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DEVELOPMENT CORPORATION

R&D Plan for the Australian Fodder Industry

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Foreword

The world economy is experiencing an unprecedented level of globalisation which is increasing competition on both domestic and export markets. For the agricultural sector these changes have meant increased demand for developments in the paddock to consumer chain. Especially evident is an increased requirement for high quality and safe intermediate and final products. To be able to achieve this agricultural producers are being required to increase their level of specialisation and scale of production. The livestock sector is a good example, with expansion of the dairy and feedlot sectors requiring larger production units to ensure increased efficiency levels and competitiveness. As these trends continue specialisation of production at both the input and output levels is becoming evident.

The fodder industry, we believe, is playing an important role in these trends. As intensive livestock production expands the demand for high quality and reliable feed supplies will increase if final product quality and safety requirements are to be guaranteed. This requires specialist producers who can support quality assured feed products. Fodder is becoming an important component of this process for increasing exports but especially the domestic market. These developments will enhance the traditional importance of fodder in times of drought.

Despite these trends the industry has not had a high R&D profile and consequently has not achieved its production potential or maximised its market scope. This plan we believe is an important step in supporting the further development of this expanding industry.

The plan has been developed in consultation with industry and most particularly the Australian Fodder Industry Association (AFIA). The plan details the agreed strategic R&D needs of the industry, which will be pursued by RIRDC in concert with industry as sufficient funds become available.

Much work has gone into the preparation of the plan, this has included a range of industry oriented meetings, discussions with research groups and presentations at AFIA conferences. We would like to thank all for the contributions they have made.

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August 2004

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1 The Purpose of the Plan

Research and development will enable the fodder industry to achieve and maintain competitive advantage by solving problems that represent either inherent weaknesses or arise as the result of changing market requirements. History has shown that industries that continue to invest in R&D are more proactive in rapidly changing market conditions and are able to differentiate their products so that they are less susceptible to the volatility of commodity markets.

Research and development is, by its very nature, a step into the unknown and a risky business. The world is also full of market opportunities. The real test is to be able to prioritise those opportunities to achieve a pre-determined level of investment return that will cover the costs of successful project and program outcomes as well as those projects that do not deliver to expectations.

Successful industries and companies plan for their success by having strategic plans and business plans that convert strategies to real life outcomes with improved competitive advantage. In the same way research and development is not a hit and miss affair but rather a planned approach to address industry and company priorities identified in an examination of weaknesses, opportunities and threats in other planning activity.

R&D should either build on existing successful R&D outcomes or address new strategic priorities to enable scarce financial resources to be invested in a prioritised way that increases the chances of further success.

The Fodder industry through the Australian Fodder Industry Association (AFIA) has been working for five years to develop a case to Government for a compulsory R&D Levy like most other significant agricultural industries. While several submissions have been made to Government a compulsory levy has still not been approved. AFIA is still working to this end and will continue this process in the coming years. In the mean time the industry has introduced a voluntary levy arrangement to highlight its commitment to R&D. Initially this was agreed to for export cereal hay as the collection points were relatively straightforward. Subsequent to this, domestic traded hay has been included. Voluntary levies are difficult as the usual 'free-rider' issue always arises.

This plan is the document that enables a transparent examination of priorities, the programs and projects that will be developed to address those industry priorities and the mechanism to evaluate progress against pre-determined quantitative objectives over the five year R&D planning period.

The following research and development strategy for the RIRDC Australian fodder program builds on the outcomes of a series of industry and research group meetings and consideration by the Australian Fodder Industry Association (AFIA).

While this plan relates to research and development, inherent in the strategy is the industry recognition that there is a great need to address the substantial education and extension needs of the industry.

2 Industry Vision, Objectives and Mission Statement

The Australian fodder industry in the next 5-10 years will be characterised by:-

The **VISION** for the fodder industry will be:-

"A sustainable and profitable Australian fodder industry producing quality product".

The MISSION STATEMENT supporting the fodder industry based R&D effort will be:-

"To stimulate and promote those R&D efforts that will produce quality products and secure sustainability and profitability for all sectors of the Australian fodder industry value chain in domestic and export markets".

3 Background to the Industry

Fodder is defined as the wide range of crop and pasture species that are grown, harvested and lightly processed to facilitate both on-farm use and domestic and export trade. The fodder industry is large with an estimated 20,000 producers on 46,000 properties across all States producing between 5.5 and 6.5 million tonnes of hay and around 3 million tonnes of silage per year. This production is traded as a wide range of fodder including lucerne, clover, pasture, cereal and others. The gross value of production at the farm gate is estimated to be about $1.1 billion a year, which represents a 50% increase over the past 10 years. About 30-35% of fodder production is traded off-farm and this share has increased substantially during the last few years.

Fodder production is concentrated in Victoria and New South Wales. Although Western Australia and South Australia are the major exporting states. The largest domestic market users are the dairy industry (40%), horse industry (25%) and feedlot industry (20%) and others (15%). In recent times there has been a growing trend for the dairy industry to rely more on off-farm purchases with recent estimates suggesting that more than 55% of fodder is purchased off-farm.

The animal feeds industry in East Asia is estimated to be valued at US$10 billion, and it is perceived that a large untapped demand will enable the industry to develop many new opportunities. The fodder industry has been taking advantage of this market with exports increasing significantly in recent years to over 500,000 tonnes. The largest market is currently cereal hay into Japan but other markets such as Korea, and Tiawan and the Middle East are growing.

Several years ago the Australian Fodder Industry Association (AFIA) developed a case for the introduction of a statutory R&D levy to support a longer-term basis for an R&D program for fodder. This case was submitted to the Government but was not supported at that time. More recent approaches to Government have also not met with further developments. AFIA will continue to investigate options and discuss these with Government. In 2000/2001 the cereal hay exporters introduced a voluntary R&D levy on export cereal hay to demonstrate that the industry is strongly committed to an R&D program. In the first full year of collection of the levy (2001/2002) $173,000 was contributed. In 2002/2003 additional producers have agreed to contribute this voluntary levy and at the AFIA Annual conference domestic hay producers also agreed to progress a similar voluntary levy contribution despite the difficulty they face of many collection points and groups.

4 Key Challenges for the Industry

A fodder industry SWOT analysis has been developed during the range of meetings and workshops. It recognises that the industry has various strengths, weaknesses, opportunities and faces a number of threats as follows:-

STRENGTHS	WEAKNESSES
• Australia is a producer of excellent quality fodder. • There is a large volume of potentially saleable product available and the capacity to produce greater quantities. • Fodder is competitively priced when compared to other feeds such as grain in terms of unit cost of energy and protein. • More specialist producers are emerging. • It is a progressive industry in several areas of its operations.	• The industry is fragmented. • There are a lot of unprofessional operators. • Transportation systems. • Unreliable seasons. • More regional supply deficiencies occurring needing long freight hauls. • No consistency of quality or quality assessment system.
OPPORTUNITIES	**THREATS**
• Production of a higher quality product. • Increasing domestic demand. • Export potential especially Asia and the Middle East. • Information transfer of the value of quality specification to the whole industry. • Improved trading language/market specifications.	• Weed contamination and weed spread. • Under-pricing creating market instability. • Chemical residues. • Product variability. • Pathogens and toxins. • Terms of trade reduced with unfavourable transport regulations.

5 Fodder Industry R&D Priorities

The original five year plan workshops (1998-2002) identified priority areas for R&D. A range of recent fodder industry meetings have reviewed these and added or subtracted issues based on them being emerging problems or having been satisfactorily resolved in the last five years. These can be grouped into the following areas:-

- New Products and Markets
- Plant Breeding and Germplasm Evaluation
- Crop agronomy
- Hay and silage production, processing and transportation
- Improved Fodder Quality
- Industry Bio security and Environmental Management
- Industry Communication and Information Flows
- R&D Program Management, Monitoring and Review.

The issues within each of these crop areas are summarised in the following tables.

R&D PROGRAM AREA	PROJECT ISSUE / ELEMENT
1. New Products and Markets including evaluation of new fodder products and investigation and development of new market opportunities	**New Products:** Assessment of new species and processing options which improve the range of products and their quality for different end uses. Assessment of medicinal and other properties of fodder. **Market research:** comprising desk research, in market research, trade visits and test marketing covering the following components:- - trends in the animal industries in Asia as a high priority - trade flows in animal feeds and fodder - short and long term market opportunity scan and prioritisation - market entry, maintenance and action planning strategies

2.	Plant Breeding and Germplasm Evaluation	Expansion of existing oat breeding activities and investigation of other species such as other cereals, vetches, lucerne, new legumes species, overseas grass species. Investigate development of molecular markers to support breeding programs.
3.	Crop agronomy	Assessment of issues related to plant nutrition and its impact on fodder quality, diseases which have a major impact on production, weed management options, integrated pest management and understanding of micro-organisms to improve fodder production and management. Develop best management practice guides for different crops.
4.	Hay and Silage Production, Processing and Transport.	Improved understanding of plant physiology associated with cutting hay and silage to improve hay and silage making technologies. Investigate aspects of processing hay and issues related to effective transportation.
5.	Improved Fodder Quality	Benchmark the quality of Australian traded fodder production against international export competitors. Development of a common description language for Australian fodder which measures all attributes important to users. Development of standard national methodologies for assessing fodder quality throughout Australia.
6.	Industry Bio security and Environmental Management	Development of tests for organisms and chemicals which can influence the end users of fodder. Evaluate more effective chemicals used in fodder production and transport in particular replacing methyl bromide as a fumigant of hay. Investigate management strategies to ensure fodder is produced with minimal environmental impacts.
7.	Industry Information and Communication Flows	Production of extension packages linking fodder quality traits with crop husbandry practices for various fodder production systems across Australia.
8.	R&D Management, Monitoring and Review	Benefit cost analysis across the total fodder R&D program supported by individual project assessments and mid-term review of the program. Develop a sustainable long term funding base for R&D.

6 The R&D Strategy for 2004-2009

The overall objective of the strategy is "A sustainable and profitable Australian fodder industry producing quality product".

This will be achieved by focusing on seven key R&D goals. These have been developed during discussions in more recent workshops and industry meetings. The key goals (not necessarily in priority order) are:

New Markets and Products

Plant Breeding and Germplasm Evaluation

Crop Agronomy - Nutrition, Disease, Weed, Pest and Micro-organism Management

Hay and Silage Production, Processing and Transport

Improved Fodder Quality

Industry Bio security and Environmental Management

Industry Communication and Information Flows.

R&D program monitoring and funding base development has not been included as a specific R&D goal. However, the Committee and Program will support these activities on an ongoing basis. It is not felt that it is appropriate to support projects in these areas.

GOAL ONE	New Markets and Products

PROGRAM OBJECTIVE	Improve Australian competitiveness in the development and supply of fodder based products for the intensive livestock industries in Australia and emerging livestock industries in North Asia.

BACKGROUND

The intensive livestock industries in Australia and the emerging livestock industries in East Asia are growing. The East Asian animal feeds industry is estimated at $US 10 billion per annum. Currently Australia's share is approximately $A 40 million principally from Japan. In the domestic market fodder is becoming increasingly competitive with alternative livestock feed sources. In order to enhance the market share in both domestic and export markets the fodder industry needs to become more market oriented rather than production and commodity/price driven. The proposed R&D program will be the vehicle that enables the industry to achieve the necessary paradigm shift to a market driven industry.

KEY STRATEGIES

- Identify new product opportunities within Australia, for example, hay and silage mixtures and rice straw.
- Market research scan on short and medium term trends in the livestock industries in East Asia including a foreign competitor analysis in these growing markets.
- Development of relevant market strategies and products for key export markets where Australia has a competitive advantage.
- Investigate new and improved processed products, for example, hay pellets.
- Investigate pharmaceutical and nutraceutical properties of fodder.

MEASURES OF SUCCESS

- Two or three new fodder opportunities and products identified.
- Improved market information for fodder and growth in fodder markets.
- Improved knowledge of other properties of fodder.

GOAL TWO	Plant Breeding and Germplasm Evaluation

PROGRAM OBJECTIVE	To develop superior varieties of fodder species for domestic and export customers.

BACKGROUND

The world fodder market is becoming increasingly more specialised. This requires a niche market approach to all aspects of production including plant variety development. In order for Australia to maintain a competitive advantage new plant varieties will need to be developed to complement or replace existing varieties in order to satisfy the market imperative. At the same time productivity and quality attributes need to be maintained and profit margins sustained as a minimum requirement and enhanced if possible.

STRATEGIES

- Maintain and improve existing plant breeding and germplasm evaluation programs for oats.
- Review and if appropriate support breeding programs for lucerne, medics, sub clover, alternative annual pasture legumes, temperate grasses, vetches and tropical legumes, wheat, barley, triticale and other grasses.
- Develop species for higher vegetative growth and nutritional values.
- Develop suitable varieties and production systems for fodder targeted at the Japanese and other export markets.
- Collaborate closely with GRDC to ensure complementarity's in plant breeding.

MEASURES OF SUCCESS

- Regular release of new improved fodder varieties which are widely adopted.
- Identification of several new species with attractive fodder production attributes.
- Commercialisation and adoption levels of new varieties and species.

GOAL THREE	Crop Agronomy: Plant Nutrition, Disease, Weed, Pest and Micro-organism Management

PROGRAM OBJECTIVE	To investigate the effects of plant nutrition, diseases, weeds, pests and micro-organisms (both beneficial and harmful) on fodder production, and to develop appropriate management strategies where appropriate.

BACKGROUND

Plant nutrition requirements to ensure quality product is an important area for fodder producers. Several aspects of this area require better management information. In addition there is a range of disease, weed and pest problems that have the potential currently and in the future to reduce the on-farm productivity of fodder. In addition the effects of these as well as micro-organisms, such as bacterium, mould and fungi, have potential to cause substantial impacts on the productivity and health of end users of fodder. A recent illustration is the problems that have arisen with Annual Ryegrass Toxicity (ARGT). It is important to continue to address current problems in this area but also to identify any future problems that may arise.

STRATEGIES

- Identify gaps in plant nutrition knowledge and development management options to resolve these.
- Identify the major plant disease, weed and pest problems that have or potentially have an impact on the production and in particular use of fodder.
- Develop cost effective and integrated management control strategies for addressing problems arising from diseases, weeds, pests and micro-organisms.
- Identify significant micro-organisms which have potential to create production benefits for fodder species and fodder production.
- Develop best management guides for different crops.

MEASURES OF SUCCESS

- Adoption of best practice for plant nutrition management
- Number of new management options for diseases, weeds and pests.
- New technologies to take advantage of favourable micro-organisms.

GOAL FOUR	Hay and Silage Production, Processing and Transport

PROGRAM OBJECTIVE	To ensure that best technologies are available to produce hay and silage, process this for a range of end uses and ensure effective transportation to end users.

BACKGROUND

With expanded markets and trade in hay and to a lesser extent silage it is important that hay and silage making techniques are efficient and effective. This requires a good understanding of the physiology of plants and how cutting etc is influenced by this. In addition it is important to understand processing techniques and the impact this has on product quality. With increase hay trading transportation effectiveness is becoming more important, especially as longer distances are becoming common.

STRATEGIES

- Develop a better understanding of plant physiology associated with cutting hay and silage and its impact on quality.
- Improved processing of hay for specific markets.
- Improved methods to produce fodder with the greatest water use efficiency by using crops such as lucerne.
- Improved understanding of transportation technologies and techniques and the implications of this for transport regulation.

MEASURES OF SUCCESS

- New technologies for cutting hay and silage.
- Better technologies for processing hay.
- Standardised method for hay transportation and uniform regulatory requirements Australia wide.

GOAL FIVE	Improved Fodder Quality

PROGRAM OBJECTIVE	To ensure that Australian produced fodder in domestic and export markets meets customer expectations for quality in terms of product description and quality attributes, such as metabolisable energy, protein content, level of extraneous matter and residues and animal preference.

BACKGROUND

The fodder consuming industries are under increasing pressure to meet stringent controls on the safety of food and animal health. The quality assurance systems are being based around HACCP systems that seek to build in quality rather than inspect it in at the end of the production process. For the fodder industry to be able to continue to supply these client industries there needs to be comparable quality specification and assurance systems.

STRATEGIES

- Develop a better understanding of the characteristics of hay and silage which satisfy the requirements of end users.
- Development of standard uniform national measurements for determining all aspects of fodder quality.
- Development of a common specification language for Australian fodder.
- Benchmark the quality of Australian fodder against our international competitors.
- Broaden the application of rapid laboratory tests for all aspects of fodder quality and provide research support to ensuring these tests are reliable and effective.

MEASURES OF SUCCESS

- A clear set of science based measures of all fodder quality attributes.
- Implementation of a standard set of measures for hay and silage quality.
- Research based support for standardised laboratory tests which are accepted by industry.

GOAL SIX	Industry Bio security and Environmental Management

PROGRAM OBJECTIVE	To effectively support the development of fodder industry products which meet international trading standards and are produced with minimal negative impacts on the environment.

BACKGROUND

Increasingly both export and domestic users are requiring that all products meet stricter requirements regarding the presence of detrimental micro-organisms, toxins and other chemicals. Since fodder is part of the supply chain for many products there is increasing pressure for hay and silage to meet strict requirements. It is crucial for the industry to have a good effective science base to support it in meeting these expectations. Examples are ARGT, chemical residues and alternatives to methyl bromide. In addition and related is the importance of environmental management for all stages of production and distribution.

STRATEGIES

- Identification and assessment of significant feed safety risks form bacteria, moulds and fungi that have potential to cause animal health and other fodder user problems.
- Assessment of any chemical residues which may present a problem to the industry.
- Development of more and more effective tests for potential product contaminants.
- Assess the importance of Environmental Management Systems (EMS) for fodder production.

MEASURES OF SUCCESS

- Application of research results to all important bio security issues for the industry.
- Introduction of appropriate tests to facilitate management of contamination threats.
- Implementation of EMS procedures for the industry.

GOAL SEVEN	Industry Communication and Information Flows

PROGRAM OBJECTIVE	To ensure early successful adoption of R&D program outcomes.

BACKGROUND

R&D only confers competitive advantage on industries if successful R&D outcomes are adopted early and the benefit streams are realised by those industry players who have invested in the R&D activity. Early adoption generally only occurs if industry players are aware of the initiation of research programs and projects, the progressive release of progress reports especially tied to the potential economic benefit that could accrue to users.

STRATEGIES

- Production of extension packages linking fodder quality traits with crop husbandry, harvest and handling practices for various fodder production systems around Australia in collaboration with the peak industry body (AFIA).

TARGETS

- Develop and Circulate Industry R&D Newsletters.
- Consultation with and reporting to peak farmer groups.
- Develop extension packages.
- Early adoption and implementation of extension materials.

MEASURES OF SUCCESS

- Effective reporting of R&D activities to industry.
- Well accepted R&D communications activities.
- High levels of adoption of R&D outcomes.

APPENDIX

ATTACHMENT 1:

ALIGNMENT OF PROGRAM STRATEGIES WITH RIRDC'S CORPORATE GOALS AND STRATEGIES

RIRDC GOAL	Specific RIRDC Strategy	Fodder Crops Program Strategies
GOAL 1 *Develop new opportunities*	Utilise advances in science such as biotechnology, genomics, communications and information technology to develop and commercialise new industries and new products	New Markets and Products (Goal 1), Improved Fodder Quality (Goal 5).
GOAL 2 *Adopt new technologies and systems for established industries*	Foster 'frontier technology' R&D packages as the driver of competitive advantage in established industries	Plant Breeding and Germplasm Evaluation (Goal 2), Improved Fodder Quality (Goal 5).
	Deliver R&D packages that are amenable for adoption by industry and key stakeholders	Crop Agronomy - Nutrition, Disease, Weed, Pest and Micro-organism Management (Goal 3)
	Disseminate R&D results through effective demonstration and communication systems and channels	Industry Communication and Information Flows (Goal 7)
	Provide research information and incentive systems (including commercialisation strategies) to facilitate more effective resource use by existing industries	Plant Breeding and Germplasm Evaluation (Goal 2), Crop Agronomy - Nutrition, Disease, Weed, Pest and Micro-organism Management (Goal 3), Hay and Silage Production, Processing and Transport (Goal 4), Improved Fodder Quality (Goal 5).

GOAL 3 *Improve the competitiveness and sustainability of Australian agriculture*	Undertake research that addresses trade impediments and options to respond to current distortions in world trading conditions	Improved Fodder Quality (Goal 5), Industry Bio security and Environmental Management (Goal 6).
	Develop and promote alternative cropping and animal husbandry systems which avoid or reduce negative environmental impacts in the rural sector	Industry Bio security and Environmental Management (Goal 6).
	Increase the focus on consumer and customer demand for clean, green, safe and healthy products and food integrity	Improved Fodder Quality (Goal 5), Industry Bio security and Environmental Management (Goal 6).
	Augment market access systems through measures to improve scientific analysis and controls over invasive pests and diseases	Industry Bio security and Environmental Management (Goal 6).
GOAL 4 *Underpin innovation and change in Australian Agriculture*	Promote improved farm health and safety performance	Crop Agronomy - Nutrition, Disease, Weed, Pest and Micro-organism Management (Goal 3), Industry Bio security and Environmental Management (Goal 6).
	Contribute to the development of the next generation of rural industry leaders	Industry Communication and Information Flows (Goal 7)

ATTACHMENT 2:

ALLIGNMENT OF FODDER CROPS PROGRAM STRATEGIES WITH NATIONAL PRIORITIES AND RURAL RESEARCH PRIORITIES

National Priorities	Fodder Crops Program Strategies
An environmentally sustainable Australia	Industry Bio security and Environmental Management (Goal 6).
Promoting and maintaining good health	Industry Bio security and Environmental Management (Goal 6).
Frontier technologies for building and transforming Australian industries	New Markets and Products (Goal 1), Plant Breeding and Germplasm Evaluation (Goal 2), Crop Agronomy - Nutrition, Disease, Weed, Pest and Micro-organism Management (Goal 3), Hay and Silage Production, Processing and Transport (Goal 4), Improved Fodder Quality (Goal 5).
Safeguarding Australia	Industry Bio security and Environmental Management (Goal 6).

National Rural Research Priorities	Fodder Crops Program Strategies
Sustainable natural resource management	Industry Bio security and Environmental Management (Goal 6).
Improving competitiveness through a whole of industry approach	Plant Breeding and Germplasm Evaluation (Goal 2), Crop Agronomy - Nutrition, Disease, Weed, Pest and Micro-organism Management (Goal 3), Hay and Silage Production, Processing and Transport (Goal 4), Improved Fodder Quality (Goal 5).
Maintaining and improving confidence in the integrity of Australian agricultural, food, fish and forestry products.	Industry Bio security and Environmental Management (Goal 6).
Improved trade and market access	New Markets and Products (Goal 1).
Use of frontier technologies	Plant Breeding and Germplasm Evaluation (Goal 2), Crop Agronomy - Nutrition, Disease, Weed, Pest and Micro-organism Management (Goal 3), Improved Fodder Quality (Goal 5).
Protecting Australia from invasive diseases and pests	Industry Bio security and Environmental Management (Goal 6).
Creating an innovative culture	Industry Communication and Information Flows (Goal 7).