

# CSREES Portfolio Review Expert Panel Report

## Portfolio 3.1 Food Safety CY 1999 – 2003

### REPORT

*External Review Completed: February 2005*

#### **Portfolio Overview**

The CSREES Food Safety Portfolio is a component of the Plant and Animal Systems (KAS). The overall aim of the Portfolio is to provide producers, manufacturers, regulatory agencies, and consumers' scientific information and technologies to support their efforts to provide affordable and safe food. This is accomplished through various types of programs, such as National Research Initiative programs, NRI 32.0, NRI 32.1, NIFSI, combined NRI-NIFSI, Special Grants, and SBIR grants. These food safety programs are not free standing and strategic goals and activities are inherently tied to each other. The portfolio consists of the following combined Knowledge Areas:

- KA 711 Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources;
- KA 712 Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally occurring Toxins.

#### **Comments on Research & Development Criteria and Dimensions**

In 2005 a panel comprised of independent experts from the field was convened to assess and score the current state of the Food Safety Portfolio. A discussion of specific comments and recommendations related to each of the dimensions of the three Office of Management and Budget (OMB) research and development (R&D) criteria used (relevance, quality, and performance) is provided below.

##### Relevance

##### *Scope*

The panel stated that the scope of the food safety portfolio was excellent. The panel also felt that the portfolio was not static and was responsive to changes in the field that need to be addressed.

As stated in the general comments and recommendations section, the panel felt that there was a need to have more quantitative data on the outputs of the funded research projects. The criteria for assessment should be developed within the CSREES leadership and used to objectively evaluate the research outputs from the portfolio.

The food safety program is highly focused with most funding going toward research on animal-based food products and infectious agents. While the reasons for this balance were recognized, (resulting from trends in place in 1999) there has been an acknowledgement that other foods are also important sources of food borne pathogens and need to be more fully demonstrated in the portfolio. In particular it was felt that produce and non-meat foods needed to be better represented in the project portfolio. This would increase the scope of the portfolio.

The work funded through the "formula fund programs" was not represented in the portfolio review document other than total dollars that were included in the research dollar totals. Therefore, the panel was not able to assess the scope of these programs. As mentioned previously, the panel felt that this was a problem related to obtaining useful data from the CRIS database. The National Program Leaders

(NPL's) and scientific staff in the food safety program in CSREES could serve to enhance communication between the competitive grants programs and the state agriculture experiment stations and extension. They should convey information about the CSREES programs and also be familiar with what the states are doing. The process appears to be working well for multi-state projects where NPLs are assigned as Agency representatives and the projects are reported through the National Information Management and Support System (NIMSS). It is hoped that the CSREES staff will be able to use this tool as an opportunity to harmonize the CSREES and state research needs. It also was felt that this would be an opportunity for the Extension community to explain their programs and assist the Agency in monitoring their current needs and activities. Addressing this concern will help link competitively awarded research with Extension and Experiment Station supported work.

The program staff should consider current geographic needs in food safety. In particular should consider the needs of rural communities in the US and developing nations and this analysis should include educational programs that will train the next generation of food safety workers. Understanding the status of international issues is important as a trade issue.

Unlike some areas of research, food safety research is the domain of several Agencies within the USDA and other Federal Departments. While a large number of players in food safety has the potential to enhance the overall portfolio of research, it was felt that CSREES staff should actively be engaged at some level in other Agency programs. This would allow the Agency to develop a more balanced portfolio and reduce research programs that are excessively duplicative. Some level of duplication that results in validation of important results is appropriate, but consultation with other agencies could be used to maintain good balance of the portfolio.

There was considerable discussion on food security and any role CSREES may have in this arena. It is an important activity and is being addressed by several government agencies including the Department of Homeland Security. However, given the present level of funding in the CSREES food safety portfolio, directing existing funds into this area would compromise the quality and breadth of the current portfolio. If additional funding can be obtained for food security, expanding the portfolio into this area would be appropriate.

#### *Focus*

The panel was impressed with the overall focus of the food safety portfolio. There was discussion that perhaps a need exists to fund additional work on viruses based on the proportion of food borne illnesses caused by viral agents. It was noted, however, that research on viruses was already part of the portfolio.

In the development of RFAs, it is recommended that CSREES staff consult with other USDA and external agencies that fund food safety research. As mentioned above, doing so could help reduce unneeded duplication of research. Perhaps of greater importance, doing so would create a mechanism to coordinate research across numerous agencies and yield a more cost effective research program. In a similar vein, CSREES might establish a stakeholders' advisory panel to provide feed-back during RFA preparations. This must be done with an understanding of the constraints of current enabling legislation (if any). By conferring with stakeholders and other agencies, CSREES can develop more robust RFAs. In considering this consultative process, it was cautioned that the Agency not attempt to eliminate all duplication of research. Scientific replication is needed to validate results and an essential process in the establishment of data required for risk assessment and interventions.

#### *Emerging Issues*

The panel was struck by the question of whether a portfolio can be both focused and responsive to the changing needs in food safety. However, the panel noted as an example, that the food safety portfolio did respond to the shift in the 1990s away from chemical contaminants as food safety issues and adopted the need for research on microbial causes of food borne illnesses. The agency should be commended for its response to the scientific community who argued that research should be focused on microbial agents.

This shift is also consistent with a similar shift in 1999 by FSIS. Consequently, the panel believes that CSREES was highly responsive to national needs and the changing external forces driving food safety.

The panel felt that CSREES staff should be more involved with the National Advisory Committees for Microbiological Criteria in Foods (NACMCF). It was suggested that CSREES NPLs attend meetings of NACMFC even though they may not be voting members. The NPLs also should seek interactions with other advisory committee even if only as attendees.

When discussing emerging issues, the panel was not certain that there was a good definition of what an emerging issue was. It also was not clear if the emerging issues were national or international issues. CSREES needs to define and clarify what emerging issues represent in order for the category to be evaluated properly.

In the aggregate, the panel was impressed with the program attentiveness to external issues.

### *Integration*

The panel felt that CSREES is doing a reasonably good job of integrating research with education and extension efforts. It was stated that this level of integration is a difficult task to accomplish effectively.

The panel is aware that true partnerships are difficult to handle (personnel issues, resource issues, etc.). There will therefore always be various constraints, some unforeseen, that CSREES can alleviate by facilitating discussions between the various entities through regular workshops. In many disciplinary and knowledge areas, jointly planned efforts with ARS and the State Agricultural Experiment Stations have been most effective and this is evidenced in many of the multi-state programs. Due to the high priority of food safety work, and the existence of several special grant funded activities, CSREES could work to further develop partnerships in all of these efforts.

NIFSI is an example of a program that integrated activities well. . However, it was noted that other programs within the food safety portfolio are contemplating more integrative programs and, as long as the current research portfolio is not compromised as a result, these programs should be encouraged to be active in this endeavor. Overall, the panel felt that the portfolio has made good efforts in integrating the various areas and has made great strides as a result of these efforts. However, even more can be done (particularly if additional resources are made available).

### *Multidisciplinary Balance*

The panel is heartened by the actions taken to promote integrative approaches. While not implemented during the review period, the panel was impressed with the new coordinated agricultural project (CAP) in food safety that requires an integrative approach. More CAP-like programs that truly integrate activities are desirable.

There was much discussion about the definition of multidisciplinary research and possible confusion between multidisciplinary and interdisciplinary research. However, regardless of specific definitions, CSREES is moving in the correct direction and the portfolio represents a good diversity of disciplines. It also was noted that not all research should fit an interdisciplinary mold.

There was concern about the artificial separation of pre-harvest research and post-harvest research. However, it was recognized that within the NRI, program 32.0 was simply and conveniently divided in this manner to reduce the amount of work within a grants review panel. The portfolio review panel was informed that, for the next round of proposal reviews, such an artificial division would not be made again.

During the period between 1999 and 2003, the portfolio made a clear shift toward more interdisciplinary research. Like many of the other areas, the panel noted that better quantitative data to evaluate the effectiveness of the interdisciplinary programs needs to be gathered. The panel noted that disciplines broadly defined in the biological sciences constituted much of the interdisciplinary work and suggests that

other disciplines be encouraged to be part of the interdisciplinary programs including the psycho-social sciences. Overall, the portfolio did a good job in developing multidisciplinary research.

## Quality

### *Significance of Outputs and Findings*

In respect to outputs, the food safety portfolio was highly productive (quality and quantity). However, on the outcomes side of the equation, measurement tools were not available to allow for a quantitative assessment to be made. The portfolio report did not specifically identify if the results of the research from the portfolio led to outcomes such as changing producer practices or industry practice. Some practices may have changed, but not many. This, however, should not be viewed as a negative statement because there is an inherent lag in the implementation of research finding (outputs) into producer application (outcomes). Furthermore, the food safety portfolio was relatively new and, in terms of outcomes, it had not had sufficient time to mature. In the same vein, the panel discussed outcomes with respect to the audience. Where the audience was the scientific community, as is the case with fundamental research, then the number and importance of outcomes from the food safety portfolio was substantial. CSREES understands the importance of research outcomes, and its Land-Grant partners are also beginning to understand the importance of outcomes.

As stated in the general recommendations section, the most important indicator of success of the food safety portfolio is the impact it has on the reduction of food borne illnesses. Food safety is a public health concern. However, there is little data linking specific programs to improvements in public health. This linkage needs to be made. A challenge for the portfolio is to develop novel and innovative approaches to making such linkages. One suggestion was to reflect this need in RFAs.

### *Stakeholder Input*

The panel discussed who the stakeholders were and who should have input into the portfolio. This should be better clarified. It also was debated whether the term “stakeholder” should be used or whether it should be the “end-user”. It was commented that the largest stakeholder group (or end-user group) for the food safety portfolio was the continuum of the food production, processing and distribution systems.

The panel was impressed by the amount of stakeholder information sought out by the staff in the food safety portfolio. The NPLs attend numerous scientific meetings, meet with other REE sister agencies, and have had stakeholder meetings in the public arena. The Agency makes significant efforts to determine the pressing issues and uses that information to develop their food safety portfolio. Although these interactions with sister agencies such as USDA/ARS were variable, this trend has increased and this is especially true in the years beyond the scope of this review. The panel hopes to see this trend continue.

The panel was very impressed that the Agency has been responsive to the needs in food safety as identified through stakeholder/end-user input.

The panel recommended that NPLs attend advisory committee meetings such as the NACMCF and provide advice to these groups. It was stated that the NPLs could attend these meetings even though they may not be voting members.

As noted above the panel was generally impressed by the efforts of the agency in looking outwardly for stakeholder/end-user input, and felt that the Agency should continue to seek opportunities that enhance the involvement of end-users in all aspects of the portfolio. The food safety portfolio could be strengthened through the use input solicited from other federal agencies, both within the USDA and in other federal departments (like HHS).

### *Portfolio Alignment*

The panel was impressed with the management of the grant review process in the NRI. The NRI staff takes this responsibility very seriously and they should be commended for this level of commitment. Funding tends to be restricted to the high priority category rating. Individuals serving on grant review panels are of very high caliber, which assures that the projects possess state of the art knowledge and are at the cutting edge of science. The panel also wondered if some of the NRI programs could take a more integrative approach.

There was some concern that within the NIFSI program, projects in the medium priority range frequently have been funded while projects rated high priority in other programs did not receive funding (due to a lack of funds). There was considerable discussion as to whether monies could be shifted to other programs (where appropriate) to address funding of high priority projects that would not otherwise be funded. Because different programs were derived under different enabling legislation and with different mandates this may not be possible.

As stated above, the panel felt that the portfolio self-study report was deficient in reporting about projects funded through Hatch and other formula funds. It was recognized that the special grants program is highly funded and has many examples of excellent work that complement the NRI/NFISI portfolio. However, the food safety program staff has little ability to influence the quality and scope of special grants. Similarly, extension was not represented in the reporting. The panel recommends a mechanism to gather data on Extension programs in food safety be developed and that a system for gathering these data on a continuing basis be implemented. Such a system may be implemented under the Agency's "OneSolution" approach for data collection.

It was recommended that NPLs sit on food security committees if CSREES elects or is directed to fund research and education in this direction. The work being funded in food safety is very important and the goal of enhancing food safety should not be compromised. Before the Agency moves into food security research and education, it needs to understand the role of all federal efforts in this area and the Agency should focus its efforts in specific defined areas that draw upon the expertise exhibited by the Agency. For example, diagnostics and modeling are areas that are at the intersection of food safety and food security issues. If funding for food security issues becomes available then the Agency should seek to develop joint programs with other federal agencies using the successful NSF-NRI genome program as a model.

#### *Appropriate Methodology*

The panel was impressed with the level of contemporary, cutting edge technologies being used for funded research. While most of the credit for this high standard of performance resides with the investigators submitting research proposals, the grants review panels are also important in recognizing this need and have been instrumental in selecting the highest quality projects for funding. While the grants review panels have been comprised of very high-level scientists concern was voiced that it was becoming more difficult to get scientists to join grants review panels. The panel entertained several recommendations to make the review process more manageable for these panels.

Firstly, it was suggested that these grants review panel members be given a consistent set of instructions and guidelines on how to evaluate and rank proposals. The competitive grants programs should fund only the highest quality research projects and having common definitions of what high priority research projects are would be helpful. Secondly, within the constraints of the programs there is a need to realign research dollars among the various competitive panels to make sure there is a consistent level of excellence and priority among the projects selected for funding. Again, this may depend on legislation that creates the programs.

The panel also suggested that the portfolio and/or Agency explore adopting a grant proposal triage procedure similar to the one used by NIH. This would reduce the number of proposals that need to be discussed and ranked at grants review panel meetings thus reducing the workload for the panels. Furthermore, such a process might be more attractive to get external reviewers to join those panels.

## Performance

### *Portfolio productivity*

The food safety portfolio has great depth and breadth. Relative to investment, the productivity was exemplary. It was noted that most of the management money was spent on the pre-award area, with relatively little expended on follow up (post award review) which is commendable.

It was recommended that in considering measures of productivity, linkage to milestones be established. The portfolios were (are) very well managed, but mechanisms to measure productivity were not in place and therefore quantitative measures of productivity were lacking.

In evaluating measures of productivity and scope, it was repeatedly stated that quantitative data are needed. Quantitative data providing evidence of productivity is particularly lacking for formula funds and extension. It is even more difficult to get data for these than to get data from the competitive grants systems.

### *Portfolio Comprehensiveness*

The panel was encouraged to see that the logic model was being used as a portfolio management tool. Within the context of the external factors cited in the logic model, the programs have aggressively pursued new research and education directions to maintain the comprehensiveness of the portfolio as it is influenced by these external factors.

The panel observed that the PART review suggests that a program needs to stay focused and responsive while, at the same time, maintain comprehensiveness. "Focus and responsiveness" and "comprehensiveness" seem to be in conflict primarily due to a lack of funds. There are generally not enough funds to be both comprehensive and focused and responsive without some level of compromise.

It also was noted that the NPLs are limited in the authority they have to direct funds to immediate, emerging issues since they are bound to follow the funding and priority recommendations of the panel.

### *Portfolio Timeliness*

The panel discussed the question of what was the important criterion of timeliness: completing the project without requesting no-cost extensions or completing projects. The panel decided that it was more important to complete projects and that no-cost extensions, while becoming part of the culture of the academic community, were of less importance. Consequently, the panel was pleased that most projects are completed. The panel did, however, believe that there should be a change in expectations around no cost extensions and that more realistic timeframes be requested by investigators in their proposals.

### *Agency Guidance*

The panel felt that the food safety staff was (are) working hard and demonstrate significant leadership. The panel was impressed with the qualifications of the NPLs. As a group, the NPLs have improved considerably in the last ten years. NPLs appear to be up to date and authoritative scientists in their respective fields (for example, they write books, articles, serve on professional society committees, etc.); they are on the cutting edge. The NPLs are led by an administration that is open to new directions and that allows the NPLs to do their jobs in a mostly unencumbered way.

The panel observed that the food safety program NPLs are among the best in CSREES.

### *Portfolio Accountability*

While there was much evaluative data presented in the portfolio summary report and the individual oral presentations to the panel, based on the information available in CRIS, accountability was viewed as

adequate. This panel report repeatedly mentions shortcomings in data acquisition, and CSREES is urged to identify ways to improve this system to allow for better and more comprehensive data. The panel recognizes that the quality of the data in CRIS is dependent on what is entered into the system by the scientists. CSREES staff should work with experiment station directors to improve this process.

## **Comments on Future Directions Presented by CSREES**

### *Suggestions for improvement*

The Panel recognized that Food Safety Portfolio programs grants review panels are important and have been instrumental in selecting the highest quality projects for funding. These grants review panels have been composed of very high-level scientists. However, it was becoming more difficult to get scientists to join grants review panels. The panel entertained several recommendations to make the review process more manageable for the members of the grants review panels. First, it would be helpful if the grants review panel members were given a consistent set of instructions and guidelines on how to evaluate and rank proposals. The competitive grants programs should fund only the highest quality research projects and that having common definitions of what high priority research projects are would be helpful. Second, within the constraints of the programs there is a need to realign research dollars among the various competitive panels to make sure there is a consistent level of excellence and priority among the projects selected for funding. Again, this may depend on legislation that creates the programs. Finally, the portfolio and/or Agency should explore adopting a grant proposal triage procedure similar to the one used by NIH. This would reduce the number of proposals that need to be discussed and ranked at grants review panel meetings thus reducing the workload for the panels.

It was recommended that, in considering measures of productivity, linkage to milestones be established, although it was felt that the portfolios were very well managed. The mechanisms to measure productivity were not in place at this time and therefore quantitative measures of productivity were lacking.

The Panel suggested that funded projects in the Portfolio be completed within the timeframe and without requesting no-cost extensions or completing projects.

It was further recommended that meetings of awardees be convened for all NRI, NIFSI, and the Special Grants programs.

### Data Issues

The data are partially available through CRIS, but there is not an adequate level of staffing to tabulate what data do exist. The Agency is working on the "OneSolution" system for collecting quantitative data (such as book chapters, articles, patents, meetings, etc). As the Agency continues to develop its reporting systems to address this concern, it is highly recommended that other reporting requirements be assessed for possible elimination so that the reporting mechanism itself does not become burdensome. In addition, the Agency needs to develop criteria for quantitative evaluations. Since this is a very painstaking process that cannot be changed or implemented overnight, the Agency should begin discussions immediately with Agency partners. By in large, though, the panel is encouraged because the Agency recognizes the problem, is actively seeking remedies, and is engaged with the Agency's partners in this effort.

One suggestion was to use publications as substitutes for project final reports. At the very least, information in CRIS should include number of publications, numbers of students supported (graduate students and postdoctoral fellows), etc. Again, it was the panel's impression that many of these shortcomings in obtaining quantitative data will be overcome with the advent of the "OneSolution" data reporting system being developed in CSREES.

Finally, there should be a final year-end report of accomplishments and accountability within the individual CSREES portfolios. However, if this recommendation is implemented, CSREES needs to come up with

new ways to obtain the information required to prepare these reports. Otherwise, NPLs could spend excessive amounts of time on this work and still have incomplete data.

### Evaluation Issues

There was much evaluative data presented in the portfolio summary report and the individual oral presentations to the panel and, based on the information available in CRIS, accountability was viewed as adequate. This panel report repeatedly mentions shortcomings in data acquisition, and CSREES is urged to identify ways to improve this system that would allow for better and more comprehensive data collection. The panel recognizes that the quality of the data in CRIS is dependent on what is entered into the system by scientists. CSREES staff should work with experiment station directors to improve this process. There should be a final year-end report of accomplishments and accountability within the individual CSREES portfolios. However, if this recommendation is implemented, CSREES should devise new ways to obtain the information required to prepare these reports. Otherwise, NPLs could spend excessive amounts of time on this work and still have incomplete data. This report repeatedly mentions shortcomings in data acquisition, and CSREES is urged to identify ways to improve the system in order to provide comprehensive information about the effectiveness of its programs.

### **Summary of General Comments and Recommendations**

Overall, the panel was impressed with the breadth, quality, and depth of the Food Safety research and education portfolio. Similarly, it was a panel consensus that the competitive grants programs (NRI 32.0 and 32.1 and NIFSI) are jewels within CSREES and ones that should be showcased with great pride. For the most part, the comments in this report should be viewed as recommendations to build upon the excellent foundation that has already been established.

While the competitive grants programs were well described and there was an impressive set of data used to describe the programs, a paucity of data describing formula fund based programs (including Hatch funds and Animal Health 1433 funds) was presented. Even less information was available regarding Extension activities. Consequently, this led to Extension activities not being represented in the portfolio summary even though the panel was well aware of the extensive activity Extension undertakes in providing training and education of HACCP. The overall impacts of the CSREES food safety program in education were very difficult to determine because program information that could be used for evaluation was scarce. As an overall recommendation the panel felt that more information was needed to assess formula funded projects.

There was little quantitative assessment data and to evaluate the accomplishments of the Food Safety portfolio. It is highly recommended that the Agency develop both quantitative and qualitative criteria that can be used for this purpose. Such information would allow for more objective assessments of relevance, quality, and performance.

Food safety must be viewed as it relates to public health. Although it was agreed little work has been done to develop measures of enhanced public health or to develop target levels for reductions in food borne diseases, these can be an important measure of program success. Further, methods to measure disease attribution need to be developed. Even though microbial food safety issues are highly complex and interventions may not translate to reductions of disease because of the need to affect more than one parameter to affect disease reduction, the food safety program should challenge the scientific community to address this as an area of need. It is further recognized that the need to develop measures of enhanced public health is not just directed at the food safety portfolio in CSREES. All those parties and agencies working in this area should undertake the task of defining the measures of impacts of programs on public health.

### **Portfolio Score**



Portfolio 3.1 received a total score of 83 from the panel. This score places the portfolio in the category 'moderately effective in supporting CSREES objectives.'