FOOD SAFETY PORTFOLIO
2007 INTERNAL REVIEW

I. Background

This document was prepared in November 2007 as the internal review of Food Safety Portfolio for Fiscal Year 2007. It contains updates to the portfolio, responses to the comments of the external panel review and changes to criteria scores with accompanying justifications. This document is a result of the efforts of the National Program Leaders responsible for the Food Safety portfolio in collaboration with CSREES Planning and Accountability.

It should be noted that the nomenclature for designating the programs has changed since the last review in 2006 in the following way. Food Safety 32.0 is now referred to as the 'Biological Approaches to Food Safety program 32.0A' and the Epidemiological Food Safety 32.1 is now referred to as the 'Epidemiological Approaches to Food Safety program 32.0B'. This change in naming does not reflect a shift in philosophy, program goals or funding levels, but rather an opportunity to present the programs as aligned within the Request for Applications in cluster format, as had been done for other program clusters within the National Research Initiative (NRI). Reference to the previous naming scheme (*i.e.*, 32.0 or 32.1 instead of 32.0A or 32.0B) indicates discussion of events prior to the 2007 funding cycle.

- **The following knowledge areas (KAs) are combined and included in the Food Safety Portfolio:**

    - **711**: Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
    - **712**: Protect Food From Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins.

- **Portfolio reviews:**

    External Review: February 2005
    Internal reviews: October 2006, November 2007

- **Portfolio score from the PREP in 2005: 83**

The portfolio received an overall score of 83 from the PREP panel in 2005. The internal panel gave the portfolio an overall score of 86 in 2006. Table I-1 below shows the breakdown of scores for different R&D criteria and dimensions.

Table I-1. Scoring of Food Safety			
Criteria	**Panel Score**	**2006 Score**	**2007 Score**
Relevance (40% of total score)			
1. Scope	3	3	3
2. Focus	3	3	3
3. Emerging Issues	2	3	3
4. Integration	2	2	2.5
5. Multi-disciplinary	2	2.5	2.5
Quality (30% of total score)			
1. Significance	2	2	2
2. Stakeholder	2	2	3
3. Alignment	3	3	3
4. Methodology	3	3	3
Performance (30% of total score)			
1. Productivity	2	2	2.5
2. Comprehensiveness	2	2	2
3. Timeliness	3	3	3
4. Agency guidance	3	3	3
5. Accountability	2	2	2
Overall score	**83**	**86**	**91**

- **General Comments of the PREP report:**

The panel found that the people of CSREES make a significant difference and add considerable value to the work of both the agency and the partnership. The evidence presented in this portfolio reflects hard work and indicates high levels of productivity. There is evidence of increasing emphasis on integration and that CSREES staffs are becoming more creative and determined about planning and reporting as forms of accountability.

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 is a need to standardize and expand the documentation and evaluation metrics across program areas and increase the archiving and accessibility of research project data (in the CRIS and other systems). This is necessary in order to permit meta-analysis of the data.

The panel recommends training on the logic model for agency employees and external and internal partners. Instead of just evaluating past performance, the panel also suggests developing strategic plans for each problem area and increasing stakeholder contributions by including panel members and other stakeholders in the development and review of CSREES strategic plans at the portfolio level.

Finally, the panel suggests increasing the documentation of outcomes. Formative evaluations to document program implementation successes and challenges should be performed.

II. CSREES response to PREP comments and recommendations that cross all portfolios

In response to directives from the Office of Management and Budget (OMB) of the President, CSREES implemented the Portfolio Review Expert Panel (PREP) process to systematically review its progress in achieving its mission. Since this process began in 2003, fourteen expert review panels have been convened and each has published a report offering recommendations and guidance. These external reviews occur on a rolling five-year basis. In the four off years an internal panel is assembled to examine how well CSREES is addressing the expert panel's recommendations. These internal reports are crafted to specifically address the issues raised for a particular portfolio; however, despite the fact that the expert reports were all written independent of one another on portfolios comprised of very different subject matter, several themes common to the set of review reports have emerged. This set of issues has repeatedly been identified by expert panels and requires an agency-wide response. The agency has taken a series of steps to effectively respond to those overarching issues.

Issue 1: Getting Credit When Credit is Due

For the most part panelists were complimentary when examples showing partnerships and leveraging of funds were used. However, panelists saw a strong need for CSREES to better assert itself and its name into the reporting process. Panelists believed that principal investigators who conduct the research, education and extension activities funded by CSREES often do not highlight the contributions made by CSREES. Multiple panel reports suggested CSREES better monitor reports of its funding and ensure that the agency is properly credited. Many panelists were unaware of the breadth of CSREES activities and believe their lack of knowledge is partly a result of CSREES not receiving credit in publications and other material made possible by CSREES funding.

Issue 1: Agency Response:

To address the issue of lack of credit being given to CSREES for funded projects, the Agency implemented several efforts likely to improve this situation in 2005.

First it developed a standard paragraph about CSREES' work and funding that project managers can easily insert into documents, papers and other material funded in part or entirely by CSREES.

Second, the Agency is in the process of implementing the "One Solution" concept. One Solution will allow for the better integration, reporting and publication of CSREES material on the web. In addition, the new Plan of Work (POW), centered a logic model framework, became operational in June 2006. The logic model framework is discussed in more detail below. Because of the new POW requirements and the POW training conducted by the Office of Planning and Accountability (also described in more detail below), it will be simpler for state and local partners to line up the work they are doing with agency expenditures. This in turn will make it easier for project managers to cite CSREES contributions when appropriate.

Issue 2: Partnership with Universities

Panelists felt that the concept of partnership was not being adequately presented. Panelists saw a need for more detail to be made available. Questions revolving around long-term planning between the entities were common as were ones that asked how the CSREES mission and goals were being supported through its partnership with universities and vice versa.

Issue 2: Agency Response:

CSREES has taken several steps to strengthen its relationship with university partners. First, to the extent possible, implementing partners will be attending the CSREES strategic development exercise which is intended to help partners and CSREES fully align what is done at the local level. Second, CSREES has realigned the state assignments for its National Program Leaders (NPLs). Each state is now assigned to one specific NPL. By reducing the number of states on which any individual NPL is asked to concentrate and assigning and training NPLs for this duty, better communication between state and NPLs should occur. Finally, several trainings that focused on the POW were conducted by CSREES in geographic regions throughout the country. A major goal of this training was to better communicate CSREES goals to state leaders which will facilitate better planning between the universities and CSREES.

Issue 3: National Program Leaders

Without exception the portfolio review panels were complimentary of the work being done by NPLs. They believe NPLs have significant responsibility, are experts in the field and do a difficult job admirably. Understanding the specific job functions of NPLs was something that helped panelists in the review process. Panelists did however mention that often times there are gaps in the assignments given to NPLs. Those gaps leave holes in programmatic coverage.

Issue 3: Agency Response:

CSREES values the substantive expertise that NPLs bring to the Agency and therefore requires all NPLs to be experts in their respective fields. Given the budget constraints often times faced by the agency, the agency has not always been able to fund needed positions and had to prioritize its hiring for open positions. In addition, because of the level of expertise CSREES requires of its NPLs, quick hires are not always possible. Often, CSREES is unable to meet the salary demands of those it wishes to hire. It is essential that position gaps not only be filled but that they be filled with the most qualified candidate.

Operating under these constraints and given inevitable staff turnover, gaps will always remain. However, establishing and drawing together multidisciplinary teams required to complete the portfolio reviews has allowed the Agency to identify gaps in program knowledge and ensure that these needs are addressed in a timely fashion. To the extent that specific gaps are mentioned by the expert panels, the urgency to fill them is heightened.

Issue 4: Integration

Lack of integration has been highlighted throughout the panel reviews. While review panelists certainly noted in their reports where they observed instances of integration, almost without fail panel reports sought more documentation in this regard.

Issue 4: Agency Response:

Complex problems require creative and integrated approaches that cut across disciplines and knowledge areas. CSREES has recognized the need for these approaches and has undertaken steps to remedy this situation. CSREES has recently mandated that up to twenty percent of all NRI funds be put aside specifically for integrated projects. These projects cut across functions as well as disciplines and ensure that future Agency work will be better integrated. Finally, integration is advanced through the portfolio process which requires cooperation across units and programmatic areas.

Issue 5: Extension

While most panels seemed satisfied at the level of discussion that focused on research, the same does not hold true for extension. There was a call for more detail and more outcome examples based upon extension activities. There was a consistent request for more detail regarding not just the activities undertaken by extension but documentation of specific results these activities achieved.

Issue 5: Agency Response:
Outcomes that come about as a result of extension are, by the very nature of the work, more difficult to document than the outcomes of a research project. CSREES has recently shuffled its strategy of assigning NPLs to serve as liaisons for states. In the past, one NPL might serve as a liaison to several states or a region comprised of states. Each state will be assigned a specific NPL and no NPL will serve as the lead representative to more than one state. This will ensure more attention is paid to extension activities.

In addition CSREES also has been in discussion with partners and they have pledged to do their best to address this issue. The new POW will make extension-based results and reporting a priority. Placing heavy emphasis on logic models by CSREES will have the effect of necessitating the inclusion of extension activities into the state's POWs. This, in turn, will require more reporting on extension activities and allow for improved documentation of extension impact.

Issue 6: Program Evaluation
Panelists were complimentary in that they saw the creation of the Office of Planning and Accountability and portfolio reviews as being the first steps towards more encompassing program evaluation work; however, they emphasized the need to see outcomes and often stated that the scores they gave were partially the result of their own personal experiences rather than specific program outcomes documented in the portfolios. In other words, they know first hand that CSREES is having an impact but would like to see more systematic and comprehensive documentation of this impact in the reports.

Issue 6: Agency Response:
The effective management of programs is at the heart of the work conducted at CSREES and program evaluation is an essential component of effective management. In 2003 the PREP process and subsequent internal reviews were implemented. Over the past three years fourteen portfolios have been reviewed by expert panel members and each year this process improves. NPLs are now familiar with the process and the staff of the Planning and Accountability unit has implemented a systematic process for pulling together the material required for these reports.

Simply managing the process more effectively is not sufficient for raising the level of program evaluations being done on CSREES funded projects to the highest standard. Good program evaluation is a process that requires constant attention by all stakeholders and the agency has focused on building the skill sets of stakeholders in the area of program evaluation. The Office of Planning and Accountability has conducted training in the area of evaluation for both NPLs and for staff working at Land-Grant universities. This training is available electronically and the Office of Planning and Accountability will be working with NPLs to deliver training to those in the field.

The Office of Planning and Accountability is working more closely with individual programs to ensure successful evaluations are developed, implemented and the data analyzed. Senior leadership at CSREES has begun to embrace program evaluation and over the coming years CSREES expects to see state leaders and project directors more effectively report on the outcomes of their programs as they begin to implement more rigorous program evaluation. The new POW system ensures data needed for good program evaluation will be available in the future.

Issue 7: Logic Models
Panelists were consistently impressed with the logic models and the range of their potential applications. They expressed the desire to see the logic model process used by all projects funded by CSREES and hoped

not only would NPLs continue to use them in their work but, also, that those conducting the research and implementing extension activities would begin to incorporate them into their work plans.

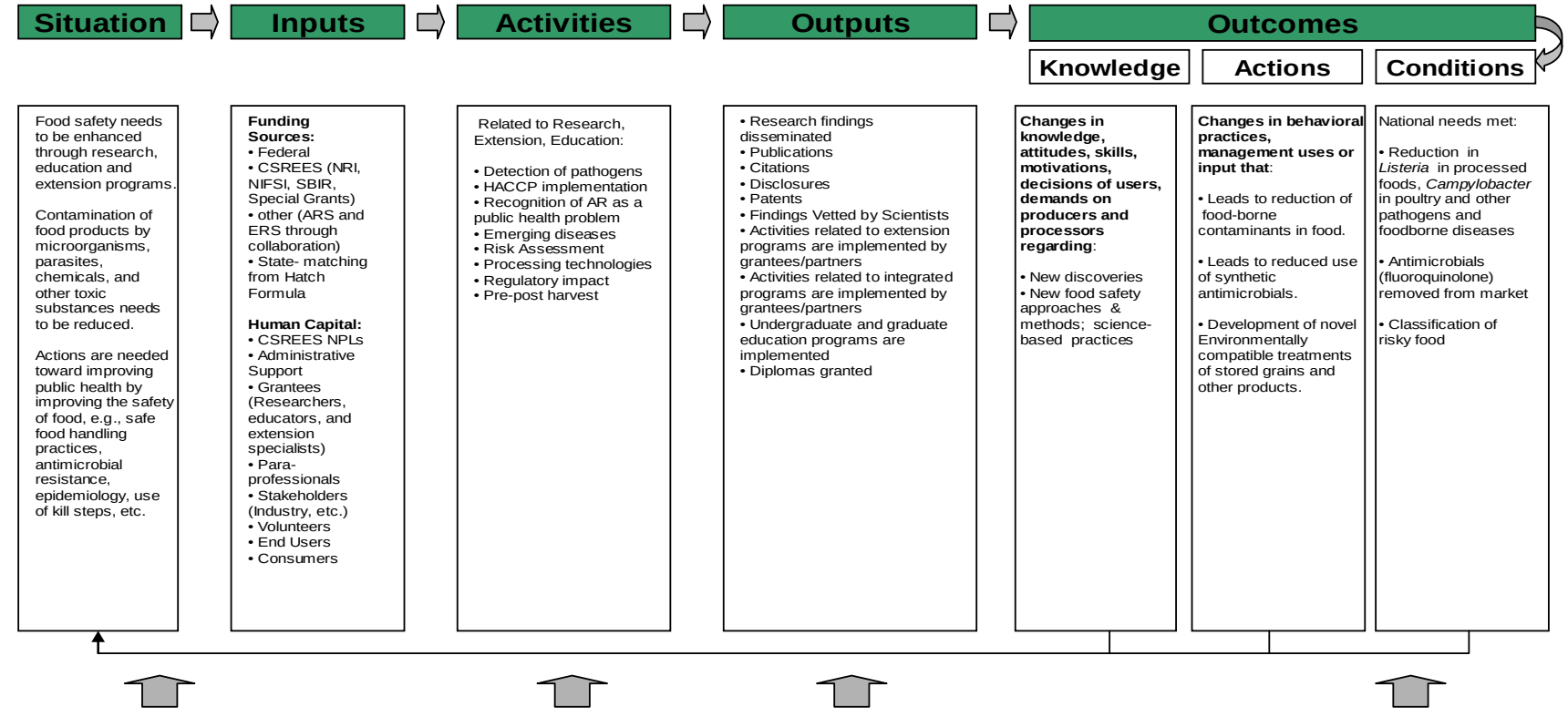
Issue 7: Agency Response:
Logic models have become a staple of the work being done at CSREES and the Agency has been proactive in promoting the use of logic models to its state partners. Two recent initiatives highlight this. First, in 2005, the POW reporting system into which states submit descriptions of their accomplishments was completely revamped. The new reporting system now closely matches the logic models being used in portfolio reports. Beginning in fiscal year 2007, states will be required to enter all of the following components of a standard logic model. These components include describing the following:

- Program Situation
- Program Assumption
- Program Long Term Goals
- Program Inputs which include both monetary and staffing
- Program Output which include such things as patents
- Short Term Outcome Goals
- Medium Term Outcome Goals
- Long Term Outcome Goals
- External Factors
- Target Audience

The system is now operational and states were required to begin using it by June of 2006. By requiring the inclusion of the data components listed above states are in essence, creating a logic model that CSREES believes will help improve both program management and outcome reporting.

The second recent initiative by CSREES regarding logic models concerns a set of training sessions conducted by Planning and Accountability staff. In October and November of 2005 four separate training sessions were held in Monterrey, California, Lincoln, Nebraska, Washington D.C. and Charleston, South Carolina. More than 200 people representing land-grant universities attended these sessions where they were given training in logic model creation, program planning, and evaluation. In addition, two training sessions were provided to NPLs in December 2005 and January 2006 to further familiarize them with the logic model process. Ultimately it is hoped these representatives will pass on to others in the Land-Grant system what they learned about logic models thus creating a network of individuals utilizing the same general approach to strategic planning. These materials also have been made available to the public on the CSREES website. The Food Safety portfolio logic model is presented below. Logic models for NRI and NIFSI are presented in Appendix B.

CSREES Food Safety Logic Model



III. National Program Leaders Responses

2006 responses: In the 2006 annual review, the NPLs responsible for the Food Safety Portfolio identified the following set of issues which were raised specifically by the PREP panel in the external review and drafted the following set of responses.

Issue I: Formula-Funded and Extension Programs
More data is needed to assess formula-funded programs (including Hatch funds and Animal Health 1433 funds) and Extension activities. These activities were not represented in the portfolio summary. Overall impacts were difficult to determine because all program information was not available.

> **Issue I --Team Response:**
> As responded in the 2006 internal review report, this issue has been addressed at the Agency level (see Issue V: Extension – Agency Response). The new Plan of Work will make formula and Extension-based results and reporting a priority and allow for the improved documentation of Extension impact.

Issue II: Quantitative Criteria
There was little quantitative assessment data to adequately evaluate portfolio accomplishments. Both quantitative and qualitative criteria should be developed by the Agency to allow for more objective assessments of relevance, quality, and performance.

> **Issue II --Team Response:**
> As responded in the 2006 internal review report, this issue has been addressed at the Agency level (see Issue VI: Program Evaluation – Agency Response). The new Plan of Work will make formula and Extension-based results and reporting a priority and allow for the improved documentation of Extension impact. The first annual reports from the new Plan of Work submissions will occur in the spring of 2008, allowing NPLs to better assess the impacts of funded Extension activities.

Issue III: Public Health Measures
Measures of enhanced public health, target levels for reductions in food-borne disease, and methods to measure disease attribution are needed (although little work has been done to develop these throughout the broad discipline of food safety). The food safety program should challenge the scientific community to address this as an area of need. All parties working in this area should undertake the task of defining the measures of impacts of programs on public health.

> **Issue III--Team Response:**
> National Program Leaders for the food safety program are active members of the Partnership for Food Safety Education, a public/private partnership among government, industry, and university representatives. The Partnership has educational programs aimed at linking food safety education programs to public health outcomes. Financial support from a NIFSI award to a multi-institutional team of researchers will provide for development and assessment of these educational materials with a report due in 2009.
>
> Across the disciplines of Nutrition, Food Science, and Food Safety, it is widely recognized that there are currently no reliable methods for linking specific food safety behaviors directly to changes in public health status. These types of disease attribution studies are sorely needed, but little research has been done across the disciplines to develop methods that will adequately link food safety behaviors to public health impacts. These are issues that are best addressed by the broad disciplines of Nutrition, Food Science, and Food Safety. National Program Leaders for CSREES food safety

programs have challenged the scientific community to address this as an area of need. Currently, CSREES food safety programs rely on methods used to collect trend data and inference data on food safety and public health impacts. These are methods used by the Centers for Disease Control and Prevention (DHHS) and the steering committee for the Healthy People 2010 (DHHS). The Healthy People 2010 Committee has set 10-year target levels for overall reductions in food-borne illness and tracks progress toward those selected targets.

The food safety Coordinated Agricultural Program (NRI 32.1) is currently initiating a large longitudinal study that will attempt to link (for the first time) pathogen load at the farm level with public health. In addition, the 2008 Request for Applications requests outcome measurements specifically designed to measure public health impacts. Currently, this longitudinal study is measuring the pathogen load (*Campylobacter* and *Salmonella* numbers) on poultry at the farm, following the poultry through processing, and sampling carcasses to measure pathogen load. This work has not been done before, and will help better define pathogen load on the farm and how it relates further down the food chain. This is important work for regulatory agencies and industry. Public health measures are the most difficult to achieve. Although risk assessment attempts to estimate risk, these fall short because of data gaps. Scientists from all areas are working on this problem and it is going to take several years to find an answer. CSREES is leading this effort with expertise in these areas.

The food safety program (NRI 32.0) has consistently funded research on *E. coli* and *Listeria monocytogenes* relative to colonization potential, pathogen load and virulence; these two pathogens received the highest funding rates of all organisms. The 32.0A program continues to move towards the 2010 Food Safety benchmarks for all food-borne pathogens based on incidence of illness. The benchmarks were developed for the Healthy People 2010 Guidelines by CDC and we have already met the goal for *E. coli* as associated with food-borne illness and are very close with incidence of infections from *Listeria monocytogenes* (DHHS, 2005). Both *E. coli* and *Listeria* spp. are considered in the revised 2008 RFA priorities for all Food Safety programs, however, the focus of projects on these two pathogens will differ by program scope.

2007 responses: In the 2007 annual review, the team further responded to the PREP panel's comments and recommendations as follows.

RELEVANCE

Scope: 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; foods other than animal-based food products and infectious agents should be fully demonstrated in the portfolio, specifically produce and non-meat foods need to be better represented in the portfolio; NPLs and scientific staff in the food safety program in CSREES could increase and improve communication between the competitive grants programs and the state agriculture experiment stations and extension. Communication about CSREES programs and about what states are doing are areas of concentration; program staff should consider current geographic needs in food safety, specifically considering the needs of rural communities in the US and developing nations; CSREES food safety staff should be involved at some level at other Agency programs, and obtain additional funding for research, education and extension activities concerning food security.

Response: The agency has made every effort to improve its data collection and reporting, e.g. the One-solution project improving the CRIS system; redesigned Plan of Work with new designs to make it possible for projects to report on progress, outcomes, etc., with the deadline of April 2008 for annual reports. NPLs will be provided with the Administrative Dashboard to enable their quantitative data collection for project outputs and outcomes. NPLs are now assigned the responsibility as state liaisons to, among other things,

improve communications with partners. This effort will serve to provide greater detailed information to the Land Grant Universities, Tribal Colleges and State Experiment Station Directors relative to competitive grant programs and other Agency activities and initiatives. Additionally, information from these institutions will aid NPLs and the Agency in communicating advances to the public. The score remained at 3 for this dimension.

Focus: Additional funding is needed for work on viruses based on the proportion of food borne illnesses caused by viral agents, and communicate and consult other USDA and external agencies involved in food safety activities.

Response: The portfolio continues to communicate and consult other USDA agencies, particularly ARS, and external agencies, such as FDA, CDCP, etc. involved in food safety activities. The portfolio continues to focus on all important issues of food borne illnesses within the allocated funding. The focusing of program priorities within the NRI-based Food Safety programs has reduced the array of food-borne illness issues covered by these competitive grant programs. This change in funding philosophy has led to emphasis and enhancement in the most critical areas; however, other areas of importance within the food safety realm do not receive critical research funding as a result. Research funding for work on enteric viruses, including, caliciviruses, has increased substantially since the external review analysis. These include efforts in both pre- and post- harvest research to track source and point of contamination during production and processing of fresh produce. The 2007 internal team gave this dimension a score of 3.

Emerging Issues: CSREES staff should be more involved with National Advisory Committees for Microbiological Criteria in Foods (NACMCF); even if CSREES staffers are not members of boards, they should attend meetings and seek interactions with other advisory committees, and CSREES needs to define and clarify what emerging issues represent in order for the category to be evaluated properly.

Response: Considering evolving funding and changes in priorities, the 2007 the team judges that the portfolio continues to improve upon its ability to put emphasis on national emerging issues. Competitive grants programs in food safety continue to reflect the evolution of food-borne illness issues and priority setting is based upon statistical analysis of ongoing and emerging issues. The score remained at 3 for this dimension.

Integration: CSREES should further develop partnerships with ARS and State Agricultural Experiment Stations and host discussions between these various entities through regular workshops.

Response: The portfolio has improved in this area. National Program Staff from ARS have been involved in stakeholder listening sessions hosted by CSREES Food Safety NPLs and ongoing informal discussions have increased to maintain a knowledge sharing pathway. ARS NPLs have also attended competitive grants program proposal reviews to gain greater understanding of the process of awarding research funding. In a similar vein, ARS NPLs have shared their annual reports detailing ARS activities in food safety research. Regularly scheduled conference calls with Land Grant University personnel, including Deans, Experiment Station Directors, Research Directors and NASULGC representatives, have fostered greater interaction and information exchange between all parties. More integrated proposals have been received in integrated programs, including NIFSI. The score increased to 2.5.

Multidisciplinary: Increase the number of coordinated agricultural projects (CAPs) in food safety; gather more quantitative data to evaluate the effectiveness of the interdisciplinary programs; encourage other disciplines, including the psycho-social sciences, to be a part of interdisciplinary work.

Response: The portfolio continues to improve in multidisciplinary balance. However, there is still room for improvement. Select programs funded multidisciplinary grant projects, for example, NIFSI special emphasis grants, Food Safety 32.1 CAP award to North Dakota State University, and a Food Safety 32.0 seed grant to

Delaware State University to track viruses in the environment. These awards represent the application of non-traditional disciplines to food safety and the interaction of scientists from more than one discipline in each project working to solve complex problems. Nevertheless, the increase in multidisciplinary grants was not for the entire portfolio. The score remained at 2.5.

QUALITY

Significance: Increase linkages of specific programs to improvements in public health. RFAs should request the development of novel and innovative approaches to increase these linkages.

Response: The portfolio continues its efforts to implement the panel's recommendations. However, it has not shown much noticeable improvement. Attribution of research, education, and extension efforts to reflect a decline in the number of food-borne illnesses or the number or magnitude of product recalls requires the interplay of multiple variables in production, processing, quality assurance and even consumer behavior to be accurate; the Agency continues to seek greater feedback from public and private entities, which may involve proprietary data. The score remained at 2.

Stakeholder: Clarify who the key stakeholders are, specifically those who should have input in the portfolio; NPLs should attend committee meetings such as the NACMCF and offer advice to these groups; NPLs should seek opportunities to enhance the involvement of end-users (stakeholders, NGOs, industry, Congress, Project Directors, etc.) in all aspects of the portfolio.

Response: The 2007 team felt that the portfolio has made an effort to solicit information from the end-users, and has processed unsolicited information, as well. This information has helped reduced duplication of work in Food Safety. Further, all Request for Applications posted by the Agency ask all interested parties to provide input into the competitive grants process, including providing contact information to facilitate this input. Two stakeholder listening sessions were held by Food Safety NPLs in 2007 seeking input into the RFA and related processes. These listening sessions involved a cross-cut of University, Experiment Station, industry, trade organization and Federal Agency staff through advertising these sessions at national food safety meetings and direct contact of individuals. The score increased to 3.

Alignment: If necessary, allow NRI programs to take a more integrative approach; develop a mechanism to gather data on Extension programs in food safety and a system for gathering these data on a continuing basis; NPLs should sit on food security committees if CSREES elects or is directed to fund research and education in this direction; if funding for food defense 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.

Response: The 2007 team felt that the portfolio continues to do an excellent job in aligning its work with current state of science. The score remained 3.

Methodology: Provide a consistent set of instructions and guidelines on how to evaluate and rank proposals for grants review panel members; the portfolio and/or Agency should consider a grant proposal triage procedure similar to the one used by NIH.

Response: The PREP panel assessed the portfolio as having routinely utilized appropriate methodologies and gave it a score of 3. However, the panel recommended that in the portfolio provide better instructions and guidelines to the area of grant proposal review and suggested that the NIH proposal review protocol be applied. The 2006 portfolio teams felt that the portfolio continued to apply appropriate methodologies and gave this dimension a score of 3. The 2007 team agreed that the portfolio continued to routinely apply the latest technologies in its work and kept the score at 3.

PERFORMANCE

Productivity: Consider measures of productivity and establish linkages to milestones; increase the amount of quantitative data to provide evidence of productivity particularly for formula funds and extension.

Response: As a response to the panel's recommendation to increase the amount of quantitative data, one of the goals of One Solution has been to revamp the way CSREES receives data submitted by its partners to make it easier for data submission and retrieval. The panel and the 2006 portfolio team gave this dimension a score of 2. The 2007 team increased the score to 2.5 on the basis that NPLs are making efforts for better portfolio management. Analysis of food safety funding by the Agency in specific areas and attainment of or closely approaching Healthy People 2010 milestones for incidence of food-borne illness for several pathogens strongly suggests the research, education and extension portfolio within the Agency has been continually productive.

Comprehensiveness: Possibly generate funds that will allow programs to be comprehensive, focused and responsive.

Response: Both the PREP panel and the 2006 team gave the portfolio a score of 2 due to the fact that the portfolio has not demonstrated a high degree of comprehensive outputs and outcomes. For the 2007 team, although "comprehensive" is a value judgment, it agreed that areas like chemical research is still not a priority for research solicitation. The score did not change for this year. In an effort to focus on high priority and emerging areas of food safety, some aspects of the food safety spectrum have not been funded to the fullest extent needed due to flat-line budgets.

Timeliness: 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.

Response: The 2007 team felt that the portfolio continued to have most projects achieved closure on time, and the law requires that all projects must complete within five years. The score remained at 3.

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.

Response: The 2007 gave this dimension a score of 3 on the basis of NPLs continued to exercise significant program leadership and CSREES continued to provide leadership to all portfolios.

Accountability: 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.

Response: CSREES has redesigned the Plan-of-Work (POW) to allow partners to report on project outputs and outcomes however the first annual report under this revised POW is due April 2008. Therefore, the 2007 team kept the score at 2 for this dimension. CSREES and ARS NPLs work with scientists to improve the

quality of the CRIS reporting information, partly by reviewing the reports and approving or disapproving termination reports at close-out of a project. Modifications to the CRIS system are expected to further enhance the quality of information provided.

IV. Updates of the self-assessment paper

The updates are in following two areas: budget and performance measures.

1. Budget

Table IV-1 -- Portfolio: Food Safety									
(as reported in the Current Research Information System)									
$ in the thousands									
Year	**HATCH**	**MC-STN**	**EVANS ALLEN**	**ANIMAL HEALTH**	**SPECIAL GRANTS**	**NRI GRANTS**	**SBIR GRANTS**	**OTHER CSREES**	**TOTAL CSREES**
2000	2,969	0	1,158	253	6,078	3,900	785	18,846	33,989
2001	3,255	0	1,558	129	5,443	8,293	481	13,886	33,045
2002	3,263	0	965	288	8,142	16,532	718	8,958	38,866
2003	3,428	0	961	266	10,675	7,005	594	10,995	33,924
2004	3,966	0	1,867	121	9,506	6,862	305	12,038	34,665
2005	4,045	0	1,053	254	10,723	12,635	851	12,321	41,882
2006	3898	0	1038	91	9725	9008	763	11302	35823
Portfolio Total	24,824	0	8,600	1,402	60,292	64,235	4,497	88,346	252,194

Table IV-2 -- Portfolio: Food Safety								
(as reported in the Current Research Information System)								
$ in the thousands								
Year	**CSREES Admin**	**Other USDA**	**Other Federal**	**State Appr.**	**Self-Gen**	**Ind/Gr Agrmt**	**Other Non-Fed**	**Total**
2000	33,988	2,506	5,722	16,924	2,361	4,141	1,733	67,375
2001	33,045	3,849	7,520	20,603	1,729	4,315	2,025	73,086
2002	38,866	3,978	9,334	24,490	3,357	4,681	2,820	87,528
2003	33,922	2,835	9,888	26,507	3,472	4,745	2,963	84,334
2004	34,666	4,340	7,437	27,881	3,783	4,562	2,322	84,991
2005	41,882	3,794	13,644	29,408	5,284	4,949	3,677	102,638
2006	35,823	3,090	9,383	26,139	4,501	3,456	2,273	84,666
Portfolio Total	252,192	24,392	62,928	171,952	24,487	30,849	17,813	584,618

Significant budget shifts were noted in the period 2005 to 2006 with a decrease in funding of over $6 million dollars. This is partially attributable to the decrease in funds allocated for the National Integrated Food Safety Initiative (NIFSI) of almost $2 million dollars. Additionally, a Federal budge rescission occurred in 2006, reducing funds for the two NRI-based programs. Since funds allocated for the NRI programs are not tied to a single fiscal year (i.*e*., they can be carried over year to year),

funding reports for a single year do not necessarily reflect the funds available for the awards made in that funding cycle.

In the past 5 years, the NIFSI program has funded a number of projects directly related to biosecurity issues, however, no new funding has been allocated for this effort. Funding in this area is expected to continue as emphasis on bioterrorism and intentional contamination of the food supply continues to be a threat.

2. Performance Measures

Performance measures for the Food Safety portfolio include measure description and explanation plus target and actual achievements.

a. *Measure Description:* Methods that reduce food contamination and growth of food-borne organisms.
b. *Measure Explanation*: The number of contamination reducing methods (intervention, mitigations) for priority, high public health risk, and economically important microbial pathogens and contaminates that have been developed and used.

Time Frame	Target	Actual	Development: Baseline/Target
2002	Baseline	2	
2003	3	3	
2004	6	6	
2005	8	8	
2007	10	10	
2008	12		
2009	15		
2010	20		

V. Evidence of Progress

The CSREES food safety programs (NRI, 406 and SBIR) have increased their input from stakeholder groups and targeted program priorities in response to needs. Awards have been made to address attribution of pathogens and commodities to frequency of food-borne illness. These efforts will aid in the quantitative assessment of program impacts on mission goals.

Previous external review teams have suggested a combination of pre- and post- harvest food safety review panels into one entity for the Food Safety 32.0 program. This has been accomplished and resulted in a more cohesive and ‘big picture’ approach to funding the most pressing research endeavors. A ‘Farm to Fork’ mindset has altered the more parochial thinking in terms of addressing food safety issues at their most critical points of control within the NIFSI, SBIR and NRI programs. Practical and economical mitigation measures are the ones that will be implemented ultimately in the food production and processing system. Hence, this has become a focus area of the Epidemiological Approaches to Food Safety 32.0B program.

A higher degree of involvement of CSREES NPLs with other Federal agency personnel (*e.g.*, ARS, FSIS, FDA, APHIS, EPA) and commodity interested representatives has furthered the food safety programs and provided for a more coordinated approach to solving some complex

problems. These include communication of food-borne illness statistics, invitations to critical interagency and commodity related meetings as well as an overall greater appreciation of the needs of all stakeholders and the logistical issues involved in our production and processing system.

Outcomes of funded projects have made direct impact on food-borne illness numbers and influenced production and processing systems within the agricultural sector. For example:

- A grant was awarded to researchers at Ohio State University whose goal was to develop protocols/guidelines to assist food processors in the development of safe products. The project has had several major successes. (NIFSI grants)
- A company in Oregon has commercialized the Pulsed Electric Field (PEF) technology using guidelines developed by the Ohio State research team. The team won the Institute for Food Technologists Industrial Achievement Award for industry-wide publication of the new guidelines. The team has also developed an inexpensive Radiofrequency Identification (RFID) -based methodology to determine Residence Time Distribution in process systems. This methodology has cut the time required for such a determination from over 10 hours of run-time to under an hour. (SBIR grants)

Other examples include:

- Development of an integrated biosensor for the rapid detection of pathogenic Salmonella on chicken with high sensitivity and field portability, Fort Valley State University, 2003, Food Safety 32.0. (NRI grants)

- Revision of regulations and institution of newly founded regulatory language to provide for antimicrobial formulations targeting elimination of bacterial biofilms in processing plants –Improved Methods to Control Biofilms Containing *Listeria* in Meat and Poultry Processing Environments, Sterilex Co., 2004, Food Safety 32.0. (NRI grants)

- Development and implementation of ozone as a fumigant for grain storage units to eliminate existing infection or colonization and remediation of established fumonisin in grain affords a practical and environmentally compatible means of pest control – Evaluation of ozone as an antimycotoxin and microbiocidal treatment for wheat and barley, Charlene Wolf-Hall, North Dakota State University, 2005, Food Safety 32.0. (NRI grants) and

- Uniform Strategy for Decontamination of Stored Food, Lynntech, Inc. (SBIR, 2006, 2007 grants)

- Preliminary interventions are being developed because of emerging research in the produce area. This research is being conducted in the California valley where the last spinach outbreak occurred, and is incorporating human, environmental, and animal sampling. Rob Mandrell (ARS) and R. Atwill (University of California) were funded by the Epidemiological Approaches to Food Safety program 32.1 and are utilizing epidemiologic methods to evaluate current research and potential impact. The method of doing systematic reviews was first done in human medicine (evidence-based). This method has garnered the attention of FSIS and other agencies. It will help document data gaps. (NRI grants)

- A project awarded to Jan Sargeant (McMasters University, Canada), and Annette O'Connor (Iowa State University) from the 32.1 program has resulted in new

epidemiologic methods to evaluate current research and potential impact. The method of doing systematic reviews was first done in human medicine (evidence-based). This method has garnered the attention of FSIS and other agencies. It will help document data gaps. (NRI grants)

Additionally, two stakeholder listening sessions as well as numerous informal meetings with interested parties have been held over the past year to provide for timely input into the process of RFA development for all Food Safety programs. Priority setting has become more crucial since NRI programs have become more focused in the past two years. NPLs have attended numerous stakeholder initiated forums aimed at addressing the flow of information from industry and public health professionals to those on the front lines of food safety decision making. Analysis of stakeholder input has been directly effective during the revision process of the RFAs in defining the scope of the individual program. For example, research on antibiotic resistance mechanisms has been redefined for the Food Safety 32.0A program in 2008 as a result of input.

Stakeholder input has been expanded to international partners. CSREES has taken the lead in forming a consortium of scientists from the EU and the US to increase collaboration in research, provide additional educational opportunities, and to increase the broadness of our input on future research directions.

The overall food safety portfolio has been productive in realizing outcomes which influence both ongoing research and direct applications of technology in mitigating food-borne illnesses. Education and extension efforts have increased to deliver the latest findings to producers and processors who are in position to modify existing practices. With a targeted approach to funding in critical areas of food safety, the programs have delivered high quality awards to primarily multi-disciplinary projects which address critical issues in U.S. agriculture, such as fresh cut produce. Projects underway for the past year or two are addressing critical needs for the food production industry as well as consumers and they are doing so in a pro-active manner (*i.e.*, not waiting for the next outbreak to initiate a new funding objective). Examples of recently funded projects addressing critical issues in safety of fresh produce include:

- Defining parameters to eliminate pathogens in composted animal manures for application to produce fields, University of Georgia-Griffin, 2007, Food Safety 32.0. (NRI grants)
- Impacts of Irrigation Water Quality on the Persistence and Transmission of *E. coli* O157:H7 from soil to plants, USDA-ARS, Riverside, CA, 2007, Food Safety 32.0. (NRI grants)
- An integrated biosensor for rapid detection of pathogenic microorganisms using NanoDetect and immunomagnetic separation, Illuminaria LLC, Groton, NY, 2005. (SBIR grants)

VI. Summary

Food safety programs in CSREES have 3 major components: The National Integrated Food Safety Initiative (NIFSI); Biological Approaches to Food Safety (National Research Initiative 32.0A); Epidemiological Approaches for Food Safety (National Research Initiative 32.0B). From 2006 through 2007, each of these three component food safety programs in CSREES put processes in place that will allow them to anticipate emerging issues in food safety and respond to those emerging issues as rapidly as possible within the context of annual competitive grant programs. Within NIFSI, priority areas are sufficiently broad that most emerging issues will be subsumed under the existing priority areas. During a recent food-borne illness outbreak linking raw spinach and *E. coli*, all three component food safety programs had active grants focusing on improved safety of fresh and fresh

cut fruits and vegetables. The Integrated Food Safety program will award up to $5 million in 2008 in this priority area and the NRI-based programs will fund approximately $3 million in research related to this problem. The SBIR program funds up to $700,000 per year for development of inventions and methods relevant to food safety detection and mitigation.

From 2005 through 2007, each of the component programs engaged in efforts that significantly increased their ability to gather quantitative data to evaluate the effectiveness of their interdisciplinary programs, by encouraging multiple disciplines to collaborate in unique and exciting ways with food scientists, nutritionists, food safety educators, and extension personnel. This will make it possible to collect and analyze future quantitative data to determine overall program impact. It is anticipated that data collected, and measurement instruments used to collect the data, will need to be revised at various intervals based on their ability to measure actual program impact.

No major shifts in funding were considered, however, in year 2006, a decrease in funding of the NIFSI program of approximately $2 million dollars occurred along with a Federal budget recission that affected the NRI and SBIR based programs to a lesser degree. The NRI-based programs, have undergone a focusing effort starting in 2006 which effectively increases funding for some priority areas of food safety while decreasing funding for other aspects of food safety research not considered within the priority list within the RFAs. This shift in emphasis has resulted in funding in the most critical areas of food-borne illness at present, however, the long term impacts of a highly focused approach are not yet determined. Educational training in areas not covered are a concern for long-term food safety priorities as many research programs lack alternative means of continued funding. Increased funding rates have, however, enhanced the willingness of applicants to apply for funding as low rates of success in the application process have dissuaded some from applying to programs previously.

Increased funding of biosecurity issues related to food safety over the past five years has consumed some of the NIFSI budget, however, no new funding has been authorized for this program. This is expected to continue.

Given the diversity of food production systems in the U.S. and in the countries from which we import seafood, fresh produce and processed items, the funding available for research, education and extension are somewhat limiting. Many high quality projects are not considered within the funding range due to the enhanced competition for scarce dollars. While significantly enhanced funding initiatives are welcome, the food safety programs have been productive and responsive to a challenging task of keeping pace with an ever changing food safety picture. Current efforts include recruiting scientists from diverse disciplines (*e.g.*, aerobiology, plant pathology, community ecology, wildlife behaviorists) to tackle some of the more challenging aspects of food safety, especially those wherein there are non-traditional approaches needed to effect problem solving.

APPENDIX A

KA Funding Tables

Table 1.-- 711: Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources CSREES Funding									
(as reported by the Current Research Information System)									
$ in the thousands									
Year	**HATCH**	**MC-STN**	**EVANS ALLEN**	**ANIMAL HEALTH**	**SPECIAL GRANTS**	**NRI GRANTS**	**SBIR GRANTS**	**OTHER CSREES**	**TOTAL CSREES**
2000	511	0	70	167	3,611	14	0	711	5,084
2001	606	0	0	9	2,287	878	0	591	4,371
2002	732	0	0	171	2,122	632	230	891	4,778
2003	823	0	0	180	3,165	202	444	1,178	5,992
2004	890	0	110	4	2,529	667	0	764	4,964
2005	849	0	106	15	3,240	665	296	1,113	6,284
2006	774	0	165	1	2,796	404	184	1,537	5,859
Total	5185	0	451	547	19750	3462	1154	6785	37,332

Table 1.-- KA 711: Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources Overall Funding								
(as reported by the Current Research Information System)								
$ in the thousands								
Year	**CSREES Admin**	**Other USDA**	**Other Federal**	**State Appr.**	**Self-Gen**	**Ind/Gr Agrmt**	**Other Non-Fed**	**Total**
2000	5,083	1,403	563	2,183	206	402	242	10,083
2001	4,371	1,320	1,648	2,815	255	1,013	367	11,789
2002	4,778	557	2,212	4,161	647	1,050	449	13,855
2003	5,991	416	2,099	4,718	1,272	911	577	15,985
2004	4,965	403	1,692	5,411	1,315	846	430	15,062
2005	6,284	358	2,970	6,364	2,482	890	935	20,283
2006	5,859	604	1,441	5,601	1,835	744	659	16,744
Total	37,331	5,061	12,625	31,253	8,012	5,856	3,659	103,801

APPENDIX A

KA Funding Tables (cont'd)

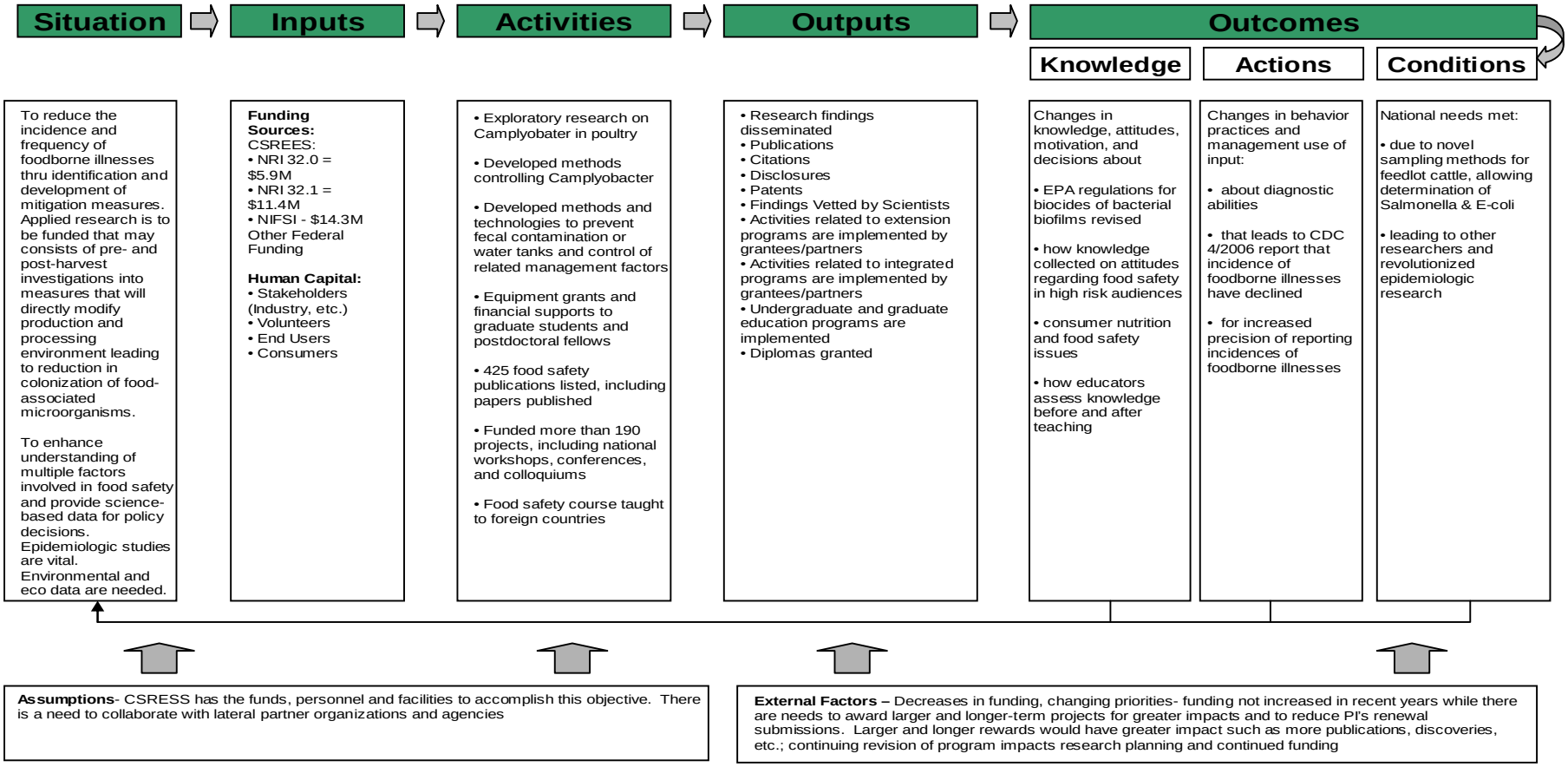
KA 712: Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins CSREES Funding									
(as reported by the Current Research Information System)									
$ in the thousands									
Year	HATCH	MC-STN	EVANS ALLEN	ANIMAL HEALTH	SPECIAL GRANTS	NRI GRANTS	SBIR GRANTS	OTHER CSREES	TOTAL CSREES
2000	2,458	0	1,088	86	2,467	3,886	785	18,135	28,905
2001	2,649	0	1,558	120	3,156	7,415	481	13,295	28,674
2002	2,531	0	965	117	6,020	15,900	488	8,067	34,088
2003	2,605	0	961	86	7,510	6,803	150	9,817	27,932
2004	3,076	0	1,757	117	6,977	6,195	305	11,274	29,701
2005	3,196	0	947	239	7,483	11,970	555	11,208	35,598
2006	3,124	0	873	90	6,929	8,604	579	9,765	29,964
KA 712 Total	19,639	0	8,149	855	40,542	60,773	3,343	81,561	214,862

KA 712: Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins Overall Funding								
(as reported by the Current Research Information System)								
$ in the thousands								
Year	CSREES Admin	Other USDA	Other Federal	State Appr.	Self-Gen	Ind/Gr Agrmt	Other Non-Fed	Total
2000	28,905	1,103	5,159	14,741	2,155	3,739	1,491	57,292
2001	28,674	2,529	5,872	17,788	1,474	3,302	1,658	61,297
2002	34,088	3,421	7,122	20,329	2,710	3,631	2,371	73,673
2003	27,931	2,419	7,789	21,789	2,200	3,834	2,386	68,349
2004	29,701	3,937	5,745	22,470	2,468	3,716	1,892	69,929
2005	35,598	3,436	10,674	23,044	2,802	4,059	2,742	82,355
2006	29,964	2,486	7,942	20,538	2,666	2,712	1,614	67,922
KA 712 Total	214,861	19,331	50,303	140,699	16,475	24,993	14,154	480,817

APPENDIX B

Logic Models

CSREES Food Safety (NRI)



Version 1.2

CSREES Food Safety (NIFSI)