National Initiative on the Improvement of U.S. Water Security

Recommendations of the Water Working Group representing the nation's Land Grant Institutions.

Water availability and quality are essential to U.S. security interests. While it is vital to human health, water is a finite natural resource upon which our economy depends. Many important challenges exist for managing and protecting our water resources that can, and must, be addressed by the U.S. Department of Agriculture (USDA) through the vast expertise and capacity of the nation's Land Grant Institutions (LGIs).

Examples of these challenges include: agricultural systems threatened by drought, fire, and flood; concerns over water reallocation and its impact on agricultural production and natural resources; the vitality of communities; impacts from agricultural and rural activities on fresh water systems, drinking water, and recreation; toxic algal blooms and nutrient rich dead zones in surface waters and coastal estuaries; lost diversity in our terrestrial and aquatic ecosystems; expanding needs for energy production; uncertainties due to climate variability; a range of human health and disease problems exacerbated by lack of water, too much water, or excess loading of nonpoint contaminants; and the long-term implications to local, regional and national economic conditions. Such problems often are framed and aggregated as national issues; however, a robust program to mitigate and solve them requires a response that reflects the unique local attributes (e.g., the interaction of people, land and water) that influence decisions about water management and protection. The tripartite mission of research, teaching, and community-based extension uniquely positions Land Grant Institutions to apply site-specific, science-based solutions that will protect, sustain, and improve U.S. water security.

The challenges associated with protecting U.S. water security are among the most pressing issues of our present and future generations. Addressing future U.S. water needs will require USDA to reinvigorate its partnership with the nation's Land Grant Institutions. There is tremendous capacity in the Land Grant Institutions to conduct agricultural research, develop adequate water resource management strategies, train future generations of scientists, educators and water professionals, and to work directly with citizens on their problems through the community-based Cooperative Extension Service.

The following recommendations call for bold steps in research and program funding that should be taken by USDA and the National Institute of Food and Agriculture (NIFA). **This report outlines a $100 million (annual) initiative by the nation's Land Grant Institutions (LGIs) to address the nation's water security challenges.**

The National Water Resources Working Group

Land Grant Institutions are central in USDA's response to protecting the nation's water resources. To develop a strategy for enhancing how Land Grant Institutions can help USDA, the Board on Agriculture Assembly [by way of the Policy Board of Director's Budget and Advocacy Committee (BAC)] created an *ad hoc* national Working Group on Water Resources in Fall 2013. The 23 member Working Group was charged with developing recommendations for how Land Grant Institutions can best address U.S. Water Security (e.g., water quantity and quality issues) following their tripartite mission of research, education and Extension (see Appendix 1. Working Group Charge, and Appendix 2. Working Group Membership). Members were selected based on experience with previous programs, their expertise, and regional representation.

The Charge

This Working Group is charged with developing a report that describes how the nation's Land Grant Institutions (LGIs) will utilize their expertise in research, education and extension to address water resource challenges through 2025 and beyond.

This report will also be used by the BAC to prioritize the future funding needs of the LGIs related to efforts that protect and enhance water resources for food and agriculture.

BAC Charge (October 2013)

The Working Group focused on two phases of activities leading to a final set of recommendations.

1. The identification and prioritization of **The Grand Challenges in Protecting and Improving U.S. Water Security.** These are the issues and problems that the nation's Land Grant Institutions have a critical role in addressing – ranging from problem identification and needs assessment, problem solving, resource protection and management, and remediation.
2. The prioritization of **The Essential Elements to an Integrated Response by The National Network of Land Grant Institutions** to address the highest area of need – this included programmatic priorities and institutional structures/mechanisms/expertise/etc...

Guiding Principles Behind the Working Group's Recommendations

In developing recommendations the working group started with several important side-boards to its discussions. These principles provided valuable guidance in keeping the group focused on the most critical water issues, and on the strategic role of the nation's Land Grant Institutions in dealing with those issues. These principles included:

- Focusing on water resources issues that include both water quality and quantity;
- Identifying opportunities for enhancing integrated responses to water challenges with research, education and extension functions of the nation's Land Grant Institutions;

- Applying Land Grant University expertise to water problems that span agricultural, rural and urbanizing landscapes;
- Linking to, and leveraging the broader expertise within our universities (e.g., state water resource centers);
- Addressing local and multistate problem solving and program implementation (and where appropriate geographic and watershed-based problem approaches);
- Fostering effective localized responses and implementation to solving water problems and reducing threats (especially by strengthening community-based extension, academic teaching programs, and applied research and demonstration);
- Stressing how multistate and interdisciplinary approaches (and/or expertise teams) will employ natural sciences, engineering and social sciences;
- Ensuring regional/multistate collaboration among Land Grant Institutions and NIFA;
- Building upon the recommendations from the Section 406/Integrated Activities Task Force – a Task Force formed jointly by the Extension Committee on Organization and Policy (ECOP) and Experiment Station Committee on Organization and Policy (ESCOP). [The Task Force authored two reports, June 2011 and April 2013.] Strong consideration was given to maintaining the intent (functional equivalency) of programs already prioritized by the Task Force;
- Identifying opportunities for partnerships and leveraging both expertise and fiscal resources within USDA (e.g., NIFA, ARS, USFS, and NRCS), as well as other agencies (e.g., Department of Interior, Environmental Protection Agency); and
- When identifying fiscal elements, a consolidated budget proposal (as few lines as possible) shall be considered.

The Grand Challenges - Protecting and Improving U.S. Water Security

The Working Group's first phase of actions focused on the identification and subsequent prioritization of the water issues and problems that the nation's Land Grant Institutions have a critical role in addressing. This broad array of problems is the basis for what the Working Group identified as "National Issues of Significance" (See Figure 1, page 5). These issues represent both current and emerging threats to U.S. water security and are thus primary drivers for future Land Grant University research, teaching programs and extension-outreach to communities. Addressing U.S. water security interests will require substantial investment in new/additional funding.

In its effort to categorize the dominant national issues associated with U.S. water security, the Water Working Group conducted a review of more than two-dozen recent priority identification efforts. This review included: academic papers; reports on priority setting processes by USDA, Land Grant Institutions and other partner agencies; and previous work by Association of Public and Land-Grant Universities (APLU), ESCOP and ECOP.

Among the documents reviewed by the Working Group (partial listing):

- Gold et. Al., (2013). Advancing water resource management in agriculture, rural and urbanizing watersheds: Why land-grant universities matter. Journal of Soil and Water Conservation (July/August, 2013, Vol 68, No 4).
- Science Roadmap for Agriculture (ESCOP, 2010).
- The Science Roadmap for Natural Resources, addressing water by a Task Force of the APLU Board on Natural Resources.
- Section 406 (Integrated Activities) Task Force - Final Report (June 2011). A joint Task Force of ECOP and ESCOP.
- Universities Council on Water Resources – Journal of Contemporary Water Research Education (June 2004 / Issue 131, Pages 2-12): Water Resources Research in the 21st Century by Henry Vaux Jr.
- USDA: Research Education and Economics [REE] Action Plan
- USDA: NIFA's background on the development of a Water Challenge Area with AFRI.
- USGS: National Cooperative Water Program (CWP) and the Priority Activities for FY14 http://water.usgs.gov/coop/about/CWP.science.priorities.pdf
- Western Governor's water initiatives [www.westgov.org/initiatives/water]
- North American Agricultural Biotechnology Council website (various documents).
- USDA-REE Agricultural Water Security Listening Session's Final Report.

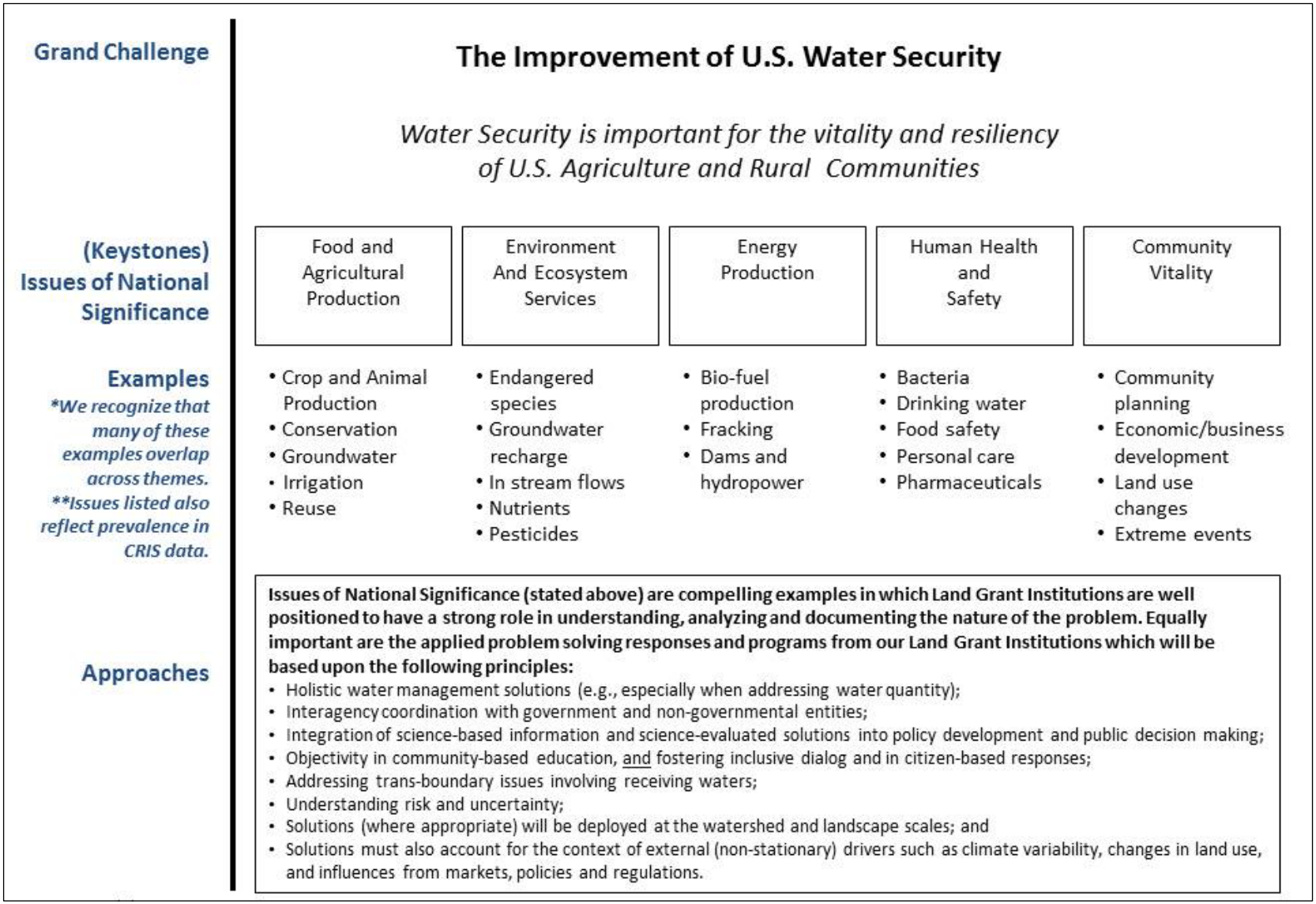
While members of the Working Group were asked to read and comment on priorities identified in the documents and reports (above) a software-driven analysis of the documents also assisted in identifying the most common sets of issues. This combined approach enabled the Working Group to develop a prioritized listing of issues and problems that our nation's Land Grant Institutions are best positioned to address.

This comprehensive approach to issue identification resulted in the emergence of five National Issues of Significance: (1) Food and Agricultural Production, (2) Environment and Ecosystem Services, (3) Energy Production, (4) Human Health and Safety, and (5) Community Vitality [See Figure 1, next page].

These five issues represent themes, or categories of challenges, that Land Grant Institutions are well equipped to make a difference in solving through efforts that are science-based, targeted, and integrated across Agricultural Experiment Stations (AES) and Cooperative Extension Service (CES).

Figure 1 (page 5): The titles and descriptions for the Issues of National Significance were carefully chosen to reflect how citizens understand problems. Under each of the five issues, the Working Group offers a few specific examples of problems that can be generally grouped under a respective issue. This list of examples is not intended to be comprehensive or exhaustive, rather an illustration of the issues that will be addressed by Land Grant Institutions.

Figure 1. National Issues of Significance



Essential Elements of the Integrated Response from the Land Grant Institutions

The Issues of National Significance should greatly influence how Land Grant Institutions organize their expertise and infrastructure. These national issues are targets for the research programs, teaching and instruction that occur on campuses, and the extension work that happens in our communities.

To ensure research, teaching and extension, are used to the fullest extent, the Working Group identified five **Essential Elements** of a Land Grant University-led national water security initiative. These Essential Elements reflect:

- how Land Grant Institutions mobilize expertise (faculty, staff, and students);
- how that human-capacity is integrated with the institution's infrastructure (campuses, classrooms, laboratories, research stations, field stations and county Extension offices); and
- how intramural and extramural funding can support a national water security initiative.

These Essential Elements connect universities with each other, connect universities to stakeholders and other partners, and clarify the linkages with NIFA.

The **Essential Elements** include:

(1) State/Institution-based Coordination;

(2) Regional Water Centers;

(3) Integrated Regional Water Grants;

(4) AFRI and National Grants; and

(5) Instructional Grants.

Each of the Essential Elements is described in detail *(See Section – Essential Elements #1-#5, below).*

The Level of Funding for a USDA/NIFA – Land Grant University Response to U.S. Water Security

The Working Group's approach to prioritizing funding for the Essential Elements was driven by the Issues of National Significance. After first considering the issues that Land Grant Institutions are best positioned to address, the Working Group then defined the five Essential Elements to meet those issue-challenges, and then finally what is required for each element to succeed. **To effectively address water security challenges we must "enhance" Land Grant Institutions through a major financial commitment to new and expanded initiatives. Therefore, the Working Group strongly recommends $100M (annually) in new/additional funding. That funding would be allocated across the five Essential Elements.**

NOTE: The Working Group offers accompanying recommendations for funding and budget policy for each Essential Element (Pages 8-13). Table 1 is an overall summary of the funding recommendations for each Essential Element.

Table 1. $100M/year National Water Security Initiative

Essential Element		
#1. State/Institution-based Coordination	$4M	Fixed costs
#2. Regional Water Centers	$6M	Fixed costs
#3. Integrated Regional Water Grants	$45M	50% of competitive funds
#4. AFRI National Grants	$36M	40% of competitive funds
#5. Instructional Grants	$9M	10% of competitive funds
TOTAL	**$100M**	Annually - for a minimum of five years.

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About Table 1. Fixed Costs versus Competitive Funding

Fixed costs are essential investments required to support the expertise and services of Land Grant Institutions as they expand their efforts to address water security. These are basic costs that occur, regardless of funds associated with short-term projects (commonly supported by grants). These costs are presented as static/fixed because they are necessary for on-going activities (ranging from program/project/curriculum development to administrative coordination). This support ensures integration among and between Agricultural Experiment Stations (AES) and Cooperative Extension Services (CES). **The Working Group recommends the first $10M in any new/additional funds be dedicated to meet these needs. The Working Group also recommends that the $10M amount in fixed costs should not decrease even if the funding for competitive programs is less than described ($90M).**

A **percentage-based allocation** of $90M from within the $100M total program costs (shown in Table 1 for the Integrated Regional Water Grants, AFRI and Instructional Grants) is proposed by the Working Group. This funding supports grant-based projects. **The Working Group recommends that if the total amount of funding for this initiative is less than $100M, a percentage-based approach be used to determine how funding is allocated within the overall (three categories) of competitive grants.** NOTE: this was offered as a means of ensuring a minimum level of funding for the fixed costs described in Essential Elements #1 and #2.

ESSENTIAL ELEMENT #1: State Coordination

Land Grant Institutions within a state (e.g., 1862s, 1890s, and 1994s) will collaborate to develop a shared, state-focused strategy that integrates research, teaching, and extension in ways that address local and statewide issues of significance. This funding would enable effective coordination through information sharing, joint priority setting, faculty and staff development, stakeholder involvement, and preparation of a state plan-of-work. In addition, it would enable active participation in multi-state issues and direct coordination with Regional Water Centers (described below).

Operational Recommendations:

- Each state submits a request for funding (state-based plan-of-work) to support coordination activities. States with multiple Land Grant Institutions must negotiate an overall plan-of-work that includes all institutions in that state who expect to receive financial support for coordination activities. Plans of work shall be integrated across AES and CES, and they should address a broad set of priorities (more than single discipline or individual specialist driven set of expertise).
- Each institution represented in the plan-of-work would identify a state/institution-based point of contact. (Identification of this individual would be made collaboratively by AES and CES within each Land Grant Institution). This person represents a clear pathway within his/her institution for coordinating activities, funding streams, linking multidisciplinary expertise of faculty and staff, and information sharing related to water. This position also maintains routine communication with the Regional Center (described below). Persons serving in these roles are likely to be experienced faculty and/or extension specialists with broad university and stakeholder connections.
- State coordination, while focused within a state, shall also include multistate and regional collaboration.
- Collectively, state work plans and the points of contact (persons) form a national collaborative network among Land Grant Institutions.

Budget Policy - Implications

- $4M (fixed cost)
- Each state can apply for a range ($25k-$100k) of funding. Higher requests would reflect the 1890s and 1994s that might fall within a state plan of work (1 state = 1 integrated plan of work).
- Funding requires a 1:1 match by the applicant.
- Awards are competitive.
- Consider this as a Smith Lever 3(d) line — jointly administered by CES and AES. *[NOTE: Additional discussion is needed regarding how 1862, 1890, 1994, and the Territories collaborate on state-based plans-of-work and the state coordination funding.]*

Additional Follow Up
(By: BAC/ECOP/ESCOP)

- Clarify the expectations for the "commitment by the institution," (e.g., %-time, how appointed, new position, funding for, etc.)? What is the minimal level of commitment?
- What can be done to insure greater adoption of the institutional point of contact (coordinator) model across all Land Grant Institutions (e.g., 1862s, 1890s and 1994s)?
- What is the role of NIFA National Program Leadership?

ESSENTIAL ELEMENT #2: Regional Water Centers

Regional Water Centers (hereafter called "Regional Centers") will integrate and extend state-level expertise and outputs through collaboration among Land Grant Institutions, and with partners and other stakeholders in a respective region. Regional Centers will prioritize issues at the regional and sub-regional level; as well as, facilitate and support collaborative responses to water security problems that are shared among states. Coordination among Regional Centers would enable a national response to water issues through visioning, multi-region collaboration, resource sharing, and technology transfer. Regional Centers will also have responsibility for managing Integrated Regional Water Grants (IRWGs).

Operational Recommendations for Regional Centers:

- Funds will be awarded to the USDA Region (e.g., like USDA Rural Development Centers). This will involve the region holding a competition for selecting a host institution. It is envisioned that a host institution for a regional center will offer significant leveraging/matching of its own expertise and funding.
- The core-funding (awards) will be multiyear continuation grants with a three-year review process.
- These centers leverage lessons learned from sister programs (e.g., individual state and multistate, HATCH, McIntire-Stennis, and extension projects, Integrated Water Resource Management Projects, and National Competitive Grants – see descriptions below).
- Centers provide synthesis and aggregation of local and regional issues that "bubble up" from the local level to national importance.
- Centers engage in multistate issue prioritization at a regional or sub-regional level;
- The Centers will coordinate research, education and extension activities through Integrated Regional Water Grants (IWRGs- see description below).

Budget Policy - Implications

- $6M (fixed cost)
- Four Regional Water Centers would be awarded. One to each of the USDA's administrative regions: North Central, Northeastern, Southern and Western. *[NOTE: This is consistent with the approach NIFA is using for Regional IPM Centers, Regional Rural Development Centers and Regional Nutrition Centers.]*
- Each regional water center must have a plan for coordinating the activities of the institutions within that geographic region (e.g., 1862s, 1890s and 1994s Land Grant Institutions).
- The annual regional water center budget would likely range from $750,000 to $1,500,000. It is not intended that all center budgets are equal; rather they should reflect resource needs, the number of collaborating institutions, and stakeholder interests.
- Awards are competitive; in a process similar to that used by Regional Rural Development Centers where the region determines the host institution. *[NOTE: Leverage and host-institution match should be considered.]*
- Additionally, one national coordination grant, of up to $500,000 would be awarded for coordination among the centers. It is expected that this may be an additional responsibility to one of the four regional centers.
- Consider this as a Smith Lever 3(d) line — jointly administered by CES and AES. *[NOTE: Additional discussion is needed regarding how 1862s, 1890s, 1994s, and Territories meet expectations for regional coordination].*

- Each Center will provide leadership on water security issues by helping establish multistate priorities for research, education and extension based on issues that occur within their scope (geographic/programmatic) coverage. In addition, Centers must:
  - facilitate priority setting for issues within an institution/state;
  - broker information about water research, education and academic teaching, and extension programs;
  - provide access and support to multistate partners and regional decision-makers;
  - document water security trends, and broader programmatic impacts; and
  - communicate the return on investment in the national network.

- These Centers would offer support to the extensive network of experts who respond to water issues. Examples include:
  - enhance, and facilitate, communication among the institution-based water points of contact within the Center's region, across regions, and nationally (e.g., Centers may host periodic regional and national meetings to enhance communication, information sharing and the translation of research among the network);
  - create opportunities for states to evaluate priorities and compare those priorities with the intent of fostering greater collaboration;
  - serve as a clearinghouse for core-skill development of state/institution-based water points of contact and faculty within a region by provide training and professional development opportunities for water professionals, students and faculty;
  - integrate and extend insights and outputs to state/institutional-based water points of contact, other related university personnel, and partners; and
  - integrate national priorities with those of the region, state and local community.

- Centers will support/create pilot efforts among states/institutions that will ultimately compete for grants and extramural funds.
- Centers must show their own commitment to program delivery (e.g., they are more than coordination entities; they will be expected to address multistate problems in ways that mobilize state/institutional expertise, while avoiding perceptions of competing against states/institutions for fiscal support).
- Each Center will have an inclusive process for setting regional priorities, communicating important information, and fostering coordination among all Land Grant Institutions (e.g., 1862, 1890 and 1994) within its region.
- Each Center will have an executive steering committee, and an advisory committee comprised of stakeholders and partners from agriculture, urban, and environmental interests. Additionally:
  - Center advisory committees must be inclusive of the needs and priorities of all Land Grant Institutions within a region (NOTE: However, it is unrealistic that all LGIs within a region serve simultaneously on such a committee, therefore Centers may want to consider rotational representatives from LGIs).
  - External partners are critical members of these advisory committees, and therefore, a Center must reach out to non-university stakeholders and partners.

Operational Recommendations for a National Coordination Grant (to one Regional Center):

- A single national coordination grant would be made to one of the four Regional Centers, not to exceed $500,000/annually.
- The grant would support one of the centers to assist in networking all centers into a national team. The grant would help the receiving center to engage in activities that would enhance national coordination among the centers.
- Furthermore, the national coordination grant should lead to greater aggregation of national impacts and increasing national visibility for the overall Water Security Program.
- Examples of anticipated national coordination mechanisms and processes include:
  - a national website, with linkages to Regional Center websites;
  - national impact reports;
  - development and maintenance of a national database of impacts and success stories; and
  - logistical support for a biennial water security conference to showcase programs and impacts, and to foster more coordination among state/institution-based points of contacts.
- The Regional Center funded by this grant will also logistically support the National Water Security Coordinating Council (e.g., it will assist [NOT Chair] in arranging meetings, maintaining meeting records and correspondence, and providing follow up to Council action where appropriate).

Additional Follow Up
(By: BAC/ECOP/ESCOP)

- Centers need to integrate and support the work among all Land Grant Institutions (e.g., 1862s, 1890s and 1994s). What can be done to support this?
- What helps a Center balance the "sometimes" competing demands of serving external partners/stakeholders and providing academic leadership within the network of Land Grant Institutions within its region?
- A Center should have a strong commitment to contributing to national-scale evaluation. What is the appropriate level of this support?
- As goals for the National Water Resource Coordinating Council (described below) are further developed, those goals will influence expectations for the activities of the center receiving the national coordination grant.
- What is the role of NIFA National Program Leadership with these Centers?

ESSENTIAL ELEMENT #3: Integrated Regional Water Grants (IRWGs)

Integrated Regional Water Grants will support research, education, and extension to address National Issues of Significance through: (1) state-based priorities and implementation of state plans-of-work, (2) multistate projects, and (3) regional/multiregional/national scale initiatives. Each Regional Center will coordinate a grant program within its defined region. Grants provided by the Center will support programs and programming that can be aggregated within the descriptions of the National Issues of Significance.

Budget Policy - Implications

- $45M, or 50% of all national competitive funds.
- Each Regional Center will compete for a pool of funds that it would manage within the region for this purpose (NOTE: each region might have different levels of funding for these grants; and the amount of funds a region receives for this could be adjusted periodically through a competitive award process);
- The Regional Center then administers a competitive process for distributing these funds within its region.
- Consider this as a Smith Lever 3(d) line — these funds are focused on implementing state and multistate work.

Operational Recommendations:

- The Regional Centers will manage the competition for these funds. [NOTE: The Working Group discussed several regional leadership models. It recommends a process similar to how former Regional Integrated Pest Management Funds were managed by Regional Integrated Pest Management Centers.]
- A national competition would occur among the Regional Centers to determine how much each region would receive for its regional grant program. This competitive-allocation for each Center will be managed by NIFA in consultation with the National Water Security Coordinating Council (described below).
- Every region would have an annual grant program, this would also allow for some national targeting to a region/geography that has a "high priority" National Issue of Significance and/or a unique need for rapid responses to water security issues.
- Furthermore, Integrated Regional Water Grants shall support:
  - priorities described/documented in the state-based plans of work;
  - state and multistate priorities;
  - integrated approaches (e.g., includes research, education and extension components);
  - pilot efforts and planning grants among states/institutions that will improve future success in seeking extramural funds;
  - Integration of partners and other stakeholders in appropriate roles of research and program delivery;
  - evaluation and impact assessment on water programs; and
  - efforts that build upon the work of existing multistate research committees (i.e., those supported by HATCH and McIntire-Stennis projects).

ESSENTIAL ELEMENT #4: AFRI - National Grants

Additional funding is recommended to enhance and expand the current NIFA-AFRI Water Challenge Area. The National Issues of Significance would provide the foundation for such expansion in AFRI. Also, Requests for Applications (RFAs) should attempt to leverage and focus the work of the other Essential Elements. Competitive funds are important to enhance the responses to the nation's most pressing water security problems by the national network of Land Grant Institutions. However, such competitive funding alone will not fully maximize the expertise and resources of the Land Grant Institutions -- in the synergistic and collective ways that will solve problems at a local and national scale. For a national grant program focused on agriculture and U.S. Water Security to be successful, it will also require a commitment to the 'other' Essential Elements to create a robust, and balanced portfolio – a hallmark of effective Land Grant University problem-solving initiatives.

Operational Recommendations:

- Funded national-scale efforts will support multi-regional (cross region) challenges.
- The projects funded by AFRI will, wherever possible, be woven into regional efforts and strengthen the topical interests of scientists by creating knowledge resources for broader implementation of problem solving.
- Projects will support a commitment to solving local problems and mobilizing the community- and campus-based expertise of Land Grant Institutions.
- AFRI should continue to place strong emphasis on "integrated" projects.

Budget Policy - Implications

- $36M, or 40% of all national competitive funds.
- Consider this as an add to AFRI.
- These grants must show a relationship to water security and National Issues of Significance.

Additional Follow Up

(By: BAC/ECOP/ESCOP)

- While an increase in AFRI is warranted; attention should remain on all Essential Elements as a "package."
- The Working Group may consider a post-report (a separate and subsequent think paper) that would describe the goals and outcomes for "integrated" projects within an AFRI Water Security Challenge Area.
- The Working Group acknowledges there is great potential in linking with other important competitive grant programs (e.g., NSF, NIH, NOAA, DOE, DOI, USGS). However, at this time, the Working Group only focused the scope of its recommendations on AFRI (e.g., as the primary mechanism for grants/support on this USDA Water Security Initiative).

ESSENTIAL ELEMENT #5: Instructional Grants

Budget Policy - Implications

- $9M, or 10% of all national competitive funds.
- Consider this as an add to AFRI.
- Must show a relationship to Water Security and National Issues of Significance.

The on-going and future needs for science and discovery demand a strong commitment to the development of future water scientists, managers, and other professionals; thus, expanding the capacity for science-based decision-making. This commitment must be reflected in undergraduate internships, graduate student opportunities, post-doctoral fellowships and curriculum development by Land Grant University to "fill the pipeline" of future scientists and water resource professionals. Instructional grants could also be extended to support training and in-service offerings for: K-12 teachers, vocational agriculture instructors, and advisors/educators of Future Farmers of America (FFA) programs. Furthermore, all Essential Elements of a new water security initiative would be asked to develop specific strategies aimed at increasing the number of young people entering water educational programs.

Operational Recommendations:

- Focus a national competitive grant-based program on developing future water scientists, managers, and other professionals.
- This commitment will be reflected in undergraduate internships, graduate student opportunities, and post-doctoral fellowships. Additionally, in some areas of graduate research and post-doctoral work this support should be linked to a one-year teaching requirement as a condition of support.
- Instructional grants will also foster university curriculum enhancement and/or new curriculum development that address the National Issues of Significance, and preparing graduates to work in areas associated with water security.
- Efforts also must include training and in-service offerings for K-12 teachers, vocational agriculture instructors, and advisors/educators of Future Farmers of America (FFA) programs.
- Furthermore, all Essential Elements of a new water security initiative will be required to develop specific strategies aimed at increasing the number of young people entering water educational programs.

RECOMMENDATIONS FOR: Enhancing Coordination and Improving Efficiency

A. **Coordination among the Essential Elements is a primary goal to create a national response to water security.** While each Essential Element (above) provides a specific function in supporting how Land Grant Institutions address the challenges associated with water security, integration across the Essential Elements is needed to effectively address common problems. Role clarification, a commitment to cooperating and communicating across the Essential Elements, and a strong willingness to allow shared-leadership functions is critical to guide collaboration across the Essential Elements. The Regional Centers and the National Water Security Coordinating Council (described below) must take leadership to remind, and where appropriate oversee, that the Essential Elements are working in concert with one another.

B. **Regional Multistate Research/Extension/Development/Coordination Committees can offer significant coordination and leverage among Land Grant Institutions.** Responses by single institutions and/or multistate entities (e.g., multistate committee) should exercise collaborative approaches that link to programs, functions and services supported by the Essential Elements; especially those activities of state/institution-based points of contact and Centers. Where issues and interests intersect, it is critical that efforts (e.g., projects and programs) supported within the Essential Elements engage in direct coordination with existing multistate committee networks (e.g., Multistate Research Projects, Multistate Research Coordinating Committees (CCs), Multistate Education/Extension and Research Activities (ERAs), National Research Support Projects (NRSPs), Development Committees (DCs), and Rapid Response Research Activities). The Working Group recognizes that coordination requires a "two way" commitment among many programs and projects for this initiative to be successful.

C. **Coordination with existing Land Grant University Water Programs will be a goal.** There are many other water related activities occurring within the broader umbrella of Land Grant Institutions, as well as other educational and research institutions. Therefore, greater integration among all water programs should be a major administrative goal. A few specific examples where coordination is warranted include: Water Research Institutes/State Water Centers, Sea Grant, Coastal Management Programs, and other Centers of expertise (e.g., National Drought Mitigation Center, etc.).

RECOMMENDATIONS FOR: National Decision Making and Shared Leadership

A. **A National Water Security Coordinating Council would be appointed by ECOP and ESCOP.**
This national entity should foster an environment for "shared leadership and decision making" about national program priorities and funding. It is very important to maintain attention on coordination and efficiency among the Centers, across state water programming efforts and state/institution-based points of contact, and with NIFA National Program Leaders (NPLs). This council will include all center directors, and a number (to be determined) of state/institution-based points of contact. NIFA-NPLs are expected to be advisors (not official voting members due to federal advisory committee rules) to the Coordinating Council. Stakeholder groups and external partners will be added as non-voting advisors where national issues support such representation.

RECOMMENDATIONS FOR: Determine Future Growth and Funding

A. The National Water Security Coordinating Council represents a critical decision-making body for determining the needs of future program growth and funding. The Coordinating Council will be expected to provide an on-going forum for various perspectives about evolving needs nationally, regionally and within states. Examples of who should be involved (at a minimum) include: state/institution-based points of contact, Centers, ECOP and ESCOP, stakeholder groups, partner agencies and NIFA.

B. The National Issues of Significance prioritizes the topics where this initiative can improve U.S. water security. That also means these issues need to be clear and understandable to those who make decisions about future funding. Expanding/modifying the National Issues of Significance should occur through a collaborative process between NIFA and ECOP/ESCOP, in consultation with the National Water Security Coordinating Council. Furthermore, any new and emerging national issues should be aligned with the Farm Bill cycle, thus allowing for additional prioritization of funding for emerging/changing needs in association with current or new issue priorities.

Appendix 1. Working Group Charge.

CHARGE

Water Resources Working Group

[Of the Budget and Advocacy Committee, APLU-BAA and Policy Board of Directors]

The Water Resources Working Group is an *ad hoc* Working Group of the Policy Board of Director's Budget and Advocacy Committee (BAC). This Working Group is charged with developing a report that describes how the nation's Land Grant Colleges an Institutions (LGIs) will utilize its expertise in research, education and extension to address water resource challenges through 2025 and beyond. This report will also be used by the BAC to prioritize the future funding needs of the LGUs related to efforts that protect and enhance water resources for food and agriculture.

Purpose of the Working Group on Water Resources:

1. Identify and prioritize water quality and quantity issues that the nation's Land Grant Colleges and Universities have a critical role in addressing – ranging from problem identification, problem solving, resource protection and management, and remediation.
2. Prioritize the essential elements to an integrated response by the national network of LGIs to address the highest area of need – this includes programmatic priorities and institutional structures/mechanisms/expertise/etc.

NOTE: The Working Group may want to consider its primary work in two phases that would follow the purpose statements above. The first being a report on the high priority issues; and a second as the prioritization of LGU responses to those needs.

Guiding Principles for the Working Group:

- Focus broadly on water resources issues (both water quality and quantity);
- Identify opportunities for enhancing integrated responses to water challenges with research, education and extension functions of the nation's LGIs;
- LGU expertise can/should be applied to problems that span agricultural, rural and urbanizing landscapes;
- Strongly consider local and multistate problem solving and program implementation (and where appropriate geographic and watershed-based problem approaches);
- Foster effective localized responses and implementation solving water problems and threats (especially by strengthening community-based extension and applied research);
- Consider multistate and interdisciplinary approaches (and/or expertise teams) that can couple insights from natural sciences, engineering and social sciences;
- Ensure regional/multistate collaboration among Land Grant institutions and NIFA;
- Build upon the recommendations of the ECOP/ESCOP Section 406 Task Force Reports (June 2011 and April 2013). Strong consideration should be given to maintaining the intent (functional equivalency) of those programs already prioritized by the Task Force;
- Identify opportunities for partnerships and leveraging both expertise and funding within USDA (e.g., NIFA, ARS, Forestry, etc.), as well as other agencies (e.g., Department of Interior, EPA, NRCS, etc.)
- Consider a consolidated budget proposal (as few lines as possible);

Composition of the Working Group:

Membership to the Water Resource Working Group is at the appointment of the BAC. Members were selected based on experience with previous programs, their expertise, and regional representation. Each member is expected to think broadly as to future programmatic needs to further reach out to other entities for input, ideas?) (both geographically and programmatically/functionally).

Working Group Recommendations and Time Table:

- The report to the BAC should include a range of considerations relevant to different groups and stakeholders.
- Recommendations must be acceptable to those directly affected and supported by the COPs, BAC and PBD.
- Recommendations must be acceptable to appropriators.
- The BAC will determine how to best utilize those recommendations in their totality or in part; and will determine to whom the report or parts of the report will be shared.
- Provide an initial update on its progress to the BAC during the APLU Meetings (November 2013).
- Draft recommendations are expected to be provided to the BAC two weeks prior to January 2014 meeting.
- Final recommendations are expected to be provided to the BAC in late February (in time for any immediate actions to be taken by the BAC and/or PBD prior to the 2014 CARET meetings).

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