



**PLANNING AND CONDUCTING EXPERT REVIEW OF  
UNIT RESEARCH PROGRAMS (ERUR)**



**USDA-Agricultural Research Service  
Northern Plains Area Protocol**

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## **Introduction and Rationale**

The research business climate that we operate in today has changed considerably in the past decade. If ARS is to succeed with our mission well into this century, it is important that we are viewed by our peers, partners, stakeholders, and customers not only as leaders in solving problems important to American Agriculture, but that our research programs are relevant and of the highest quality.

The government invests nearly \$2 billion in agricultural research each year, more than half of that through ARS. In return, the public expects new knowledge and technology that tangibly improve the quality of life. We live in a time where famine is no longer perceived as a problem, rather, the oversupply of food is a concern. The congressional power base is centered in the suburbs where the perception exists that every citizen is entitled to an abundant, readily available, safe, and nutritious food supply. Society is asking farmers and ranchers to provide this “Birthright” in ways they have never done before and with little awareness of the linkages between food and fiber, their production, and research.

In 1993 Congress passed the Government Performance and Results Act which requires federal agencies to set strategic goals and to use performance measures for management and budgeting. For ARS, it required that we move from an output to an outcome organization. This requires greater efficiency, effectiveness, and accountability in our research programs and spending.

As a result of Public Law 105-185, ARS research projects (CRIS Projects) are required to be peer reviewed by a panel of individuals with scientific expertise, with a majority of the panel being non-ARS employees. The panels are to verify that each proposed research project has scientific merit and relevance in relation to the ARS National Program they are conducted under. As a result of this law, the Agency established the Office of Scientific Quality Review (OSQR) to coordinate the review of all research project proposals in ARS on a five-year cycle.

Each ARS National Program focuses on the quality, relevance and impact of research conducted as outlined by their particular action plan. To accomplish the goals of the National Programs it is imperative that our research units implement quality research programs as approved by the OSQR process, have the best possible human, physical, and fiscal resources, and are operationally sound. Therefore, on-site expert review of Unit research is designed to provide a positive vehicle to augment OSQR review of individual project plans and further strengthen ARS research programs. Expert review is not a substitute for vision, planning, decision-making, nor a vehicle to vent personal issues or to compare scientists’ expertise and productivity. It is a management tool used to best insure that ARS research is of the highest quality and meets the established goals of our national research portfolio. Since National Programs define research objectives, a key focus of the panel during this onsite review should be to determine how effectively the Unit is making progress toward meeting those research objectives.

Scientific peers have the essential knowledge and perception to judge the quality of research and to determine if individual research units have the resources and attributes to implement quality, OSQR-approved research projects. Expert review by such peers is the most rigorous and

effective measure for evaluating both fundamental and applied federally-funded research programs. Research program reviews measure progress toward practical outcomes, and users of the products of such programs are invited to participate on the Review Panels.

**Purpose:** The ARS National Program Staff (NPS) have defined the research objectives of the National Program in the Action Plan based upon customer and stakeholder input. NPS has also defined the objectives of the CRIS project in the Program Development and Resource Allocation Memo (PDRAM). The purpose of this Expert Review is to engage a Panel of experts to assess the Unit's research programs with regard to the factors below (also see Final Panel Report section):

1. Research Performance
2. Research Quality
3. Research Capacity
4. Research Leadership

**Expected Outcomes:**

1. Panel recommends actions needed to improve the unit's research programs
2. Unit implements Panel recommendations
3. Performance of relevant ARS research is optimized and Unit operations is improved

### **Preparing for the Review**

**Panel selection:** Selecting the Review Panel is a crucial step in preparing for the review. The Panel selection process must strive for balance between having the most knowledgeable and most independent individuals serve as members. Real or perceived conflicts of interests are to be avoided in nomination and selection of Panelists.

The Unit, in collaboration with appropriate National Program Staff (NPS), submits candidate names to the Area Director (AD) for Panel Chair and members at least **nine months** prior to the review date; more lead time will increase the probability of obtaining first-choice individuals. The Unit and NPS are encouraged to nominate qualified minorities and women to serve on Review Panels. After the Panel Chair has been selected by the AD and the Chairperson has agreed to serve, the Area Office will consult with the Chairperson on suggested Review Panel members.

The Panel members (usually 4 to 6) are to be mostly non-ARS experts who can provide an objective, unbiased assessment of the Unit's research program. (The Review Panel will be composed of external reviewers from academia, industry, or government.) Inclusion of one ARS panelist has proven helpful in the Panel's understanding of ARS operations. Logistics and coordination problems increase rapidly if the team is larger. Thirty days in advance of the review, the RL/LD/CD brings important issues to the attention of the Area Office and NPS for potential joint advanced discussion.

The following criteria are suggested when selecting potential Panel members:

1. Panel members should be well respected by their colleagues and professionally active, with training and experience in their specialty areas
2. Panel members should provide a balance among sub-disciplines, functions, and points of view. International scientists may, if deemed important by the Unit or NPS, be appointed to the Review Panel.
3. **Former employees, graduate students or scientists with connections to the Research Unit under review should not be selected as review team members to avoid any conflict of interest or even the appearance of it.**

The Area Office will schedule, if deemed necessary, a conference call with the RL/LD/CD, NPL(s), and AD to discuss the review and any special circumstances and answer the Chairperson's questions and provide an opportunity for staff input. As soon as the Panel members have been identified the Area Office will send each a copy of this document, and if appropriate for the Unit, a copy of the CONFIDENTIALITY Agreement regarding proprietary or confidential information with a request to return a signed copy. The Unit will be responsible for transportation, lodging, and subsistence costs for the Panel members.

**Briefing Book:** The Unit will develop an informational document to orient the Review Panel. A copy of the Unit's briefing book is to be provided to the Review Panel, NPS, and the Area Office (4 copies) one month prior to the review. This review document includes a clear description of the Unit's vision, mission and strategic issues (problem areas) being addressed, status of research, personnel, and outcomes. The material should be organized to address the four criteria the Panel will use to evaluate the Unit: research performance, research quality, research capacity, and national and international research leadership. Providing relevant information for advance study by the Review Panel contributes to both the efficiency and effectiveness of the process. It minimizes presentation time during the reviews, permits a concentrated focus on important materials, and ensures that the majority of time is devoted to major issues.

The following is an outline of items to be included in the review document. The material should be organized to facilitate use by the Panel during the review by collating the materials with the items on the agenda by function or subject matter, and by organizing the document to address the four criteria used for evaluation. (See section on Final Panel Report.)

1. Agenda:
  - a. Include beginning and ending times on the agenda
  - b. Give first names of participants, not just initials
  - c. Identify by name and title the ARS administrators who will be meeting with the Panel
2. Brief, 1-2 pages, biographical sketch of Review Panel members
3. Organizational structure including research projects (CRIS) and resources available to the Unit (funds - list permanent and temporary funds separately, land, facilities, equipment, research subject materials, animals, etc.)

4. Vision and mission statements and strategic issues (problem areas) being addressed by the Unit
5. For each research program (CRIS project) being reviewed provide a brief statement of the following:
  - a. Funds available and staff assigned. Include for each scientist the support available, e.g. personnel, discretionary funds, travel, shared research support, etc.
  - b. General hypothesis, objectives and important outcomes, e.g., impact assessment (recency is important):
    - i. Major discoveries or scientific breakthroughs
    - ii. Information or technology developed by the Unit that is being used by customers, stakeholders, etc.
  - c. Brief discussion for each program of the research performance (address how the research has met the goals/milestones of the OSQR approved project and its relevance to the national program), research quality, research capacity, and national and international research leadership provided by the scientists
  - d. Status of research:
    - i. Systems or computer programs developed
    - ii. Collaboration/partnerships (Universities, Industry, etc.)
    - iii. Status of technology transfer efforts (CRADA's, MOU's, SCA, etc.)
    - iv. Potential future direction
6. Interactions with customers (focus groups, etc.)
7. Appendix:
  - a. List of Unit personnel and titles
  - b. Biographical sketch of each scientist (name, title, education, work experience, significant honors, committees, technology transfer activities, grants and contracts (soft funds), significant research outcomes, and from the past five years the most significant peer-reviewed publications and invited presentations
  - c. List of patents and the following publications of the Unit by year:
    - i. Patents received
    - ii. Articles in refereed professional journals
    - iii. Books
    - iv. Chapters in books
    - v. Research bulletins, proceedings, and other research reports
  - d. National Program Statements / Action Plans
  - e. List of Acronyms

**Review Agenda:** It is essential that the Review Panel be allotted adequate time to absorb relevant information, dialogue with scientists and support staff, develop consensus on issues, arrive at conclusions, make recommendations, and write a draft report. Scheduling sufficient on-site time for these important activities results in improved team performance, reduces the time needed in home offices to draft reports, and lessens the time in which the final report can be written and forwarded to the Area Director. The duration for an on-site review depends on the size, logistics, complexity, and diversity of the Unit(s). Unit reviews usually require a total of

three days, including time for deliberation and writing a draft report. The Review Panel is encouraged to interact as a unit with the scientists, rather than dividing the Review Panel into sub-units and conducting concurrent sessions. Panel cohesiveness in the process enhances consensus building on issues and recommendations.

1. The review begins with an executive session (60 minutes) with the Review Panel, Area Director(s), National Program Leader(s), and Laboratory Director or Center Director for an overview of the review goals and objectives and to answer any questions the Review Panel may have. (This meeting usually occurs at an evening dinner prior to the review.)
2. In an open session, a brief Charge as to the objectives and expected outcomes of the review is given by the AD. In addition, a brief overview of the National Programs supported by the Unit's research is presented by the NPL(s).
3. If the Unit is part of a Laboratory or Center, the LD or CD will present an overview of the Laboratory or Center and a brief description of how the Unit being reviewed fits into the overall scope of the Laboratory or Center programs.
4. The RL will present a brief history, vision, mission, strategic issues, broad objectives, and outcomes for the Unit.
5. A more in-depth presentation of the research program will be reported by program (problem) area, where all scientists may or may not be involved in the presentation. **The presentations should be structured around the review criteria: research performance, research quality, research capacity, and national and international research leadership (see Final Panel Report section).**
6. The Panel will meet with the scientists as needed for an in-depth discussion of the research. The inclusion of postdoctoral research associates in the review will be at the discretion of the scientists and research leader.
7. The research leader will also schedule time for the support staff to meet with the Review Panel as a group.
8. An interview with the RL/LD/CD and the NPL(s) will be scheduled as needed.
9. An interview with the Unit's customers / stakeholders will be scheduled as needed.
10. Additional interviews are at the discretion of the Panel.
11. The Unit will provide the Panel with a tour of the facilities and physical resources. A facilities location map will be provided.
12. Following the review of the Unit, the Review Panel will meet in Executive Session with the AD(s) and NPL(s) to answer questions and clarify ARS Mission and objectives, then the Review Panel will privately draft a report. It may take several hours for the team to complete a draft report. Clerical services will be offered the Panel by the Unit, and the RL, LD, CD, AD, and NPL will be available to answer questions during this period.

13. Oral Panel Report. The Panel will give a brief oral report of its preliminary findings in an executive session to the AD, NPL(s) and CD and/or RL, followed by a second oral report to the entire staff.

### **Conducting the Review**

Proper usage of the limited on-site time of the Review Panel is essential to the process. Time management is most effective and produces the most productive results if scientists' presentations focus on research programs within the Unit, rather than on individual projects or studies. Project-by-project presentations are time consuming and make it difficult for members of the Review Panel to grasp research programs, team research, or the future direction of the Unit's research. The participation of all scientists is necessary for the Panel to fully comprehend program independencies, future plans and alternatives, learn about activities throughout the Unit, and benefit from an information exchange with the Review Panel. It is important that all scientists working in the programs participate in the review, respond to questions, and be available to offer additional information.

Panel members are expected to study the background material prior to arriving at the location. Therefore, it is not necessary for presenters to repeat detailed information provided in the briefing document. **The presentations should be structured to provide concise information that will help the Panel address the four review criteria. Is the Unit's research performance progressing well toward its stated objectives? Is the research of high quality? Is the research capacity adequate? What is the Unit's contribution to national and international research leadership?** Presentations should also focus on future research plans, and on relationships among research programs at the location and between other ARS locations, universities, and industry. Presentations should be well organized and utilize visual aids, overheads or PowerPoint, etc. to highlight important material. The presenter should avoid procedural details or methodology, unless a program objective is to explore new methodologies, and encourage Review Panel questions and dialogue. **Copies of presentation handouts will be provided to the Panel prior to the presentation.**

Adequate time should be allotted for discussion, and scientists should be encouraged to share ideas with the Panel and among themselves. Group interaction and dialogue are enhanced if seating is arranged so individuals face each other, rather than in classroom style. Members of the Research Unit and Review Panel should make every effort to create an atmosphere that encourages exchange of ideas.

**Participation in the Review:** Every effort should be made to have the entire scientific staff participate in all sessions throughout the review, rather than just when their area specialties are being discussed. Participation of all scientists is necessary to fully grasp program interdependencies, share in discussions of future plans and alternatives, learn about activities throughout the Unit, and benefit from an information exchange with the Review Panel. If feasible, the review should be held away from the Unit offices to reduce work day distractions. However, selection of the review schedule and site should allow scientist and staff to maintain

their regular activities during deliberations if they are not able to completely clear their calendars. For example, the total review might be three days, yet individual scientists participation would usually be one and one-half to two days.

Work space should be available for the review team throughout the entire process, particularly during the evening when organizational meetings, writing or discussions may be conducted. Word processing equipment should also be available as should secretarial assistance to work on draft reports, if necessary.

**Role of the Panel Chair:** Prior to the review the Panel Chair will develop a strategy to optimize the operation and activities of the Panel members, including any special assignments each member may have. **The strategy and team member responsibilities should be reviewed in an on-site planning meeting with the Panel members just prior to the commencement of the review.** The Panel Chair is responsible for overall coordination of the review team activities, facilitating communication, and identifying the need for additional material. The Panel Chair directs discussions to the issues of the review purpose and objectives, keeps presentations and discussion within the prescribed time schedule, and helps avoid non-productive discussion paths. It is the joint responsibility of the Panel Chair and Unit RL/CD to make productive use of the scientists and Review Panel's on-site time. Members of the Review Panel share the responsibility for the success of the review with scientists and ARS administrators.

**Role of the Review Panel:** The Panel's main functions are to provide an objective appraisal (strengths and weakness) and suggestions for improvement regarding the four review criteria. It is essential for the Panel to ask pertinent questions and gather information relevant to their analyses. Occasionally, Panel questions may appear critical of the Unit or of the individuals questioned. These questions are purely for information purposes and are not intended to indicate the personal or professional view of the Review Panel. These inquiries are an essential part of the review process and facilitates the Panels objective analysis of the Unit's research programs.

**Closing Sessions:** Upon completing its deliberations, the Panel will provide an oral report, including assessments and recommendations, in a separate executive session with the ARS AD(s) and NPL(s) and in a general session with the Unit. The closing executive session and Panel report to Unit staff serves several important functions. It provides:

1. An evaluation of the Unit's research performance, research quality, research capacity, and research leadership nationally and internationally.
2. A list of specific Panel recommendations.
3. Other considerations important to strengthening the Unit's programs.

### **Final Panel Report**

Immediately following the review, the Panel Chair compiles team input and prepares a written report to include an overall evaluation of the Unit programs that includes observations, analyses, conclusions, and recommendations for improvement. The final report is due to the Area Office within six weeks of the review and should specifically address the following review criteria.



**Research Performance:**

1. How well has the research progressed toward meeting its stated objectives?
2. Is the research producing the anticipated benefits to end users, scientific communities and the broader society?
3. Suggestions for improving the performance of the research to address relevant components of ARS National Programs.

**Research Quality:**

1. How good is the current research program compared with other research programs in the field?
2. What is the quality of published research?
3. Is the research being performed at the forefront of scientific and technological knowledge?
4. Will this research lead to appropriate advances in the future?
5. Suggestions for improving the quality of the research.

**Research Capacity:**

1. Are the Unit's facilities, land, laboratories, and equipment adequate?
2. Is the Unit adequately staffed with personnel who have appropriate skills? (include support staff)
3. Is the Unit's funding adequate? (include both hard and soft funds)
4. Are the Unit's collaborative relationships adequate and appropriate?
5. Suggestions for improving research capacity.

**Research Leadership:**

1. What is the Unit's contribution to national and international leadership in their specific fields?
2. How would you benchmark the Unit's leadership in relation to national and international leadership?
3. Suggestions for improving national and international leadership.

**Suggested Panel Report Format:**

1. Executive Summary (one to three page overview of key assessments and recommendations)
2. Background
  - a. Reason for the Review
  - b. History/Organization of the Units(s)
  - c. Date(s) and location of the Review, names and affiliations of Panel members
3. Assessments
  - a. Research Performance
  - b. Research Quality
  - c. Research Capacity
  - d. Research Leadership
4. Recommendations
  - a. Research Performance
  - b. Research Quality
  - c. Research Capacity
  - d. Research Leadership

## Implementation of Panel Recommendations

After receiving the final report the Area Director (and LD/CD if appropriate), in consultation with NPS and the RL(s), will discuss how the Unit will address the concerns raised by the Panel. **The Unit will have one month after receiving the Panel report to draft a written action plan to the Area Director outlining steps to be taken to implement Panel recommendations.** The action plan will address each recommendation with milestones and resource implications. Units are encouraged to schedule retreats or other follow-up activities to discuss and plan how they will implement Panel recommendations and to draft the action plan. Analyzing and responding to the review report is an important additional benefit of the overall process, especially when the recommendations are incorporated into the research project statement prepared for the OSQR review process. The recommendations contained in the written review report are extremely useful to the Units as they strive for excellence in their research programs.

A follow-up meeting (if applicable) will be scheduled by the Area Office between LD/CD, RL, the scientists, and NPS to discuss the concerns raised by the review team, the action plan, and how the Unit will implement solutions to concerns raised by the Panel. The final Unit action plan will be sent by the Area Director to the Panel chair who then distributes the document to the Panel members.

### **Suggested Action Plan Format:**

1. Summary Remarks from Unit
2. List Panel recommendations by category, number them sequentially and briefly discuss how the Unit plans to address each recommendation.
3. Provide action response for each numbered recommendation (see Action Plan Template):
  - a. Specific: identify particular actions that will be taken by Unit personnel
  - b. Measurable: establish criteria for measuring progress (i.e., training conducted, manuscripts published, positions filled)
  - c. Achievable: ensure that the response is manageable within the resources available
  - d. Timely: set a target date for accomplishing the action response

Once the action plan has been approved by the AD the Unit will provide 6 month status report until the milestones are achieved. (The can be done using the Action Plan Template found on page 13.)

### **Action Plan Discussion Examples:**

*Recommendation 1:* Additional training on policies and procedures should occur for all support staff.

**Action Plan:** Training will be provided by the Research Leader to all employees once uniform policies are developed.

**Milestone:** Training will occur beginning with implementation of uniform policies in October 2005. Training will be provided afterwards on an as-needed basis. All new employees will be trained on policies as part of their orientation.

*Recommendation 2:* Turn data into usable information through cost-benefit analyses and decision support modules.

**Action Plan:** We will identify types of cost-benefit analyses that growers want for precision agriculture and the data available to do these analyses. We will identify and evaluate existing models that may be useful for generating cost-benefit analyses for irrigation, N- and weed-management in precision agriculture and begin modifying our Unit's weed management model, WeedSite, to become a tool for prescribing spatially variable application of inputs besides postemergence herbicides. We will also modify WeedSite to generate spatially variable application maps for use with the Unit's spatially variable sprayer.

**Milestones:** Obtain input from growers and other customers on what they consider useful information by the end of 2005. Identify and prioritize models and begin discussions with potential collaborators by March 2006. Modify WeedSite for soil-applied chemicals by December 2005.

## Definition of Terms, Abbreviations, and Acronyms

**AD:** Area Director.

**AFM:** Administrative and Financial Management. This branch of ARS manages support activities, such as procurement, facilities, fiscal allocations, and personnel operations at all levels in ARS.

**ARS:** Agricultural Research Service, an agency in the Research, Education, and Economics Mission Area of USDA. ARS has about 8,000 employees, including 2,000 senior scientists. The Agency conducts research at over 100 locations in the U.S. The Agency is led by an Administrator and is divided geographically into eight Areas, which are led by Area Directors.

**CD:** Center Director. See Laboratories or Centers.

**CRIS Projects:** CRIS stands for "Current Research Information System." This is an electronic system for the filing and retrieval of information about individual agricultural research projects. In ARS, the terms "CRIS Work Unit" or the acronym "CRIS" are used synonymously with "research project" or "project." New projects are planned in coordination with NPS and are subject to external peer-review. This review is coordinated by the Office of Scientific Quality Review (OSQR), located in Beltsville, MD. The normal life of a project is five years.

**Laboratories or Centers:** Locations with more than one Research Unit may be called a Laboratory or Center. These are administered by a **Laboratory or Center Director**.

**LD:** Laboratory Director. See Laboratories or Centers.

**NPA:** The Northern Plains Area, comprised of four Research Centers, two Research Laboratories, and 40 Research Units, at 14 locations in the eight states - Colorado, Wyoming, Utah, Montana, North and South Dakota, Nebraska, and Kansas. The annual budget for the Area is over \$100 million, with 1000 federal employees, of which 279 are senior research scientists (SYs). The Areas are responsible for implementation of research programs and the scientific merit of the research and is administered by an Area Director (AD).

**NPL:** National Program Leader, a member of the National Program Staff.

**NPS:** National Program Staff. Members are called National Program Leaders and each is a subject matter specialist. NPS serves the Administrator of ARS in developing and coordinating research plans and strategies on a national basis. NPS sets National program directions (relevance), establishes priorities, allocates resources, and acts as a clearing-house for decision-making. Considerable interaction between Area managers and NPS is required to fulfill respective roles.

**NPT:** National Program Team. A cross-cutting team composed of National Program Leaders.

**OSQR:** Office of Scientific Quality Review. As a result of Public Law 105-185, the Agency established the Office of Scientific Quality Review to coordinate the peer review of all research (CRIS) project proposals in ARS, by a panel of individuals on a five-year cycle.

**Other Scientific Personnel:** Research scientists are responsible for all phases of research. ARS also employs research associates (post-docs), support scientists (who have responsibility for some portion of a project), technicians, students, and, in some operations, non-research scientific personnel who perform work involving service to the public or to other government agencies.

**RL:** Research Leader. See Research Units.

**Research Units:** Research Units are the basic management entity within ARS. It is in the Research Units where our business of research is conducted. There is at least one and usually several research projects (CRIS Projects) in each Unit. Research Units are led, both scientifically and administratively, by **Research Leaders**. Typically, a Research Unit is comprised of 5-10 research scientists, a scientific and clerical support staff, technicians, post-doctoral employees, and temporary students.

**SY: Scientist Year.** This is the effort of a research scientist for one year. Fractional efforts (e.g., 0.5 SY) may be assigned in a given project. It is possible for a scientist to work on more than one project during the course of a fiscal year. The term is also used in ARS as a synonym for a research scientist (e.g., six SYs (research scientists) in the Unit).

\_\_\_\_\_ **Research Unit Action Plan**  
**As of** \_\_\_\_\_

Recommendation	Action Planned	Action assigned to	Target Completion Date	Actual Completion Date	Result
<b>Research Performance</b>					
1.					
2.					
3.					
<b>Research Quality</b>					
4.					
<b>Research Capacity</b>					
5.					
6.					
7.					
<b>Research Leadership</b>					
8.					
9.					
10.					