Food Integrity and Biosecurity
R&D Plan
2007 – 2012
Food Integrity and Biosecurity
R&D Plan 2007–2012

April 2007
RIRDC Publication No 07/055
RIRDC Project No CIE-14A
Foreword

Five-year research and development (R&D) plans are developed for each of RIRDC’s major programs. This plan (2007–2012) is the first for the Food Integrity and Biosecurity (FIB) Program, which was established in 2004.

The Food Integrity and Biosecurity Program is managed by RIRDC as part of the National Rural Issues Portfolio. The R&D plan was prepared in consultation with the FIB Research and Development Advisory Committee. The Committee has members from the Department of Agriculture, Fisheries and Forestry (DAFF), the Department of the Prime Minister and Cabinet (PM&C), National Farmers’ Federation (NFF), Australian Food and Grocery Council, Plant Health Australia (PHA) and Animal Health Australia (AHA). The plan was developed between February and May 2006.

This 2007–12 R&D plan sets out five objectives and accompanying strategies for R&D under the program. Each strategy has a set of performance indicators. The strategies define how each objective should be tackled, and the indicators provide the basis on which the program will be assessed.

The plan is consistent with the RIRDC Corporate Plan and Australian Government National Research Priorities and Rural Research Priorities. The plan reflects stakeholders’ priorities for R&D to support profitable, competitive and resilient agricultural industries and innovation and change in rural industries.

The current level of funding for the program is low relative to the R&D needs for addressing biosecurity and food integrity issues in RIRDC small industries. There are major gaps in R&D to identify risk and develop solutions for peri-urban production that is a concern to many industries. There may be scope for economies of scale in developing technologies and systems for managing risk in smaller industries. Substantial negotiation with the RIRDC industries and with other industry R&D organisations and state agencies will be required to source additional funding to pursue the strategies set out in this plan. Success in achieving this co-investment will indicate that the issues raised in the plan are priorities, and that successful implementation of the R&D outputs is likely.

This report, an addition to RIRDC’s diverse range of over 1600 research publications, forms part of our Food Integrity and Biosecurity R&D program, which aims to:

- optimize investment in surveillance for Food Integrity and Biosecurity
- address the risks posed by peri-urban activities and alternative distribution networks
- develop biosecurity and food integrity management tools for RIRDC industries
- assist RIRDC industries meet national and international market demands
- communication and adoption by industry of research funded by the FIB program.

Most of our publications are available for viewing, downloading or purchasing online through our website:

- purchases at www.rirdc.gov.au/eshop

Peter O’Brien
Managing Director
Rural Industries Research and Development Corporation
Acknowledgments

Peter Arkle (NFF); Reg Butler (DAFF); Alan Edwards (DAFF); Rob Floyd (PM&C); Ralph Hood, (AHA); Robert Moore, (PHA); and Dick Wells (AFGC).

Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFGC</td>
<td>Australian Food &amp; Grocery Council</td>
</tr>
<tr>
<td>AFSCE</td>
<td>Australian Food Industry Science Centre</td>
</tr>
<tr>
<td>AHA</td>
<td>Animal Health Australia</td>
</tr>
<tr>
<td>AQIS</td>
<td>Australian Quarantine and Inspection Service</td>
</tr>
<tr>
<td>AusBIOSEC</td>
<td>Australian Biosecurity System for Primary Production and the Environment</td>
</tr>
<tr>
<td>BA</td>
<td>Biosecurity Australia</td>
</tr>
<tr>
<td>DA</td>
<td>Dairy Australia</td>
</tr>
<tr>
<td>DAFF</td>
<td>Department of Agriculture, Fisheries and Forestry</td>
</tr>
<tr>
<td>DEH</td>
<td>Department of Environment and Heritage</td>
</tr>
<tr>
<td>FSA</td>
<td>Food Science Australia</td>
</tr>
<tr>
<td>FSANZ</td>
<td>Food Standards Australia and New Zealand</td>
</tr>
<tr>
<td>HAL</td>
<td>Horticulture Australia Limited</td>
</tr>
<tr>
<td>IRA</td>
<td>Import Risk Analysis</td>
</tr>
<tr>
<td>MLA</td>
<td>Meat and Livestock Australia</td>
</tr>
<tr>
<td>NFIS</td>
<td>National Food Industry Strategy</td>
</tr>
<tr>
<td>NFF</td>
<td>National Farmers’ Federation</td>
</tr>
<tr>
<td>PHA</td>
<td>Plant Health Australia</td>
</tr>
<tr>
<td>PM&amp;C</td>
<td>Department of the Prime Minister and Cabinet</td>
</tr>
</tbody>
</table>
Snapshot of the five-year plan

Goal

The Food Integrity and Biosecurity Program aims to deliver research and development to enable Australia to maintain its ability to deal with the threats that pest, disease and bio-terrorism pose to food, to crops, to livestock and to enable access to national and international markets.

Objectives

The research objectives of the program are to:

- Enable Australian agricultural industries to optimize investment in surveillance for biosecurity and food integrity on and off farm (35% of budget).
- Address the risks posed to agricultural industries and human health from peri-urban and regional production and alternative distribution networks (8% of budget).
- Develop biosecurity and food integrity management tools for RIRDC industries (27% of budget).
- Assist RIRDC industries meet national and international market demands by improving their ability to track and trace their products (20% of budget).
- Extension and communication of research (10% of budget).

All objectives address Australia’s need for economic, environmental and social sustainability. Program budget allocations are flexible and will be guided by the Food Integrity and Biosecurity R&D Advisory Committee.

The Plan is consistent with RIRDC’s overriding aim of maximising the contribution its investments make to the profitability, sustainability and resilience of rural industries and communities. Alignment of Plan objectives with RIRDC’s Corporate Goals and Strategies is shown in Appendix 1.
1. Purpose of the plan

The purpose of this five-year plan is to:

- Outline the rationale for the Food Integrity and Biosecurity (FIB) Program that the Rural Industries Research and Development Corporation (RIRDC) will fund and manage.
- Indicate the specific role that RIRDC-funded R&D will play in expanding the knowledge and management of food integrity and biosecurity.
- Provide clear signals concerning food integrity and biosecurity needs and priorities for the period 2007–2012.
- Outline the broad priorities that RIRDC will pursue through its investment in the program over the next five years.
- Take account of national research priorities, Ministerial guidance and RIRDC policies.
- Encourage collaboration and coordination for FIB R&D, including new joint investment.
- Encourage and support discussion between RIRDC and the research, development and extension community that will enable future needs of the sector to be identified and incorporated into annual and longer-term planning.

The plan is based on consultation with the CRC for Plant Biosecurity, Plant Health Australia (PHA), Animal Health Australia (AHA), AusBIOSEC, the Department of the Prime Minister and Cabinet (PM&C) and the Department of Agriculture, Fisheries and Forestry (DAFF), Biosecurity Australia, Australian Quarantine and Inspections Service (AQIS) and a workshop involving the committee in April 2006. A draft plan was circulated to the Committee in May 2006 and refined following feedback.

The plan should be regarded as a living document that will be updated, as circumstances require. All agencies involved in food integrity and biosecurity and providers of R&D are encouraged to work towards achieving the objectives of the plan to enhance food integrity and biosecurity in Australia.
2. **The Food Integrity and Biosecurity Program**

This paper presents the first five-year R&D plan for the Food Integrity and Biosecurity (FIB) Program in the National Rural Issues portfolio. The FIB Program was established in 2004 in response to a need for smaller industries to access R&D to support their food integrity and biosecurity efforts. It grew out of a commitment made by RIRDC to support the CRC for Plant Biosecurity. The current budget is around $270,000 per year, with additional financial and in-kind contributions attracted on a project by project basis.

**FIB Committee**

The program is managed by RIRDC in consultation with a Research and Development Advisory Committee. The Committee has representatives from the:

- Department of Agriculture, Fisheries and Forestry (DAFF)
- Department of the Prime Minister and Cabinet (PM&C)
- National Farmers’ Federation (NFF)
- Australian Food and Grocery Council
- Plant Health Australia (PHA)
- Animal Health Australia (AHA)
- RIRDC Program Manager for FIB.

It is currently chaired by the General Manager, National Rural Issues, RIRDC.

The committee meets twice yearly, to consider preliminary and full research proposals. Recommendations from the Committee on which proposals are suitable for funding are made to the RIRDC Board.
3. Overview of Food Integrity and Biosecurity

Current organisational structures

Both biosecurity and food integrity are addressed in a formal structure defined in part by the constitutional responsibilities of the Australian and state governments. These structures influence the pathways to adoption with the setting of regulation and mechanisms for information sharing. Industries have the incentive to invest in R&D to reduce the costs of complying with regulations, and benefit from the information shared. Commercialisation is a pathway to adoption mainly when the technology is embodied in a product that provides a more cost effective way of meeting compulsory or voluntary standards or requirements.

Food integrity

The broad institutional structures for food integrity are set out in Figure 3.1. The overarching agency setting standards for food safety is Food Standards Australia New Zealand (FSANZ). The state and territory governments are the responsible legislating bodies for food standards, but they have adopted a national approach to setting standards based on the Australia New Zealand Food Standards Code, which they then implement. In most states the responsibility for implementation still lies with the relevant Department of Health, however, some states have set up dedicated agencies for this purpose.

Industries are responsible for developing their own quality assurance systems and for meeting the requirements of the state and territory regulations and the Food Standards Code. Meat and Livestock Australia (MLA), for example, fund SAFEMEAT, and Dairy Australia operate a quality control program aimed at quality assurance, including food safety. Processors and others along the food chain are subject to regulations to meet national standards but may also choose to comply with international standards, as long as Australia’s national standards are met. Major supermarket chains are also imposing their own food safety standards on suppliers, which must meet national standards. Guidelines for accreditation of ISO22000: 2005 Food Safety Management Systems: Requirement for any organisation in the food chain is expected in September 2006.

The Australian Government supports industry in these efforts through the National Food Industry Strategy (NFIS) Ltd, which is an industry-led public company funded under contract to DAFF. The most relevant area under the NFIS is the Food Safety and Quality Systems Initiative, managed by DAFF, which recently developed the National Food Safety Auditor Certification Scheme and relevant training to improve national consistency of food safety auditors. DAFF is involved in the development of policies and programs for food safety. Table 3.1 outlines the major players in food integrity in Australia.

Biosecurity

There is a framework of national arrangements and institutions to address the preparedness and response to biosecurity issues facing Australia. These are set out in Figure 3.2. A Joint Steering Committee formed by the Primary Industries Ministerial Council and the Natural Resource Management Ministerial Council provides the overall policy coordination between the Australian Government and the state and territory governments. Recently AusBIOSEC has been formed to provide coordination of the national arrangements. The main policy making agencies are DAFF and the relevant departments in the states and territories. The main implementing agencies are:
• Australian Quarantine and Inspection Service (AQIS), which provides border control and import quarantine and ballast water programs.
• Biosecurity Australia (BA), which undertakes import risk analyses (IRAs).
• Animal Health Australia (AHA), a not-for-profit industry and government-owned company which supports biosecurity planning for industry members and AUSVETPLAN and administers the Emergency Animal Disease Response Agreement. Cost sharing arrangements between the two levels of government and industry are in place for emergency response to incursions assessed as nationally significant.
• Plant Health Australia (PHA) which is similar to AHA, but for plant pests and diseases and delivers PLANTPLAN.
• Industry signatories to the Emergency Animal Disease Response Agreement and Emergency Plant Pest Response Deed who have obligations to develop biosecurity strategies, and implement these strategies including risk mitigation actions.
• State and territory departments of agriculture, which are responsible for state level emergency response and on-going management of emergency pests and diseases. The relevant state agencies also implement AQUAVET PLAN and the Emergency Marine Pests plan (EMP PLAN). There is an intergovernmental funding agreement on weed management in place.

**Research and development providers and research programs**

**Food integrity R&D**

There are a range of providers of R&D for industry and the food integrity regulatory and implementing agencies. The two dominant providers are Food Science Australia (FSA) and the Australian Food Safety Centre of Excellence (AFSCE). FSA is a joint venture between CSIRO and the Australian Food Industry Science Centre (which is funded by the Victorian Government). AFSCE was established by the NFIS, with FSA as a founding member, and is located at the University of Tasmania in the Tasmanian Institute for Agricultural Research. AFSCE research programs include studies in predictive modeling, microbial physiology, molecular biology, and industrial microbiology, (including evaluation of new preservation technologies) that must be combined to provide effective food safety management options.

FSA undertakes R&D to establish the efficacy of new processes that deliver safe, fresher, more convenient foods for consumers, and to understand how pathogenic micro-organisms and chemical contaminants interact with food and their environments and develop techniques to effectively control or eliminate food safety hazards. FSA also has strategic partnerships with firms to develop relevant, novel products and processes. There is also considerable R&D capacity in private companies at the product development and processing points in the food chain.
Biosecurity R&D

Biosecurity R&D is provided mainly by the state departments of agriculture and two Cooperative Research Centres (CRCs) that were established specifically to provide R&D into biosecurity issues. State departments’ R&D is largely focused on emergency response, and there appears to be limited scope for these agencies to fund basic research to support improved surveillance and early warning of disease incursion.

The CRC for National Plant Biosecurity ($65 million over 7 years from 2005) research strategy is to:

- Conduct research to fill gaps in the knowledge of the biology and epidemiology of priority exotic plant pathogens and pests
- Develop and maintain a diagnostic capability to detect and identify exotic pathogens and pests
- Develop underlying tools to enhance surveillance and incursion response capabilities
- Equip plant breeders with information and tools to facilitate pre-emptive breeding against exotic pests and diseases (such as DNA resistance markers and resistant germ plasm)
- Stimulate adoption of biosecurity technology through commercialisation and information dissemination.

The Australian Biosecurity CRC for Emerging and Infectious Disease, ($68 million over 7 years) commenced in 2003. Its main research areas are:

- developing technologies to enhance detection: To develop new and improved detection methods for significant emerging infectious disease threats.
- investigating the ecology of emerging infectious diseases: To elaborate the disease ecology of prioritised emerging infectious disease threats.
- advanced surveillance systems: To develop new disease surveillance support tools and systems to provide an improved scientific basis for decision–making by disease control authorities.
Figure 3.1 The broad institutional structures for food integrity
Figure 3.2  A framework of national arrangements and institutions to address the preparedness and response to biosecurity issues facing Australia
4. Key challenges for the program (SWOT)

The Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was undertaken at the planning workshop on 21 April 2006. It drew on a background paper prepared for the R&D Advisory Committee. The focus of the analysis is slightly different to the usual industry R&D planning SWOT as there is considerable R&D activity in biosecurity and food integrity already occurring outside of the program. Chapter 2 summarised the activity and the agencies involved. The RIRDC program targets the gaps in these current arrangements. Thus the analysis below is a gap analysis as much as a SWOT.

Table 4.1 sets out the gap analysis. It is divided into areas of R&D already being covered by other rural research and development corporations (RRDCs), industries, state governments, and other research organisations. In many cases the work is being done for (and funded by) the large industries, but there is a gap for the small industries that fall under RIRDC’s portfolios. There is also a potential gap when an issue affects a number of industries, when the collective nature of the problem can result in under-investment in developing a solution. This gap may be more relevant to R&D in biosecurity than in food integrity.

Food safety R&D tends to be fairly product-specific in nature, apart from the collective problem of identification of pathogens that may be present in a range of food products. Much of the focus of food safety R&D in large industries is on reducing the cost of meeting regulatory requirements. There is also a strong overlap between the R&D that addresses issues of food integrity and that aimed at improving quality assurance systems. Quality assurance systems tend to be industry-specific in nature, however where common platforms are cost-effective, a collective approach is preferable.

Establishing priority areas for the R&D plan

The scope of the RIRDC program needs to be guided by both the dollars available for investment as well as by the R&D being undertaken by other agencies. In selecting the areas for the program to address the following filters were used:

- What are the areas of food integrity and biosecurity (FIB) planning, preparedness and management that are not covered by the major agricultural industry organisations or by private firms, including climate change, and organic production systems?
- Which of these gaps or issues require R&D as part of the solution?
- What are the pathways by which the R&D outputs will contribute to the solution?
- What is already being addressed well in other industries and is transferable or is being addressed overseas?
- Do Australian researchers have the capacity to address these issues?
- What level of investment is required for the science to be successful? For adoption?
- Is there potential for generic solutions that are applicable to the set of industries of interest?
- Is there a significant benefit to public health or consumers in general?
- Is there a benefit to producers not directly involved in adopting the R&D outputs; for example, through avoiding loss of market access if Australian products are banned, or through a reduction in contamination risk, or the need for preventative actions?
The priorities that emerged are set out in Table 4.2. The analysis separated out all industries, RIRDC small industries as a collective and specific industries. It also divided these into on-farm and off-farm needs.

**Capacity to deliver on these priorities**

The analysis of R&D providers found that there is ample capacity in Australia for research, so this is not a limiting factor for the program. However, funding and the potential to develop partners is a major limitation. While to date the program has attracted good co-investment from collaborators at a project level, these projects reflect the priorities of the contributing agency. Funding available for direct allocation to priorities set out in this five-year plan is limited to the RIRDC investment as the Advisory Committee member’s organisations are not financial contributors to the program. For AHA and PHA at least, these organisations may not have resources that can be committed for R&D as this falls outside of their mandate.

**Options for increasing funding**

The priorities that emerged from the analysis suggest the need for an increase in funding. There is an opportunity for funding to be accessed through Natural Heritage Trust-3 funding, and conversations about this possibility have begun with the Australian Government Joint NRM team. A second option is for RIRDC to make a case to the Australian Government for increased funding for the program on the basis of the R&D plan set out in this document. Under this option it may be advisable to expand the Advisory Committee to include AusBIOSEC (Australian Biosecurity System for Primary Production and the Environment). The AusBIOSEC brings together biosecurity strategies and programs being undertaken by the Australian Government, states and territories, as well as industry, landholders and other key stakeholders. It establishes a policy framework for greater national collaboration on biosecurity issues both within and across jurisdictions and with key stakeholders in the primary production and environment sectors. It would be useful to include this knowledge on the committee.

The importance of the risk to both biosecurity and to food integrity posed by peri-urban production and alternative distribution networks points to the need for a cooperative or joint venture approach to fund and disseminate R&D in this area. This area is of interest to a range of industries and to state governments responsible for managing these risks. The involvement of these organisations and agencies in the R&D is essential for the development of programs to implement the R&D outcomes. The third option for increasing funding is to seek coalitions for pursuit of specific projects or sets of projects. The RIRDC industries are ideal partners in the areas where the objectives are targeting developing generic approaches for small industries. However, this will require convincing these programs that the returns to their industries from these projects exceed those from other areas of investment (as set out in their five-year R&D plans). Ensuring that biosecurity and food integrity issues are considered at the time of development of program five-year plans within RIRDC is a slow but potentially more effective way of establishing such cooperative approaches than seeking coalitions after the programs have been committed.
Table 4.1 Gap analysis of FIB and related R&D

<table>
<thead>
<tr>
<th>Issues</th>
<th>R&amp;D being undertaken</th>
<th>Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioterrorism, security and access control through the food chain—US</td>
<td>Traceback systems developed for beef and dairy, underway in some other areas (DA, MLA)</td>
<td>Track and trace not being developed for or adopted by small industries</td>
</tr>
<tr>
<td>Bioterrorism Act requirements and voluntary commercial security</td>
<td>Development of tamper evident packaging (Industry-CSIRO)</td>
<td></td>
</tr>
<tr>
<td>auditing arrangements</td>
<td>Critical infrastructure for physical security—driven by trade demands including US CT-PAT</td>
<td></td>
</tr>
<tr>
<td>Traceback systems developed for beef and dairy, underway in some other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>areas (DA, MLA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New organisms—Evolution, spread and entry of new pathogens, invasive</td>
<td>Surveillance and detection systems for some industries (CSIRO-AIFST)</td>
<td>Appropriate practices for surveillance—Question of how much is enough</td>
</tr>
<tr>
<td>species</td>
<td>Work on human health vectors and zoonoses (Medical research, tropical disease)</td>
<td></td>
</tr>
<tr>
<td>Diagnostic tests, surveillance methods, containment, management</td>
<td>CRCs extensively involved in these areas—Industry and partner (AHA/PHA) driven</td>
<td>Small industry needs may not be covered</td>
</tr>
<tr>
<td>strategies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Import risk analysis failure to take account of all risks</td>
<td>Methodologies for IRA being developed (UMelb Centre for Risk Assessment, CRCs)</td>
<td>Case by case gaps revealed</td>
</tr>
<tr>
<td>Market access requirements are increasing—Potential to be used for</td>
<td>Industry responding to demands, beef processing (MLA-CSIRO, state departments)</td>
<td>What intensity of measurement is needed to prove that something does not exist?</td>
</tr>
<tr>
<td>restraint of trade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simply prepared foods and preference for fresh food pose new human</td>
<td>Tamper evident packaging, packaging that reads the quality parameters to indicate</td>
<td>Adequacy of treatments for small industry products</td>
</tr>
<tr>
<td>health risks</td>
<td>freshness (Industry-CSIRO)</td>
<td></td>
</tr>
<tr>
<td>Farmers markets and other alternative distribution networks fall</td>
<td>State jurisdiction—Undertake the R&amp;D to support their implementation</td>
<td></td>
</tr>
<tr>
<td>outside of food safety monitoring and pose a risk for spread of disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labelling requirements, process as well as content labelling may be</td>
<td>Food safety regulations cover prepared food area to some degree (state agencies)</td>
<td>Industries have little capacity to engage with this sector</td>
</tr>
<tr>
<td>needed for human health, but impose costs</td>
<td></td>
<td>Limited effectiveness of voluntary approaches Pathways to adoption may be different</td>
</tr>
<tr>
<td>QA, certification and audit for food safety</td>
<td>Undertaken by industries (MLA, DA, PAL, HAL)</td>
<td>Food safety in organics Level of risk acceptable Social impact of risk mitigation</td>
</tr>
<tr>
<td>Impact of primary production practices—pre-farm gate, extension of the</td>
<td>FSANZ is going to work with horticulture on food safety (HAL)</td>
<td>Common approaches that can work for a range of industries</td>
</tr>
<tr>
<td>NFS code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peri-urban agriculture</td>
<td>State agencies</td>
<td>Adequacy of research for small industries</td>
</tr>
<tr>
<td>Surveillance issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues</td>
<td>R&amp;D being undertaken</td>
<td>Gaps</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Communication issues</td>
<td>Undertaken by RIRDC, state agencies and Catchment management authorities</td>
<td>How to communicate effectively with peri-urban producers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Importation of genetic material without appropriate quarantine assessment</td>
</tr>
<tr>
<td>Climate Change</td>
<td>Currently addressed through the cross RDC program “Climate Variability in Agriculture Program (CVAP)” Land and Water Australia.</td>
<td>Adequacy of research for small industries</td>
</tr>
<tr>
<td>Organic Agriculture</td>
<td>Addressed through the RIRDC Organic Industry Program</td>
<td>Adequacy of research and communication for organic industries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risks that organic agriculture practices pose to conventional agriculture</td>
</tr>
</tbody>
</table>

Source: Background paper, workshop 21 April 2006
<table>
<thead>
<tr>
<th></th>
<th>On-farm</th>
<th>Off-farm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All industries</strong></td>
<td>What does effective and adequate surveillance look like?</td>
<td>Generic technology for testing and detection</td>
</tr>
<tr>
<td></td>
<td>What are the risk factors for food integrity and biosecurity and how can they be managed?</td>
<td>What is the level of risk posed by farmers markets and alternative distribution networks?</td>
</tr>
<tr>
<td></td>
<td>IRA methodology enhancement</td>
<td>Can communication of the risk encourage voluntary action?</td>
</tr>
<tr>
<td><strong>RIRDC industries as a collective</strong></td>
<td>IRA methodology enhancement—access to materials</td>
<td>Technology options for track and trace —integration for an Australian solution</td>
</tr>
<tr>
<td></td>
<td>Codes of practice for on-farm food safety and on-farm biosecurity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integration of on-farm food safety and biosecurity into standard farm management and QA systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication of risk for voluntary action</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reliable and accessible Information to aid early detection and reporting of food safety and biosecurity threats</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluation of awareness levels and behavioural change</td>
<td></td>
</tr>
<tr>
<td><strong>Specific industries</strong></td>
<td>Risk management options for pests and diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organics—food safety</td>
<td></td>
</tr>
</tbody>
</table>
5. Review of the existing R&D program

Background to the RIRDC FIB Program

The Food Integrity and Biosecurity Program was established in 2004 in response to a need for smaller industries to access R&D to support their food integrity and biosecurity efforts. It grew out of a commitment made by RIRDC to support the CRC for Plant Biosecurity. The program is managed by RIRDC in consultation with an Advisory Committee comprising members from the Department of Agriculture, Fisheries and Forestry (DAFF), the Department of the Prime Minister and Cabinet (PM&C), National Farmers’ Federation (NFF), Australian Food and Grocery Council, Plant Health Australia (PHA) and Animal Health Australia (AHA).

Its stated objectives are to:
- Assist Australia’s rural industries by supporting research that integrates human and environmental health objectives
- Undertake research that enhances the capacity of participants in the supply chain to ensure food integrity
- Contribute to Australia’s biosecurity by investigating potential risks and how they can be addressed and communicated.

Program funding commitments

Over the period of 2006–09, the FIB Committee has undertaken to fund the following collaborative projects:
- Biosecurity Risk Management in the Food Chain, a two-year project with a first-year contribution of $54,219 from RIRDC and $13,614 from the Victorian Department of Primary Industries.
- Infrared and Raman micro-spectroscopic analysis of food contamination and integrity, a three-year project funded through the CRC for Plant Biosecurity. In Year 1 (2006–07) RIRDC will invest $54,772; the National Science and Technology Unit (NSST) $132,832; and Monash University $78,024. In Year 2 (2007–08) RIRDC will invest $42,617; NSST $122,292; and Monash $79,675. Year 3 has yet to be confirmed but indicative amounts are RIRDC $50,000; and Monash $81,360.

To date the program has made commitments for funding of the CRC for Plant Biosecurity for $100,000 a year for the next three years. This has funded two projects:
- “Enhanced biosecurity planning tools” with the CRC for Plant Biosecurity which has leveraged additional funding (to the CRC) of cash co-investment of $210,000 per annum, two research staff and a Post-Doctoral fellowship for the period 2006-2009.
- A rice blast project: RIRDC $50,000, Research Organisation $20,800 and CRC National Plant Biosecurity $3,794 (Total $74,594), in 2006–07. Other projects are anticipated.

Vision
Effective biosecurity and food integrity practices adopted by all Australian agricultural industries.

In RIRDC’s Food Integrity and Biosecurity Program, biosecurity addresses the risks and costs associated with the impact of invasive species on animal, plant and human health throughout the food supply chain. Food integrity addresses the risks and costs associated with the human health impact of hazard control failure at any point in the food supply chain.

Mission
To provide R&D to support the development and application of a framework that enables all Australian agricultural industries to achieve appropriate levels of biosecurity protection and preparedness.

Objectives
To fund high quality R&D that will achieve the following:

• Enable Australian agricultural industries to undertake the optimal level of investment in surveillance for biosecurity and food integrity on and off farm1 (35% of budget).
• Address the risks posed to agricultural industries and human health from peri-urban production, regional production and alternative distribution networks (8% of budget).
• Promote better management of biosecurity and food integrity risks for RIRDC industries by providing them with management tools (27% of budget).
• Improve the capacity of RIRDC industries to meet export and domestic market demands relating to product and process integrity now and in the future by improving their ability to track and trace their products (20% of budget).
• Extension and communication (10% of budget).

Strategies
Strategies indicate specific research areas that will contribute to achieving the five objectives. Strategies have been defined in sufficient detail to indicate to research providers where RIRDC will invest over the period 2006–2011. The strategies will enable research organizations to align their research investments with RIRDC’s priorities. These strategies will be complemented with more specific research priorities that will be published annually, to give more detailed information about the research priorities for RIRDC funding in the following year.

Key Performance Indicators
Key performance indicators (KPIs) have been provided to assess whether the research investment has contributed to the R&D objectives.

---

1 The optimal level of investment is that commensurate to the level of risk, the costs events would impose and the cost-effectiveness of surveillance in reducing risk and/or costs of events.
Objectives

Objective 1: Optimize investment in surveillance for FIB

The objective will enable Australian agricultural industries to undertake an optimal level of investment in surveillance for biosecurity and food integrity on and off farm (35% of budget).

Background

Markets are increasingly demanding ‘evidence of absence’ as well as process certification as market access requirements. These demands vary with the nature of the product, the potential risk to human health and the demands for technical barriers to trade from domestic producers (in international and interstate markets). The costs of meeting these demands can be considerable, and the level of surveillance and other actions required to meet market requirements can be difficult to determine. There may also be a need for collective action as market access can be impacted by the failure of one producer. Specific market requirements are many, varied and changing and many small industries and producers lack information to make informed decisions about their own actions or the need for collective action. There is also a need for low cost diagnostic tools to develop and implement collective surveillance systems.

Strategies

- Develop advisory material to assist industries in determining what constitutes sufficient and appropriate evidence to meet market requirements for proof of adequate biosecurity and/or food integrity.
- Develop cost-effective diagnostic tools for on and off-farm pests, diseases and contaminants. The focus is on generic technologies for low cost testing and detection for use in surveillance programs.
- Develop technologies and arrangements for capturing and reporting surveillance information.

Key performance indicators and targets

The delivery of the strategies will depend on the funding available. An important early indicator of program performance will be its capacity to attract co-contributions from RIRDC industries to address specific strategies. The key performance indicators and targets set out below reflect this approach to program funding.

- KPI: Publication of advisory material that allows industry organisations and producers to assess and develop their investment in meeting food integrity and biosecurity market access requirements.
  - Target: Use of advisory material by two RIRDC industries in their assessment of market requirements for biosecurity and food integrity.
- KPI: Availability of new diagnostic tools and evidence of adoption by RIRDC industries.
  - Target: Use of new diagnostics tools by three RIRDC industries.
Objective 2: Address the risks posed by peri-urban producers, regional production and alternative distribution networks

The objective is to reduce the risk posed to industry and human health from peri-urban and regional production and alternative distribution networks (8% of budget).

Background

Biosecurity risks for industries in Australia are rising with the increasing travel and trade in goods and services. The growth of peri-urban production, small mainly part-time producers located on the outskirts of urban areas, potentially raises exposure to risk of entry or outbreak of exotic pests and diseases. This is due to the higher density of production, the smaller scale and limited ability to control access and the greater intensity of the production system. It can also be exacerbated by the lack of knowledge of new entrants (hobby farmers) and lack of resources for managing risk for existing producers who may also be taking off-farm work to remain financially viable. Effective communication with these target audiences is crucial to minimisation of the risk of disease incursion in these industries. Outbreaks of pests and diseases in peri-urban production may not be readily identified, are more difficult to isolate and control and pose risks to other members of the industry as well as the public. Alternative distribution networks, which may fall outside of the ambit of food safety and plant health regulators, are a possible channel for distribution of pests and diseases as well as posing food safety risks. It is difficult for industries to address these risks as most peri-urban producers are not members of industry associations. The reach of state government regulators into these areas is also limited by the high cost of engagement and the currently low (but growing) perception of the risk posed.

Strategies

- Assess the risk posed to industry and human health by peri-urban producers, regional production and alternative distribution systems (such as farmer’s markets).
- Identify the on-farm risk factors for this set of producers and develop effective risk management systems for the scale and systems of production.

Develop and test materials and methods to communicate the risks and management options to peri-urban producers, regional producers and agents along the supply chain in collaboration with other agencies and industries undertaking related communications.

Key performance indicators and targets

The strategies set out above can only be achieved by collective action of affected industries and state agencies. The program must work with state and other agencies in the development of their programs to promote adoption of good management options for peri-urban producers and alternative distribution networks to achieve the second and third strategies.

- KPI: Establishment of collaborative arrangement with state agencies
- Target: Decision on participation in FIB joint venture by state agencies.
- KPI: Publication of a study on the risks posed by peri-urban production and the major risk factors
  - Target: High rates of awareness of the publication and agreement with the findings in state agencies involved in biosecurity and food integrity and in the relevant areas in the industry organisations for industries identified as affected by peri-urban production risks. Co-investment in R&D for the second and third strategies of Objective 2 (above).
• KPI: Publication of guidelines for management of biosecurity risks and food integrity risks for peri-urban and regional producers
  – Target: Guidelines widely available and promoted by organisations with reach into these communities.
  – Target: Development of strategies to address the risks posed by peri-urban and regional producers by industry and state agencies. Evidence of use of the R&D findings in the development of these strategies.
Objective 3: Develop biosecurity and food integrity management tools for RIRDC industries

The objective is to promote better management of biosecurity and food integrity risks for RIRDC ‘small’ industries by providing them with management tools (27% of budget).

Background

Industries that are signatories to the AHA and PHA Deeds of Arrangement have or are developing biosecurity plans for managing biosecurity risks to their industries. Many also have food integrity programs, although this is more generally managed at a producer level. Very few of the RIRDC industries are signatories, and many are too small to have the resources to develop biosecurity plans or to implement management actions. Yet these industries are at no less and possibly greater risk from biosecurity threats and food integrity is important for those producing products that enter the human food chain.

Strategies

- Develop a framework for or a generic approach to codes of practice for on-farm biosecurity and food integrity that promotes step-wise improvement.
- Develop treatments and/or protocols for facilitating movement of plant and animal materials across boundaries (international, state and regional) that take trade barriers into account.
- Identify the generic biosecurity and food integrity risks, including organic production systems, climate change and climate variability for small industries (in RIRDC’s portfolio) and develop a package for industries to do their own risk assessment (including getting a baseline of the current tools available).

Key performance indicators and targets

The strategies will target the RIRDC industries. The success of the strategies depends not only on attracting co-funding from these industries, but the active promotion by these industries of the findings and coordination of activities to implement the management options developed. An overall target for the program is to partner with at least one RIRDC industry each year to undertake a project to deliver one or more of the strategies. Thus at the end of five years, at least five RIRDC industries will have been involved as core partners or as pilots in delivering on this objective.

- **KPI: Publication of guidelines for the development of codes of practice for on-farm biosecurity and food integrity**
  - Target: High rates of awareness of the publication across the RIRDC industries, including organic production systems.
  - Target: Approval of treatments/protocols by one state agency.
  - Target: Three industries applying for approval by state agencies for their protocols.
- **KPI: Publication of a risk assessment package**
  - Target: High rates of awareness of the package among RIRDC industries, including organic production systems.
  - Target: Use of the package to undertake a risk assessment by three RIRDC industries.
Objective 4: Assist RIRDC industries meet national and international market demands

The objective is to improve the capacity of RIRDC industries to meet export and domestic market demands relating to product and process integrity now and in the future by improving their ability to track and trace their products (20% of budget).

Background

Track and trace is the capacity to trace back products from the retail point to the primary producer and even to the source animal or paddock. Some markets are requiring producers to be able to provide this facility. This is most relevant for meat products, but is starting to be required for some fresh fruit and vegetable products. The ability to track and trace is a strong selling point for a producer where this is valued by the consumer. Thus individual producers as well as industries have an interest in the technology to provide this facility in a cost-effective way. The large economies of scale in implementing such technology also mean that industry organisations may be well placed to facilitate implementation.

Strategies

- Scope the likely future market demands for track and trace and communicate to small industries on their need to address these issues in their industry. Develop/identify and adapt technologies to support track and trace systems that will be effective in small industries.
- Design and test systems for track and trace that will work for small industries.

Economies of scale in the implementation of technology and overlap in processing, wholesale and retail markets will be the important for forming a coalition of industries with a common interest to invest in the strategies. The first strategy is designed to identify areas of common interest. If there is found to be a strong interest and need RIRDC explore a coalition of interested RIRDC (and possibly HAL) industries to co-fund the R&D to deliver the second and third strategies. The early performance of the program on this objective can be assessed in terms of the coalition being formed. The second and third strategies should only be pursued on the findings of a common need in the first strategy.

Key performance indicators and targets

- KPI: Explore the possibility of a joint venture between RIRDC small industries and HAL industries for development and implementation of track and trace technologies for industries. Publication of a study on the demands for track and trace technology identifying potential common interests.
  - Target: High awareness of the publication in RIRDC industries.
  - Target: Decision on development of FIB joint venture by potential collaborators.
- KPI: Technologies that support track and trace available to small industries
  - Target: adoption of track and trace technologies by two industries.
- KPI: Publication of guidelines for small industries in designing and implementing a track and trace system with costings
  - Target: Implementation of pilot track and trace systems by two RIRDC industries.
Objective 5: Extension and communication
The objective is to communicate and assist in the adoption by industry of research funded by the FIB program (10% of budget).

Background
Adoption of research is crucial in implementation the Plan. Rate of adoption of research depends on both the relative advantage that use of the innovation gives, and the trial ability of the innovation. Rate of adoption of new technologies can be enhanced by using appropriate interventions.

Strategies
A variety of strategies will be used to ensure adoption of research outputs from the FIB program. Links with existing agencies that promote adoption (eg state agencies and industry bodies) will be maintained, and new ones forged as required with specific industries or sectors (eg organic industry sectors). As a cross-sectoral program, the FIB program is working with audiences that have quite different needs for information. Prior to any project being funded, the committee will discuss the target audience for the research (Table 6.1). When this has been defined, appropriate awareness raising strategies will be implemented so that when the research is completed, the audience is receptive to adopting the research recommendations. When possible, evaluation strategies will be put in place to measure adoption of the research

When the research has a direct application to a RIRDC industry, the industry will be consulted before the project is funded to begin the dialogue about the best process for adoption of end results. Industry will receive regular updates about research in progress, and when the research is completed, the report delivered to industry in a format suitable for promoting adoption. Where possible, an action learning cycle will be used to explore both the relative advantage of the product, and its trial-ability, to ensure that the research is appropriate for industry needs. The adoption component of the research will be budgeted for when the project is initially funded. This component will be revisited when the research is completed.
Table 6.1: Possible strategies for adoption of research funded by the FIB program

<table>
<thead>
<tr>
<th>Audience</th>
<th>Information Needs</th>
<th>Possible Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government agencies</td>
<td>Context of threat to Australia pre and post border security Tools for dealing with the threat</td>
<td>• Report • Contact with researchers</td>
</tr>
<tr>
<td>Industry organisations</td>
<td>Related to maintaining industry productivity, profitability, sustainability</td>
<td>• Report • Contact with researchers • Learning tools</td>
</tr>
<tr>
<td>Growers</td>
<td>How threat / solution will impact on or benefit business What is in it for me? How to incorporate research into business</td>
<td>• Report • Use action learning cycle • Farmer talking to farmer • Direct contact with researcher • Work through agribusiness, state agencies, and industry associations. • Develop code of practice • Integrate into QA systems • Incorporate information into grower training packages • Support farm advisory services with information • Target hobby farmer/small landholder associations • Profile FIB at unregulated farmers/produce markets</td>
</tr>
</tbody>
</table>

Key performance indicators and targets
- KPI: Adoption strategy scoped for each project before the project is funded
  - Target: Adoption strategy captured in project proposal and monitored during and after project completion.
- KPI: Ex-ante and post hoc evaluation of selected projects with two RIRDC industries.
  - Target: Adoption of new technology by industry quantified.
  - Target: Qualitative analysis of the impact of the use of the new technology by industry.
  - Target: Benefit-cost analysis of two projects.
7. Proposed budget

An indicative research budget for the life of the program is given in Table 7.1.

Table 7.1 Food Integrity and Biosecurity five-year R&D plan (Indicative Budget)

<table>
<thead>
<tr>
<th>Food Integrity &amp; Biosecurity</th>
<th>Budget ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUDGET</td>
<td>for the period ended 30 June</td>
</tr>
<tr>
<td>Revenues from ordinary activities</td>
<td></td>
</tr>
<tr>
<td>External contributions¹</td>
<td>145,000</td>
</tr>
<tr>
<td>RIRDC Core contributions</td>
<td>271,000</td>
</tr>
<tr>
<td>Total revenues from ordinary activities</td>
<td>416,000</td>
</tr>
<tr>
<td>Expenses from ordinary activities</td>
<td></td>
</tr>
<tr>
<td>Existing commitments</td>
<td>419,604</td>
</tr>
</tbody>
</table>

Notes

1. External Contributions

| Total External Contributions | 145,000 | 122,292 | - | - | - |
Appendices

Appendix 1: Alignment with Government and RIRDC priorities

The Plan aligns well with the Australian Government’s National Research Priorities and Rural Research Priorities and with RIRDC’s corporate objectives. RIRDC has an overarching outcome of a more profitable, dynamic and sustainable rural sector. The FIB Program is in the National Rural Issues Portfolio, which has the goal of:

Providing the knowledge to address national rural issues

National Rural Issues Portfolio Strategy
Invest in R&D in the national interest to support:
- rural policy priorities of government
- priorities of rural industries and communities
- topics that are cross-sectoral, or multi-industry

The FIB program is clearly addressing the national R&D priority of safeguarding Australia and its multiple industries. It will contribute to profitable, competitive and resilient rural industries through reducing the risk and cost of biosecurity and food integrity events for a wide range of industries. The focus is on small industries and producers on the margin of industries, but in managing these risks better the program will deliver benefits to all Australian agricultural industries and to the Australian consumer.

Rural Research Priorities
The FIB program addresses a number of the rural R&D priorities. Those most relevant are as follows:
- Improving competitiveness through a whole-of-industry approach that emphasises efficient and effective supply chain management—the FIB program works across the whole of the food supply chain in seeking to address food integrity and biosecurity risks.
- Maintaining confidence in the integrity of Australia's food, fish and forestry products—by reducing risks and providing evidence of process and outcomes the program will contribute to maintaining confidence.
- Probability of a biosecurity or food integrity event—this reduces the risk of loss of market access. The need for industries to be able to undertake track and trace for maintaining market access is also increasing, making this focus relevant to this priority.
- Making use of ‘frontier’ technologies—in undertaking the R&D there is an emphasis on innovative approaches to minimise the cost of achieving high quality outcomes for industry and the public.
- Protecting Australia from invasive diseases and pests—this is addressed directly by the program.
- Creating a culture of innovation, largely by investing in the sector's most important asset—its people. The program will support, through the funding of projects, the CRC for Plant Biosecurity (established in 2005) and is also developing relationships with the University of Melbourne’s new Centre for Risk Management. These new organisations aim to be at the forefront of innovation in their respective areas, and have a strong component of capacity building.