NATIONAL AGRICULTURAL RESEARCH, EXTENSION, EDUCATION, AND ECONOMICS ADVISORY BOARD

GENERAL MEETING AND FOCUS SESSION:
Bioproducts, Water and 1890/1994 Land Grant Institutions

October 24-26, 2006
L'Enfant Plaza Hotel, 480 L'Enfant Plaza, S.W., Washington, DC

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TUESDAY, OCTOBER 24, 2006

New Member Orientation

During the morning before the General Session, the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board (the Board), held an orientation meeting for new members. This included presentations by Research, Education and Economics (REE) mission agencies, USDA budget and legislative staff, and Board staff.

Immigration and Agriculture

During a working lunch, economist William Kandel, Economic Research Service (ERS), spoke on the impact of immigration reform on agriculture. Undocumented workers are very important to the farming, meat processing and food service industries, and the estimated 2.2 to 3.1 million such workers in these sectors represent between 31 and 47 percent of all undocumented workers in the United States. Stricter enforcement or legalization would both have negative impacts on agricultural competitiveness, raising wages by anywhere from 15 to 50 percent and boosting U.S. food imports by as much as 50 percent. Annual losses to U.S. agriculture could range from $1.5 to $5.0 billion, and as many as 10 to 20 percent of all fruit and vegetable producers could go out of business. U.S. meat processors are also increasingly dependent on Hispanic, foreign-born and undocumented laborers, but the increasing number of immigrant workers has depressed wages for native workers by from 1 to 5 percent, mostly for low-skill workers and those without high school diplomas.

In response to questions from the Board, Kandel said that producers and processors can adapt to these changes by raising prices, adopting labor-saving technologies, or leaving the business. Thus, far, however, industry has been slow to introduce new technology, although there are a number of new techniques in use elsewhere that have not been introduced in the United States, such as mechanized grape pickers in Australia and robotic milking machines in Europe. It would be useful to fund studies of how other nations have adapted to similar challenges. Industry has not supported mechanization research in the past but might be more receptive now. However, there will also be a need for social sciences research that industry is less likely to support, including impacts on community structure, poverty rates, and demand for social services. As is so often the case, what is needed is a multidisciplinary approach that responds to a broader perspective.

GENERAL SESSION

Welcome and Introductory Remarks

Martin Massengale, Acting Chairman and presiding officer of the Board, called the meeting to order at 1:12 p.m and asked those in attendance to introduce themselves (see attached list). He noted that this afternoon's session of the Board meeting had not been advertised in the *Federal Register*, as required by the Federal Advisory Committees Act, and that while the Board might

hear presentations and discuss issued today, it would not act on those discussions until the morning. This included official business such as the minutes of the previous meeting and the election of Board officers.

Gale A. Buchanan, Under Secretary for Research, Education and Economics (REE), USDA, also welcomed new and returning members, to not only represent their constituencies but also to participate in creating a consensus on issues where REE needs their advice. He promised them that their recommendations will always be taken seriously, even if they aren't always be acted on, and that when REE doesn't follow the Board's advice, he would explain why. But he also asked them to be mindful of the limited resources available to support the Board, which does not receive a separate appropriation.

General Advisory Board Business

Gale Buchanan reported on REE responses to the Board's previous recommendations. On the future of the National Arboretum, the Board's draft response is being reviewed by REE staff in light of the reorganization of REE. The Arboretum has considerable public visibility, and the Classical Chines Garden in particular has been heavily promoted in China, but Congress has not provided funding for this new feature. The Arboretum may need to seek private or corporate funding for the infrastructure to support it, and staff is looking for additional revenue sources, including licensing, royalties, or even vehicle entry fees. On bioenergy, there is now an active working group within REE, looking for areas of possible collaboration that might receive additional funding in the future. Planning for the Farm Bill has pushed many matters to the back burner, and recommendations for the Farm Bill itself will need to be in place by January or February to be considered.

Joseph Dunn, Executive Director, NAREEE Advisory Board, USDA, reported that the Board website is currently undergoing final testing and should be available in a few more weeks. Among the documents available to members on this site will be meeting minutes and reports submitted by the Board in past years, along with REE responses. There will be a list of the topics of previous focus sessions, and an abstract if not the full text of the Board's deliberations and recommendations.

Martin Massengale reminded new members that the Board has repeatedly advised REE of the need to improve the public image and understanding of the role that USDA research plays in the U.S. food sector, and that the Board had advised REE of the need for a major initiative, akin to the Manhattan Project, for biofuels and renewable sources of energy. Other members asked if REE had considered using a mechanism similar to the Government-University-Industry Roundtable, sponsored by the National Research Council. Others suggested that there might be new opportunities for collaborations with other federal agencies who might need access to the kinds of data that REE routinely collects, such as environment statistics from the farm sector.

Specialty Crop Committee Report for 2006

Walter Armbruster reported that the draft Specialty Crops report is not yet ready for review. The minutes of the committee's hearings are complete, but not the recommendations. He hopes to circulated it to the Board in late December or early January, before it is submitted to the Secretary and the Congress. The committee's initial draft of this report is available at the old NAREEE website. Board members indicated that ten days would be a sufficient turnaround time for their review.

Germplasm Report from May 2006

Marty Apple and Daryl Lund reported on the draft Germplasm report, which was distributed in the briefing book for this meeting. The report emphasizes production agriculture, rather than alternative uses (e.g., biomaterials and bioenergy), but it does note that switchgrass yields three times as much ethanol per acre as corn. The report outlines a number of new goals that will allow USDA and its customers exploit these new technologies, including a number of specific recommendations relating to the National Germplasm Resources Program (NGRP). They urged Board members to review and comment on these recommendations. In response to questions about how much it would cost to implement these recommendations, they added that the current NGRP of $50-$60 million/yr. would need to increase by $15-$20 million/yr. for five years. With regard to intellectual property, they suggested that – to ensure access to novel germplasm – donor countries might be offered royalty-free access to improved seed stock. Alternatively, the improved crop species might be distributed to developing countries as a common good, supported by profits deriving from developed nations. The latter idea has not yet been tried out on industry. The National Advisory Committee on Biosecurity will be meeting later this week, and the recommendations of the NAREEE report should be consistent with that group with regard to pathogens. Several members suggested that the report needs to be shortened even further, and that an executive summary would be useful.

National Digital Library of Agriculture (NDLA) Task Force

Marianne Smith Edge reported that the Board's task force has participated in the NDLA vision sessions, which have stressed a short-term action plan to make NDLA valuable to the consumer. The National Library of Agriculture (NAL) got a good response to its survey of 6,000 potential users, who indicated that they want tailored information that's available to end-users at any location. NAL staff are ready, willing and able to develop and launch NDLA; director Peter Young and his deputy Eleanor Friarson received particular praise. However, NAL has not received the budget increase that would be needed to implement the Board's recommendations, a reflection of the generally flat budgets for ARS and for agricultural research more broadly.

Update on Creating Research, Extension, and Teaching Excellence for the 21st Century (CREATE-21)

Jeff Armstrong reviewed the status of this initiative of the National Association of State Universities and Land Grant Colleges (NASULGC), whose goals include (1) reorganizing REE's research and development functions under a proposed National Institute for Food and Agriculture and (2) doubling the federal budget for agricultural research from $2.7 billion to $5.3 billion per year. As currently envisioned, CREATE-21 has a new emphasis on bioenergy and sustainable agriculture, but it continues to promised health, environmental and economic benefits for all Americans. According to Hoffman, some 87 percent of the faculty and researchers at land grant colleges and universities support the kinds of changes proposed by CREATE-21, which would allow them to attract increased research funding from the private sector.

In the discussion that followed, Board members suggested that doubling the budget is probably the minimum needed to achieve the stated goals; it will take $1-$2 billion/yr. just to reduce the timeline for cellulosic ethanol from 10-15 years to only 5-10 years. They also pointed out that the National Center for the Future of Agricultural Research (N-CFAR) supports the competing proposal of the commission chaired by William H. Danforth, and that there isn't enough money to do both. Proponents of CREATE-21 have scheduled a meeting with and hope to merge the two initiatives. Proponents have not yet met with congressional committees, and they were advised that they should focus initially on a single, easily communicated theme. Bioenergy is probably an appropriate target; other issues (obesity, rural development, etc.) can be pursued later.

Topics and Timing of Next Board Meeting

The Board held a wide-ranging discussion of topics for their next focus session, and (in view of the looming Farm Bill) their next meeting should take place in January, rather than waiting until March as usual. Among the possible focus topics were the following:

- *Globalization* (what are the social, economic and national security implications of the United States becoming a net importer of food, as is expected to happen in 2006?)
- *Sustainability* (how do we achieve maximum productivity with a minimum of water and energy?)
- *Air Quality* (how will EPA rules and enforcement affect producers and processors?)
- *Agricultural Literacy* (how do we get the public to understand the importance of research to agriculture, and the importance of agriculture to the larger economy and society?)

On this last topic, Colien Hefferan, Administrator, Cooperative State Research, Education and Extension Service (CSREES), REE, USDA, characterized the topic of reorganizing REE as "inside baseball" – of interest to a small circle of participants, but not very interesting to the general public. Repositioning USDA as a lead agency on bioenergy is more compelling, but the real challenge is to change the public's perception of USDA in general, of REE in particular, and of agricultural science most specifically. The proper focus should be on *science*, not research, with bioenergy or bioproducts or sustainability as examples of issues that can be addressed only

by bringing to bear new, science-based ideas and strategies. A label for this topic might be *Repositioning Agricultural Science.*

On the subject of timing, the consensus of the Board was that they should meet again sooner than March, and that they might consider meeting three times per year instead of two, budget permitting.

RECEPTION AND PROGRAM

Steven Pueppke, Assistant VP for Research & Graduate Studies, Michigan State University, presented a broad introduction to the potential of the biobased economy. He reminded the Board that bioproducts and bioenergy have been around for over 70 years, but that they failed to mature and expand because of a lack of political support. As more and more attention is focused on oil prices and fossil fuel flows, however, the social will to grow our own energy will eventually lead to the necessary political will. As this happens, the three key challenges for the public agriculture sector will be (1) to focus attention on what people care about (whether it is sustainability, smaller scale, or industry structure), (2) to focus on the long term (there is no quick fix), and (3) to discover, translate and transfer the technologies needed to support an effective bioeconomy.

The emerging bioeconomy will be technology-intensive, but the current technology base is still fairly primitive. New technologies will be needed to make possible new uses for familiar crops and landscapes, to produce and exploit dedicated biomass, and to extract value from materials that are now considered "wastes" but will be the feedstocks of the future. In the short term, the "low-hanging fruit" will be to increase yields, breed for desired compounds, and utilize "wastes." In the medium term, new crops will be developed specifically as feedstock for materials and energy. In the long term, however, the economic viability of this system will require the integration of these crops, processes and facilities in a coherent, efficient agricultural-industrial enterprise.

ARS and its land grant partners have enormous science and engineering assets to bring to bear on this problem, but technological progress will be neither simple nor linear. They also have an immense tacit understanding of the U.S. agricultural system. But many of the spokesmen who are currently promoting the bio-economy don't have this understanding, and it is the responsibility of agricultural scientists to inform the emerging debate. Particular opportunities in that debate include climate change, policy alternatives (e.g., more attention to conservation), and trees (cellulosic ethanol has enormous potential, but there are enormous gaps in the enabling technologies).

In response to questions from the Board, Pueppke added that past failures (e.g., on-farm digesters) and yo-yo policies (start, stop, start again) can be a barrier to future innovation. The social and political will to pursue this path must be decoupled from the current price of energy, a trick that the Europeans seem to be better at than we are. As a result, there is a need (as well as an opportunity) to educate decision makers and the public. Another underpublicized problem is

water – at present it takes four gallons of water to make one gallon of ethanol; does it make sense to use that water to run our SUVs, instead of growing our food? This and other social issues will need to be addressed, but they cannot be allowed to hold back new technologies.

WEDNESDAY, OCTOBER 25, 2006

GENERAL SESSION

Board Business

Martin Massengale and George Hoffman were unanimously re-elected as Chairman and Vice Chairman of the Board, respectively. The Board voted to wait ten days for the Executive Committee to approve the minutes of the March 2006 meeting.

Mike Johans, Secretary, USDA, expressed his appreciation for the Board's service and advice. He said that this was an exciting time to be in agriculture – prices are high, in part because ethanol now consumes 20 percent of the corn crop and biodiesel 8 percent of soy, and major investors are looking at rural America. Whether these favorable trends will last depends on many factors, including the balance between energy and food, and our ability to develop new crops and supporting technologies. Congress must produce a new Farm Bill in 2007, and USDA has held listening forums throughout the country to hear from its customers.

In response to questions, the Secretary added that the price cycles of the past may not be repeated this time, since only a dramatic drop in oil prices can derail the shift to ethanol. However, there is a need to broaden the benefits of this transition beyond corn. Not every acre can be planted in corn, and some acres definitely should not. Water appears to be a growing concern, and an interagency approach is needed in developing a national water policy. There is an opportunity to address these and other issues in the new Farm Bill.

FOCUS SESSION 1 – BIOPRODUCTS AT WORK: EFFECTIVENESS OF REE PLANNING AND EXECUTION

Carol Keiser explained that the planning committee had commissioned three white papers on this topic – one from an REE agency, one from industry, and one from an independent source – which were included in the briefing book. Today's presentation would be a summary and panel discussion by the authors. She also presented a list of questions for consideration by Board members.

Non-Food Bioproducts Research

Robert Fireovid, National Program Leader, Quality and Utilization of Agricultural Products (NP308), ARS, USDA, said that ARS has been conducting bioproducts research since 1938, concentrating on new markets and new uses for agricultural products. NP308 has a history of commercially successful innovation, including new foods as well as non-food products and processes. Projects are evaluated based on their quality, relevance and impact, and NP308 has twice the ARS average of Cooperative Research and Development Agreements (CRADAs) to move these innovations to market. Current research, shaped in part by the president's Advanced Energy Initiative (AEI), includes refinery coproducts and substitutes for petroleum-based products; non-AEI projects include coproducts, substitutes and specialty chemicals. The Federal Biobased Products Preferred Procurement Program (FB4P), created by Congress in 2002, provides a good "market pull" for these new products. Future directions include increased use of molecular breeding, metabolic engineering and alternative feedstocks, as well as greater use of partnerships to translate, develop and commercialize new plant-based products.

Bioproducts – Opportunities and Challenges

Paul Bloom, Manager, New Industrial Chemicals, Archer Daniels Midland Company, said that USDA could help industry greatly by providing a list of approved inputs for FB4P. In his view, bioproducts are nothing magically new, simply a new feedstock for the chemical industry. In the short term, the "low-hanging fruit" in chemicals is to used agricultural feedstocks as a direct replacement for petroleum-based compounds in the production of existing products. In the longer term, and with considerable R&D, it will be possible to use bio-based feedstocks to produce new intermediates and entirely new end products. These new applications are far more difficult to pursue, but they also have the greatest potential for the industry and the economy. To exploit that potential, there must be equal footing for energy and nonenergy products. Industry also needs new manpower, in the form of conversion chemists, and new technology, such as improved catalysts. Ultimately, sustainability and biodegradability will be important concerns in the emergence of a bio-based economy.

Bioproducts – An Independent View

Mike Tumbleson, Professor of Agricultural and Biological Engineering, University of Illinois at Urbana-Champaign, agreed that bioproducts is nothing new – after all, the term "biorefinery" was coined by agricultural economists. But while the current production of bioproducts is technically sound and environmentally safe, there are important scientific, technological and socioeconomic barriers to the kind of large-scale commercialization that is envisioned. Missed opportunities and abandoned programs from the past continue to haunt the field, and some of the most daunting impediments are embedded in the institutional culture of agricultural research: funding departments rather than projects, funding single PIs rather than multidisciplinary teams, risk aversion, funding decisions based on perceptions rather than facts, across-the-board budget cuts instead of winnowing the portfolio. To change this culture, USDA might consider the model of the Advanced Technology Program, through which the Department of Commerce has

since 1990 provided R&D funding to industry, which then subcontracts to universities for the necessary translational work. And from the farmer's point of view, the key issue isn't yield but return; farmers want progress, and only ARS has the stability to address their long-term needs.

Panel Discussion

In response to questions from the Board, the panelists agreed that the Advanced Technology Program might be a good model for mechanisms to bridge the "valley of death" between research and commercialization. A key feature of that program is its industry advisory board, which helps to ensure relevance; USDA should include similar bodies. The panelists also agreed that manure is prominently missing from the list of bioproducts that need new applications; ARS is working on the problem and has tried to enlist the help of the National Laboratories, whose high overhead makes them difficult collaborators. Perhaps the new Farm Bill will address this barrier.

Several Board members suggested that the social and environmental impacts of these new technologies are not receiving enough attention; they asked for a total systems approach that will put the economic analysis in a broader context. There may also be a need for new organizational models, for instance to build and operate cooperative biorefineries in rural locations. REE agencies and land grant universities, for their part, would like to pursue these topics, but they would required larger grants, of longer duration, than are currently possible. Money for translational research and implementation should be part of the budget, but federal funding for implementation may run afoul of our historic aversion to industrial policy. In many cases, however, state governments are well positioned to support commercialization of new technologies. Several Board members pointed to a potential double bind: stakeholder buy-in is absolutely necessary, but current stakeholders want what is, first, and what might be as an add-on. This may make it difficult to sell major changes that decrease funding for existing programs.

FOCUS SESSION 2 – WATER QUALITY AND QUANTITY

Jeff Armstrong and Marty Apple introduced the session. As with bioproducts, they had commissioned four white papers from different perspectives, along with a list of questions for consideration by the Board. The session would consist of summaries by the authors, followed by a panel discussion with the Board.

Critical Issues on Water and Agriculture

Peter Gleick, President, Pacific Institute for Studies in Development, Environment, and Security, asserted that the U.S. agricultural sector faces unprecedented challenges in the 21st century, many of them related to water. Availability already hinders productivity in other parts of the world , if not yet in the United States (northern China may be the worst), and there are physical, economic, environmental, and political constraints on the development of new supply. The lack of a consistent national water policy hinders improvement in this outlook. Irrigation has greatly increased the productivity of U.S. farms, and the productivity of water used in agriculture

continues to increase – total withdrawals today are less than they were in 1980 – but irrigation also has environmental consequences, including the pollution and consumption of rivers. In some regions, surface and ground waters are already overdrafted. Farms must compete for water with growing urban areas, and rising energy prices also drive the cost of irrigation. Drought is a recurring threat, and climate change is a new but unpredictable variable.

Gleick called for a "new economy of water," stressing the efficiency of end-uses, the equity of allocation and reallocation, and the development of alternative sources (e.g., banking, recycling and reclamation). Key issues for researchers and policy makers alike will be how to grow more food with less water, how to identify and protect high-quality agricultural land, and how to reduce quality impacts on rivers, wetlands and groundwater. New technologies and new strategies will be needed for integrated planning, improved monitoring and meaningful enforcement. Governments should reduce the subsidies that distort water usage and create mechanisms for marketing and trading water supplies. And while biotechnology may yield new crops that can deal with drought and climate change, there is also a need to increase the productivity of rain-fed agriculture.

Water and Agriculture: Background and Research Needs

Robert Hirsch, Associate Director for Water, U.S. Geological Survey, revealed a serious lack of data on key questions having to do with water quantity and quality. Energy production and irrigation are assumed to be major consumers of water, but there is no actual data gathering on the consumptive use of water in the United States. Availability is a problem in only a few areas, so far: consumption is less than 40 percent of the renewable supply in most of the country, but in the Rio Grande watershed the figure is closer to 60 percent, and in the Lower Colorado it is over 100 percent. On the other hand, the United States has build no new storage (dams and reservoirs) since 1970. Data is also lacking on groundwater depletion – other than the Ogallala, there is no information on aquifer water levels, although it is assumed that pumping adds significantly to the cost of irrigation and that subsidence causes infrastructure damage, reduced streamflow and damage to riparian ecosystems. There is a similar lack of data on water quality issues, including both traditional pollutants (such as fertilizers, pesticides and coliform bacteria) and emerging pollutants (such as environmental estrogen and pharmaceuticals). There is poor data on existing management practices, and a particular need for long-term monitoring and analysis to understand the complex processes at work. USGS will soon publish its "GSFLOW" model, which integrates the two, and a "farm package" specifically addresses the role of drains and pumping. This and other models are only as good as the data they are fed, however, and there is a need for data that captures longer periods of time and larger geographical areas – tens of year, tens of kilometers.

Environmental Issues and Water Resources

Sandra Batie, Professor of Agricultural and Food Policy, Michigan State University, told the Board that much research remained to be done on the connection between water resources, agriculture and rural land use. Trends are poor for most impacts, and the new urgency over

bioenergy may aggravate existing problems. In many regions, the question is no longer the sufficiency of the water supply but its functional integrity. As a result, agricultural land management and water management practices will need to change, and there will be a need for a sound theoretical and empirical knowledge base to guide those changes, grounded in a framework of risk management.

Batie believes that there is more information available than is being applied to these problems. Current policies tend to be one-dimensional, dealing with single pollutants in isolation from larger changes, or focused on preventing degradation rather than promoting restoration. Most of these policies omit the role of the land manager and ignore the need for better monitoring and more effective risk communication. We need a new way to think about old problems. As a result, the research and education agenda for the future should include risk assessment, total systems analysis, full-cost accounting, the use of complementary technologies, and investments in translational research to put new knowledge into practice.

A View from Ground Zero: Assessing the Real State of Western Irrigated Agriculture

Patrick O'Toole, President, Family Farm Alliance, observed that the engine of Western growth is the conversion of agricultural land and water to urban uses. This may create jobs, but it spells disaster for the family farm. He appealed to the Board to help farmers assemble the data they need to adapt to these changes and preserve their way of life. A particular problem is storage facilities – there are 180 federal water projects in the 17 Western states, but it takes 25 years to get a new reservoir, and farmers are looking at a 35 percent reduction in water flows from the upper to lower Colorado River. Another important question is the interaction between surface water and groundwater. Policy and research alike must recognize and protect the value of irrigated agriculture.

USDA Research on Water Quality and Quantity

Mark Weltz, National Program Leader, Natural Resources and Sustainable Agricultural Systems, ARS, USDA, reported that the ARS budget for research on water availability will total $63.7 million in FY2007, with slightly more going to quality than to quantity. Erosion is still an important concern, but attention is also shifting to emerging pollutants such as bioendocrine and pharmaceutical contaminants. Other emerging issues are drought resistance, reuse and recycling of water, the sustainability of bioenergy technologies, and mechanisms for trading water. Conservation is still highly integrated with the entire USDA mission, so research also includes techniques for recharging aquifers with recycled water and urban runoff.

Michael O'Neill, National Program Leader, Water Resources, CSREES, USDA, identified three research priorities that emerged from the Secretary's listening sessions: (1) plants that use less water or tolerate salinity; (2) broader adoption of existing technologies; and (3) reuse of water. A conference next wee in Santa Rosa, CA, will address the third issue, which involves many problems with public perception. These issues are facets of a larger paradigm shift from

production-oriented to sustainability-oriented water use. In more general terms, the question could be expressed as, "Is the desert the best place to grow cotton?"

Marc Ribaudo, Agricultural Economist, ERS, USDA, described ERS research on the interactions between agriculture and the quantity and quality of water resources. This includes surveys to monitor water as an input, to assess the adoption of irrigation and conservation technologies, and to evaluate the impact of federal policies and programs. The latter includes not only the impact of USDA programs but also the impact on agriculture of environmental policies and regulations. Recent reports have focused on greater flexibility in conservation programs and the effectiveness of alternative manure management techniques.

Mark Miller, Head, Environmental and Demographics Section, NASS, identified the water-relevant sections of the Census of Agriculture, which is conducted every five years, and the supplemental Farm and Ranch Irrigation Survey (FRIS), which has been conducted every five years since 1979. These reports publish data on a state level, and by major river basin, on acres under irrigation, types and amounts of irrigation, energy costs, fertilizer and pesticide use, and alternative crop coverage. In collaboration with ERS, NASS conducts annual surveys of agricultural resource management and conservation effects. Miller added that NASS data are based on self-report, rather than physical measurement (e.g., satellite data), which often results in different numbers from those published by USGS.

Panel Discussion

When a Board member asked the panelists to identify the two most important problems in this area, and possible solutions, there was an interesting convergence in their answers: we need better monitoring and analysis, so that planning can be based on real numbers; we need to rationalize water policy, putting in place the right incentives and removing perverse incentives; and we need to look at water policy in the larger perspective of land use, environmental protection and food security.

Several Board members commented that the European Community has made a conscious decision to support small farms and to keep people on the land. The United States may be moving in that direction, as witness the rising interest in local food and farmers markets, but thus far development has trumped family farms. One Board members suggested a recent watershed audit by the Charles River Alliance as a model for integrated planning, using the model of a "foodshed" rather than "agriculture-dependent counties."

GENERAL SESSION

Election of Executive Committee

The Board elected the following members to serve on the Executive Committee:

- Martin Apple;
- Walt Armbruster;

· Carol Keiser;
· Darryl Lund;
· David Thomassen;
· Mary Wagner;
· James Zuiches.

Other Matters

Darryl Lund suggested that, in future, REE agencies might present their reports in a common format – programs, objectives, resources, plans, and how the Board can help. Other members agreed but asked that there be greater flexibility, for example "what, so what, now what." Lund volunteered to develop a format and circulate it for comment.

Jeff Armstrong suggested that the Board would have more time for discussion and deliberation if meetings were limited to two focus sessions instead of three. He also asked the Executive Committee to consider scheduling meeting on two days, 9 to 5, rather than the current half day, full day, half day schedule. Other members suggested that the Board should meet sooner than March if it wants to have an impact on the new Farm Bill. In fact, the Farm Bill itself might be sufficient focus topic for a January or early February meeting. Since there are research elements in all five titles, it would be useful for staff to provide Board members with a list of where the research elements are. Jeff Armstrong, who also chairs the Farm Bill committee, said that he would send copies of their materials to Board members.

There being no public comment, the meeting was recessed at 5 p.m.

RECEPTION AND PROGRAM

USDA Programs and Authorizations Impacting the 1890 and 1994 Colleges and Universities – Expectations and Realities

George Cooper, Deputy Administrator, Office of Science and Education Resource Development, CSREES, USDA, gave a brief history of the 1890 and 1994 land grant colleges, which have extended the benefits of the original Morrill Act of 1862 to new beneficiaries. Their mission includes teaching, research and extension, with particular attention to low-income individuals and low-resource communities. There are 18 of the so-called 1890 institutions, most of them historically black, and 34 of the 1994 institutions, most of them originally tribal colleges chartered by the tribe rather than the state government. All of them have grown enormously in size, scale and skills, but their funding arrangements are a constraint on their potential contributions.

In response to questions, Cooper added that over 40 percent of the students in 1890 institutions, and almost all of those at 1994s, are the first in their families to attend college. These institutions use a somewhat broader definition of "food and agriculture" than the 1862s, and they place somewhat greater emphasis on rural community development. For 1890s, the requirement

for matching funds is a barrier to capacity building and strategic partnerships. For 1994s, the prohibition on drawing down endowment means that it can take up to 10 years to accumulate the funds for specific projects.

THURSDAY, OCTOBER 26, 2006

FOCUS SESSION 3 – ENGAGING USDA/REE IN THE SUCCESS OF THE 189O AND 1994 LAND GRANT INSTITUTIONS

Research, Education and Extension at 1890 Institutions

Carolyn Brooks, Dean, School of Agricultural and Natural Sciences, University of Maryland Eastern Shore (UMES), described her school's twin mission of (1) education and (2) research and education for the community. UMES graduates about 16,000 students per year, roughly 70-percent of them African American, and the school is very aware of its role as an economic driver in the community. Faculty practice what she called "intrusive counseling" in order to produce "society-ready" graduates, and UMES has collaborated with public schools to produce a "seamless K-16 education system" that emphasizes science, technology, engineering, and mathematics. Research at 1890s emphasizes farmers and rural communities, rather than commodities and industrial agriculture.

One of the biggest challenges facing 1890s is declining resources, at a time when they face growing competition for both students and faculty, and declining support for affirmative action programs. They need more money for curriculum overhauls, aggressive recruiting, and financial support. But they also need help from USDA programs that would help them attract and retain minority students, strengthen agricultural education, and increase the diversity of investigators and grantees. The strict requirement for matching funds means that 1890s don't compete with the 1862s on a level playing field. It would be particularly useful for USDA to co-locate some of its facilities on 1890 campuses and invest in upgrading their centers of excellence, which too often consist of one scientist, one technician, and $10,000 toward the cost of utilities.

L. Washington Lyons, Executive Director, Association of Extension Administrators, North Carolina A&T State University, described the efforts of 1890 institutions to carry out their extension mission for a diverse clientele and with limited resources. Their focus areas include alternative entrepreneurship, rural development, nutrition, and families. Examples include direct marketing to reduce risk and mobile computer labs. In some cases, several 1890s have collaborated to launch regional initiatives. Lyons identified several areas in which USDA could help the 1890s improve their extension activities:

- Increase funding for facilities and equipment;
- Revise EFNEP rules to expand 1890s participation;
- Increase funding for the Section 2501 outreach program to increase participation by minority farmers;
- Reform the Food Stamp program to reverse the decline in participation;
- Exempt 1890s from cost-sharing requirements that are a barrier to research partnerships.

In response to questions from the Board, panelists said that the funding declines that have been felt throughout agricultural research have been more acute in the 1890s, where the need is greatest. For example, 93 percent of the students at UMES could qualify for Pell grants, and money is needed for a broad range of student aid, graduate fellowships, and faculty development. There seems to be a recognition among the 1862s of the needs of the 1890s, and a willingness to help if possible. One possibility might be a budget-neutral program of teacher and researcher exchanges; visiting professors would become advocates and partners for the 1890s when they return home. Virginia State University and Virginia Tech have a long history of cooperation and collaboration, with their presidents acting as champions before the state legislature. Internships in industry would also be productive, for both students and faculty, since it would sharpen the focus of their research and seed advocates for business partnerships.

Research, Education and Extension at 1994 Institutions

Terry Tatsey, Director, Land Grant Department, Blackfeet Community College, reminded the Board that the 1994s began as tribal colleges, chartered by their tribes or nations rather than the states, and there is a history of friction between the state and tribal governments. The 1994s' clientele are typically underrepresented, underserved and underfunded, and both access and delivery can be problems in isolated rural communities. Most of their agriculture courses are part of a "culturally appropriate curriculum," but Blackfeet is also a member of the American Indian Conservation Alliance. Technology is a relatively new need and focus, but the school already provides in-service training for USDA and community employees in accounting, business management, etc. Tatsey would like to see a program of internships in USDA agencies for Native American students.

Chad Waushechon, Director, Office of Education Outreach and Training, College of the Menominee Nation, noted with irony that the University of Wisconsin at Madison, the state's 1862 land grant institution, was built with the proceeds from land taken from the Menominee. The state's 1994 institution is now 12 years old and has 120 students, but it also provides noncredit training to as much as 25 percent of the local population in a small rural community that is starved for education. This represents a way out of poverty, and success has led to rising expectations. Waushechon has successfully developed a sustainable development institute, which trains Native Americans in how to manage the 56 million acres of forest and prairie that are under tribal control, including significant forest biomass. The related First American Forest Institute awaits funding. His next goal is an archeological research center based on a 13,500 year old Paleoindian site on the reservation. In a place where 85 percent of households have no access to the internet, even a basic broadband system would be a significant infrastructure improvement. As a result, the Menominee look to USDA's rural development programs as a kind of venture capital for business and community development.

Virgil Dupuis, Extension Director, Salish Kootenai College, noted that the enrollment of tribal colleges has increased from 11,000 in 1994 to over 30,000 today. However, there are now 4.5 million Americans who identify themselves as Indians, a number that is growing by 25 to 35

percent every decade, and while there are 550 federally recognized tribal entities, there are only 34 tribal colleges. Who serves the other tribes, especially the 50 percent of Indians who do no live on reservations? For example, the Census of Agriculture has traditionally published data that treat all of the agricultural activities of a reservation as a single operator, but there are an estimated 42,000 Indian farms and over 2 million head of cattle on Indian ranches. NASS now plans to conduct a pilot census of Indian agriculture in Montana and the Dakotas to provide finer-grained data on these operators.

USDA could help tribal extension officers by supporting a tribal liaison at every 1862 campus, instead of a single liaison for all of the 1994s. Topics of interest include native plants and land restoration, nutritional research on buffalo meat, and native crops. (Dupuis noted wryly that Native Americans have 5,000 years of experience breeding corn that will grow with 12 inches of precipitation. Other emerging areas are energy resources (coal and biomass), water quality, and computer technology. Indian students tend to prefer a hands-on, experiential approach, which favors programs that integrate research, education and extension. REE could be particularly helpful in guiding tribal colleges in creating partnerships with 1862 and 1890 institutions, particularly those that address national priorities such as biofuels and water quality.

REE Programs for 1890 and 1994 Institutions

Antoinette Betschart, Associate Administrator, ARS, USDA, described a number of programs through which ARS creates partnerships with 1890 institutions, including centers of excellence, cooperative agreements and capacity-building grants. The goal is to improve ARS research, as well as to strengthen its partners and attract students to agricultural science. The money comes out of the normal ARS budget; there is no line item for these partnerships.

Melinda McClanahan, Chief Information Officer, ARS, USDA (herself a member of the Choctaw Nation), described an equally broad array of programs through which ARS supports 1994 institutions, including research internships, material gifts, programs through the National Agricultural Library, and disposition of excess federal property (e.g., 75 computers to three tribal colleges). ARS plans to expand the number of internship programs from three to ten and to open them to tribal elders as well as faculty and students.

Kitty Smith, Director, Resource Economics Division, ERS, USDA, said that her agency collaborates with 1890 and 1994 faculty to improve ERS data and research. In one case, ERS' Food Economics Program "adopted" Tennessee A&M, providing faculty relief and conducting joint research. Smith feels that there is a broader opportunity for USDA scientists and economists to provide expertise as teachers in 1890s and 1994. ERS also provides summer internships in DC for 1890 students, although they have yet to bring interns from tribal colleges.

George Cooper, Deputy Director, Science and Education Resources Development, CSREES, USDA, described the CSREES Fellows Program, which brings faculty and staff from 1890s and 1994s to Washington for a 90-day summer fellowship. The 1890 Scholars Program provides tuition, room, board, compensation, and a guaranteed job at CSREES for 38 students per year;

there is no such mechanism for students from 1994s. In addition, the CSREES Liaison Program puts a USDA representative on the campus of every 1890. At present there is only one liaison for all 34 of the 1994s, so there is an opportunity to expand this program. Cooper also distributed a list of specific program enhancements that serve the 1890 and 1994 institutions.

In the discussion that followed, Board members suggested that tribal colleges had an opportunity to expand their activities in renewable energy, particularly solar in the Southwest, wind in the Northern Plains, and forest biomass in many regions. However, many investors are leery of investments on tribal land, which are subject to a number of regulatory and legal issues, including access to the electrical grid. In addition, public perceptions about Indian casinos work against such investments, even though most tribes don't have casinos and those that do spend only a small share of the revenue on tribal colleges.

Most of the panelists agreed that lifting the matching requirements for cooperative research would benefit both 1890s and 1994. Transferability of credits is a bigger problem for 1994, especially for science and environment courses. At present only eight 1994s offer bachelor's degrees, and only two offer master's.

BOARD DISCUSSION AND RECOMMENDATIONS

The planning committees that organized these focus sessions will develop more complete reports and recommendations on these topics in coming weeks. The following is a summary of the Board's deliberations during these focus sessions.

Bioproducts at Work

Both bioenergy and bioproducts present us with a generational opportunity to create new science, new technology, and new applications. We must seize this opportunity, identify the most promising avenues of research, and move forward. In the short term, the greatest success will come from picking the "low-hanging fruit" – that is, directly replacing familiar oil-based products (e.g., fuels, lubricants, plastics) with equivalent bioproducts from existing crops. In the long term, however, technological success will depend on developing entirely new crops, new products and new processes. traditional agricultural research and economics with their larger social and environmental impacts). What industry would like to see is an equal footing for oil- and bio-based products, and a list of approved inputs for the evolving Biobased Products Preferred Procurement Program.

The debate over expanding the bioeconomy, particularly if approached from a total systems perspective, will also provide an opportunity to address a number of collateral issues. These include not only conservation (which never gets enough attention in energy policy) and global warming (which continues to be ignored), but also environmental impacts and even water (a bigger challenge than currently acknowledged). Board members also asked whether USDA and its university partners currently have, or can quickly develop, the research and extension workforce that will be required to pursue this new mandate.

Water Quality and Quantity

The program planning committee offered the following list of recommendations from this discussion:

- Continue research to improve the efficiency of water use in agricultural
- Link research results to policy instrument, incentives and market-like mechanisms to drive efficiency of water use and protection of water quality.
- Conduct research to compare effectiveness of BMPs vs. economic incentives vs. market-based mechanisms in achieving better water quality outcomes.
- Determine how land use and land management can be changed to achieve maximum benefit to water quality.
- Develop a risk-management framework for thinking about water quality and quantity, functional integrity, and sustainability.
- Find ways to make regulatory processes more efficient in accommodating changes in water demand in the West.
- Conduct research on reuse, reclamation and recycling of water as tools for increasing the efficiency of water use and quality protection.

Engaging USDA/REE in the Success of the 1890 and 1994 Land Grant Institutions

The program planning committee developed the following preliminary recommendations in response to these presentations:

- Increase funding for 1890s and 1994s under USDA's formula funding, facilities programs and capacity-building programs.
- Support the creation of faculty and student exchange programs among 1862, 1890 and 1994 institutions.
- Give 1890s and 1994s a greater role in USDA/REE advisory boards.
- Increase funding for centers of excellence programs.
- Provide additional funding to NAL to expand library access for 1890s and 1994s.
- Encourage the co-location of REE centers on 1890 an 1994 campuses.
- Provide funding for regional 1994 liaisons.
- Provide more capacity-building grants to 1890 and 1994 institution.
- Modify RFPs to include greater integration of research, extension and education. In particular, modify CSREES programs for 1890/1994 institutions to place more emphasis on their *education* component.

ACTION ITEMS

- ERS will provide Board members with report on its workshop, "Exploring Rural Entrepreneurship," 26-27 Oct 2006.
- NAREEE staff will consolidate on Board website a list of the topics of all focus sessions, with recommendations made by the Board and responses by REE.
- NAREEE staff will circulate minutes of the August listening session within 30 days.

- NAREEE staff will circulate draft Bioenergy and Germplasm reports to Board members as soon as they are ready for review.
- ARS and CSREES will provide the Board with a breakdown of the percentage of formula and competitive research funding goes to bioenergy and bioproducts.
- Bioproducts program committee will write up findings and recommendation as an addendum to the bioenergy report, stressing the need for research on second-generation cellulosic ethanol, items for the procurement program, total systems approach, and greater emphasis on animal byproducts and processing waste.
- REE agencies will present their written reports to the Board in a uniform format. Daryl Lund will develop and circulated a sample format.

There being no public comment, the meeting adjourned at 12:15 p.m.