furthermore, the proposal does not address the chronic decline in funding that is slowly eroding the intramural capacity of agencies such as ARS and Forest Service R&D and the research, teaching, and extension capacity of the land-grant system. And, finally, it does not bolster the capacity and competitive position of the minority-serving land-grant institutions, such as the historically black universities and the tribal colleges.

The USDA Plan. Unlike the Danforth proposal, the USDA plan has yet to be proffered in legislative form. However, from what we have been able to discern, the proposal does incorporate some of the key elements of CREATE-21. For example, it calls for the consolidation of CSREES and ARS into a new agency to be called the Research, Education, and Extension Service within a new USDA Office of Science. Further, it would authorize new fundamental research funding streams for biofuels and specialty crops.

It would not, however, reverse the slow but steady erosion in capacity funding at USDA and within the land-grant system. It would not include all of the key agencies/units that are included within CREATE-21. And, it would not authorize broad, new competitive programs. Thus, the proposal is not equivalent to the total systems approach that CREATE-21 provides (through

bolstering research and extension capacity and an integrated competitive grants program). Finally, this proposal does not strengthen the capacity and competitive position of the minority-serving land-grant institutions.

#### Other Farm Bill Recommendations

Mr. Chairman, I would be remiss if I did not mention that the NASULGC's Farm Bill Committee has developed a number of other proposals to improve the operation and effectiveness of several other Farm Bill programs and authorities beyond CREATE-21 and the Research Title. These include suggestions to further enhance the contributions that our research, education, and extension programs make through the Farm Bill's energy, conservation, nutrition, rural development, trade, and other titles. We would be pleased to share these proposals with the Committee at your earliest convenience.

#### Conclusion

On behalf of the Board on Agriculture Assembly of the National Association of State Universities and Land-Grant Colleges let me thank you for the opportunity to present this testimony. We look forward to working closely with you in the months ahead to craft a Research Title to the 2007 Farm Bill that seizes the opportunity to update and improve both the structure of the USDA science apparatus and the mechanisms by which the Federal-State Partnership funds food, agricultural, and natural resources research, teaching, and extension.