



RURAL INDUSTRIES RESEARCH
& DEVELOPMENT CORPORATION

Australian Durian Industry Strategic Plan 2001-2006

**Prepared for the Rural Industries Research
and Development Corporation**

by A J Zappala

July 2002

RIRDC Web Publication No W02/016
RIRDC Project No ZTR-1A

© 2002 Rural Industries Research and Development Corporation.
All rights reserved.

Australian Durian Industry Strategic Plan 2001-2006
Web Publication No. W02/016
Project No. ZTR-1A

The views expressed and the conclusions reached in this publication are those of the author and not necessarily those of persons consulted. RIRDC shall not be responsible in any way whatsoever to any person who relies in whole or in part on the contents of this report.

This publication is copyright. However, RIRDC encourages wide dissemination of its research, providing the Corporation is clearly acknowledged. For any other enquiries concerning reproduction, contact the Publications Manager on phone 02 6272 3186.

In submitting this report, the researcher has agreed to RIRDC publishing this material in its edited form.

Researcher Contact Details

Mr Alan Zappala
Zappala Tropicals Pty Ltd
CMB No 61 Deeral
via Cairns QLD 4871

Phone: 07 4067 5266
Fax: 07 4067 5315
Email: zappala@iig.com.au

RIRDC Contact Details

Rural Industries Research and Development Corporation
Level 1, AMA House
42 Macquarie Street
BARTON ACT 2600
PO Box 4776
KINGSTON ACT 2604

Phone: 02 6272 4539
Fax: 02 6272 5877
Email: rirdc@rirdc.gov.au
Website: <http://www.rirdc.gov.au>

Published in July 2002

Vision Statement

*To establish a coordinated Australian Durian Industry
for the sustainable production of quality fruit
using optimum farm management practices developed by
committed growers and researchers.*

Acknowledgments

This Industry Strategic Plan was funded by RIRDC as part of Project ZTR-1A, “Durian germplasm evaluation for tropical Australia Phase 1”.

RIRDC project ZTR-1A is also sponsored by Zappala Tropicals Pty Ltd, the Queensland Department of Primary Industries (QHI) and the Northern Territory Department of Primary Industries and Fisheries (NT DPI&F).

Special thanks goes to the NT DPI&F staff, DPI staff, steering committee members and all who contributed in any way to produce this comprehensive industry document.

Contents

	Page
Vision statement	iii
Acknowledgments	iii
Background Statement	1
Strategic Planing Process	1
Strategic Planing Review 1998	2
Strategic Planing Review 1999	2
Strategic Planing Review 2002	2
Strategic plan (all issues in tabular form)	3
Section 1. Sustainable Farm Management	4
Section 2. Future Industry Direction	14
Section 3. Marketing Structure	18
Section 4. Implementation/work program time frame	22

List of Tables

	Page
1. DPI input	22
2. NT DBIRD input	23
3. Non government agencies input	23
4. NT and NQ grower input	24
5. CSIRO/CRC/University input	25
6. Funding Bodies input	25
7. Australian durian plantings 1999 - 2007	26
8. Australian Durian Industry Value Forecasts to 2010	26
9. Comparisons of NT and NQ durian production and value data to 2010	27
10. Climatic Comparisons for Australian and other World Durian Production Areas	28
11. Comparison of Durian Flowering and Fruiting Patterns in Australia	29
12. Malaysian climatic data East and West	30
13. Industry strengths	31
14. Industry weaknesses	32
15. Industry opportunities	33
16. Industry threats	34
17. Durian SWOT Meeting Attendance	35

List of Appendices

Appendix 1 Initial SWOT circulated information	36
Appendix 2 1998 Review meeting handouts	44
Appendix 3 Strategic planning process model	46

Background Statement

Clonal durian importation into Australia commenced in 1975 with the first orchard plantings in North Queensland. Plantings occurred along protected coastal regions from Tully 18° S to Cape Tribulation 16° S latitude. In the Northern Territory, plantings are located at Humpty Doo, Lambell's Lagoon, Howard Springs and Berrimah.

The durian industry presently comprises 55 growers with more than 40 hectares planted. Many other potential growers are waiting for variety evaluation to be carried out.

Successful clonal imports during the 1990's in both NT and NQ have established a world class germplasm from reliable suppliers. After evaluation, these collections will provide Australian growers with the basis to create a profitable industry supplying quality fruit aimed at import replacement and future off-season exports.

Plantings are currently expanding in NT with several growers developing new areas of up to 5,000 trees by 2000. Current estimates of plantings are NT: 4,000 trees planted by 1999 and NQ: 4,500 trees planted by 1999.

There has been strong lobbying for our industry's survival, following a recent application from Thailand to export fresh durian into Australia. Thailand already has market access with up to 500 tonnes of frozen durian sold in Australia annually.

Strategic Planning Process

The industry planning requirement of RIRDC Project ZTR 01 commenced with 3 SWOT meetings held in South Johnstone, Mossman and Darwin during November and December 1996. Task 3 of RIRDC Project ZTR 01, the industry strategic plan was completed in June 1997 and has now been reviewed in August 1998, October 1999.

A grower' list was completed and a Durian Newsletter was circulated to all growers with preliminary production, industry and marketing issues for comments prior to the SWOT meetings.

61 growers and researchers attended these meetings raising additional issues and prioritising all the issues on a ranking of one to five. Several growers and researchers unable to attend these meetings returned completed SWOT forms for inclusion. The ranking value is listed below.

One	=	most essential
Two	=	very important
Three	=	important
Four	=	minor importance
Five	=	not important at all

Four people attended all of the SWOT meetings: Joe and Alan Zappala, Phil Ross, DPI extension officer Wet Tropics, and Chris Horsburgh, DPI Mareeba Marketing Section. Phil Ross acted as meeting chairman and Chris Horsburgh the facilitator to ensure consistency was maintained.

The meetings also elected a steering committee to advance the planning process quickly and to report back to the growers as required. The steering committee and senior researchers further developed this initial draft over the next few months. Copies were sent to all that attended the SWOT meetings for additional comments.

The plan is divided into 4 major sections titled:

1. Sustainable Farm Management
2. Future Industry Direction
3. Marketing Structure
4. Stakeholder Work plans

Issues, SWOT priority ratings, strategies, actions and performance indicators or resource availabilities are listed within each strategic issue.

Section 4 comprises an action plan for each industry stakeholder group, which allocates responsibility and a timeframe to the appropriate personal for implementation of the strategic planning objectives.

This 5-year plan will be updated on an annual basis (August 1998 and October 1999) to ensure all issues, research priority goals, resource availability and performance indicators are successfully completed or carefully monitored.

Special thanks goes to the NT DPI&F staff, DPI staff, steering committee members and all who contributed in any way to produce this comprehensive industry document.

Current Australian industry statics and overseas weather data comparisons are also included for additional background data

Strategic Planning Review 1998

A total of 35 Industry Stakeholders met at 3 venues to review progress on the strategic plan. Meeting Information handouts (included in pages 44 and 45) were used to stimulate discussion at the meetings held in Darwin May 29th, Mossman June 16th and South Johnstone June 17th 1998. A draft 1998 version was circulated to Industry stakeholders for further comment in August 1998.

Strategic Planning Review 1999

The majority of 1999 was spent answering AQIS and AFFA draft reports and lobbying for our industry's survival. This follows a government to government request from Thailand to export fresh durian into Australia. As there was no strategic review, and this year's upgrade related only related to staff changes, this review was conducted by A. Zappala, Y. Diczbalis (QHI) and C. Wicks (NT DPIF). Draft changes were emailed to other growers for their input.

Strategic Planning Review 2002

This review was conducted as part of the final report for ZTR-1A. Alan Zappala and Yan Diczbalis have updated the 1999 plan and noting the completed tasks from the work plans and adjusting the actions to match latest research findings. The key issues remain unchanged and considerable progress has been made in the Sustainable Farm Management in Section 1 and the Work Plans in Section 4.

Key issues requiring the development of strategies and goals are summarised within each major strategic section.

1. Sustainable Farm Management	2. Future Industry Direction	3. Marketing Structure
<p>1.1. Reliable Varieties</p> <ul style="list-style-type: none"> • Clonal genepool introduction • Clonal genepool evaluation • Seedling evaluation • Rootstocks-scion interactions • Species and clonal identification and confirmation <p>1.2. Nursery Supplies</p> <ul style="list-style-type: none"> • Planting stock <p>1.3. Farm Design and Management</p> <ul style="list-style-type: none"> • Site selection • Tree life • Crop phenology • Cultural practices • Pollination • Pruning • Organic production • Cyclone susceptibility <p>1.4. Pest and Disease Control</p> <ul style="list-style-type: none"> • Phytophthora, Pythium and other diseases • Insect pests • Durian PFF/Q Fly certification/exemption <p>1.5. Nutrition Requirements</p> <ul style="list-style-type: none"> • Industry standards • Application rates and timing <p>1.6. Irrigation</p> <ul style="list-style-type: none"> • Plant requirements and timing • Fertigation <p>1.7. Harvest Maturity</p> <ul style="list-style-type: none"> • Grower training • Harvesting index and Existing production • Uneven fruit ripeness and wet core 	<p>2.1. Industry Infrastructure</p> <ul style="list-style-type: none"> • Industry size • Industry growers associations • Industry planning • Industry R&D funding • AQIS liaison and plant health • Economic analysis • Production costs • Cross crop technology • QHI tropical fruit R&D&E <p>2.2. Tropical Tree Crop Research Liaison</p> <ul style="list-style-type: none"> • Research priorities • Recommended clonal list • Lack of production information • Lack of registered chemicals • Loss of registered chemicals • Shared research resources • Information transfer <p>2.3. International Co-operation</p> <ul style="list-style-type: none"> • Joint research • Variety identification 	<p>3.1. Maturity Standards</p> <ul style="list-style-type: none"> • Development of guidelines • Post harvest treatments • Identification of inferior fruit <p>3.2. Promotion</p> <ul style="list-style-type: none"> • Market survey • Unique product image • Industry funding <p>3.3. Transport</p> <ul style="list-style-type: none"> • Product compatibility <p>3.4. Packaging</p> <ul style="list-style-type: none"> • Packaging design • New technology patent loss <p>3.5. Marketing</p> <ul style="list-style-type: none"> • Marketing systems • Consumer focus • Local market • Domestic market • Market returns • Import replacement • AQIS liaison <p>3.6. Export Potential</p> <ul style="list-style-type: none"> • Off-season production • Export market • Indonesian production <p>3.7 Value Adding</p> <ul style="list-style-type: none"> • Minimal processed products • By-products

Section 1. SUSTAINABLE FARM MANAGEMENT

ISSUE	SWOT RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
1.1. Quality Varieties				
Clonal genepool introduction	1.3	Importation of the best productive varieties from all overseas sources.	Interested growers, researchers and nurseries to continue the importation of quality plant material from Malaysia, Thailand, Indonesia, The Philippines, Sri Lanka and Vietnam. AQIS and DPI Centre for Wet Tropics Agriculture to agree on financial arrangements and operational protocols for the South Johnstone facility	Malaysia and other Asian countries are continually registering new durian clones therefore introductions will be ongoing. The South Johnstone facility is now fully operational with Peter Langdon the contact officer for import permits.
Clonal evaluation program	1.7	Identify the most suitable clones for Australia using selection criteria based on: consistent production of quality fruit, adaptability to local weather patterns, pest and disease resistance and acceptable fruit size.	Support the RIRDC Project ZTR-1A. Support Phase 2 RIRDC Project ZTR-1A (Fruit Quality). Evaluate fruiting and growth habits of other imported clones not included in RIRDC Project ZTR-1A Request other growers with other clones to participate in evaluation through use of standardised evaluation sheets (tick list). Growers to lobby DPI to provide a support researcher to act as coordinator and to assist in collation and interpretation of results. Durian growers, through Rambutan and Tropical Exotics Assn. and NT Horticultural Assn. to hold durian competitions during fruiting season, to encourage growers to evaluate grafted varieties.	Growers purchase copies of RIRDC ZTR-1A by 2002. Develop a recommended variety list by 2002. Invite growers to nominate for participation in the evaluation group. Pedro O'Connor to assist as required. Durian competitions to commence as quantities of quality fruit become available.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Seedling evaluation	2.0	<p>Monitor seedling performances in NT and NQ using the following selection criteria:</p> <p>consistent production of quality fruit, adaptability to local weather patterns, pest and disease resistance and acceptable fruit size.</p>	<p>QHI and NT DPI & F and a grower monitoring group to identify promising seedling selections for propagation.</p> <p>Establish a grower group willing to monitor and evaluate seedling performance.</p> <p>Make up a checklist for standardised evaluation.</p> <p>Lobby DPI to provide a research coordinator to help collate and interpret results.</p> <p>Durian growers via local growers associations to hold durian competitions during fruiting season, to encourage growers to evaluate seedlings.</p>	<p>Promising seedlings must have demonstrated good clonal characteristics over several fruiting seasons.</p> <p>Invite growers to nominate for participation in the evaluation group.</p> <p>This evaluation system to be operational by 2004.</p> <p>Pedro O'Connor to assist as required.</p> <p>Durian competitions to commence as quantities of quality fruit become available.</p>
Rootstock-scion interaction	1.5	<p>Collect seed from other related species and diverse climatic production areas.</p>	<p>Growers with overseas access to seeds for potential rootstocks to continue to supply DPI South Johnstone with these seeds</p> <p>Growers evaluate field performance of these wild species regarding compatibility and disease tolerances in NT and NQ</p> <p>Evaluate marcotts/cuttings of vigorous clones for rootstocks.</p> <p>Request information from Mike Fabian at Limberlost Nursery regarding the success of propagation by cuttings.</p>	<p>DPI contact is Lynton Vawdrey Phone 07 40 641130.</p> <p>Assessment has commenced at NT DPIF and NQ grower observations have commenced.</p> <p>ACIAR /RIRDC project included work on marcotts has failed to successfully establish any marcotts despite roots forming on the original tree.</p> <p>Mike Fabian to be asked to further update growers at a grower information exchange meeting in 2002.</p>

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Species and clonal identification and confirmation	1.4	Reduce the mistaken identification of all current existing durian plantings.	<p>NT DPI& F to completed identification of all NT grower trees using a polygon leaf measurement system and DPI and NQ growers to utilise the polygon measurement procedure at South Johnstone to identify trees.</p> <p>Send samples to CSIRO Brisbane for identification.</p> <p>Investigate the possibility of working with overseas research organisations to classify the major Asian clones by DNA to compare with Australian results.</p>	<p>A polygon leaf sample measurement system developed by NT DPI& F is available and Yan Diczbalis has identified some of the South Johnstone durian trees using the polygon method.</p> <p>CSIRO has successfully used their macadamia test on durian. Contact Cameron Peace.</p> <p>Overseas research organisations have commenced DNA research.</p> <p>Identification of all grafted durian trees by 2004.</p>
Breeding program	Steering Group issue	To breed new varieties of Durian suitable for NT and NQ conditions and market requirements.	<p>Nil action for the medium term.</p> <p>Clonal and promising seedling selections are the most economical first step.</p>	Review the need for breeding program in 5 years time.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
1.2. Nursery Supplies				
Planting stock	1.4	Improvement in the availability of reliable planting materials.	<p>Develop recommended nursery practices by combining most suitable aspects of the ANVAS avocado system and Nursery Industry Accreditation Scheme, Australia.</p> <p>DPI (Lynton Vawdrey) and DPI & F to assist in developing these guidelines.</p> <p>Initial observations from RIRDC ZTR-1A indicate that advanced planting material survives field establishment best.</p> <p>DPI to update nurseries further as the ACIAR/RIRDC project progresses.</p>	<p>Sterile nursery potting mixes to be introduced ASAP.</p> <p>Sterile potting mixes to be stored hygienically to avoid contamination.</p> <p>Implement best practice nursery standards by 2001.</p> <p>Nursery supplies to increase to match demand by 2002.</p> <p>ACIAR/RIRDC project information will be available in 2002</p>
1.3. Farm Design and Management				
Crop phenology	1.5	Identify annual crop phenology relating to: flushing, flowering and fruit development.	<p>Develop a monitoring program to identify leaf and root growth patterns and carbohydrate levels.</p> <p>Interested growers to record leaf flushing, flower bud and fruit development timeframes.</p>	<p>NT information available for RIRDC Boosting Durian Productivity Project and NQ data available from John Mansfield's investigations.</p> <p>RIRDC Project No. DAQ – 288A “Nutrition of Durian and Mangosteen Orchards in North Queensland”</p>
Site selection	1.9	Set a base criteria for preferred durian growing areas.	<p>DPI to publish an updated Ag note on durian or:</p> <p>Negotiate with RFCA for a print run and any contribution to printing costs for the update.</p>	NT DPI&F Agnote is available.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Tree life	2.3	Identify ways to shorten the juvenile period.	<p>Growers to introduce and evaluate precocious <i>Durio</i> species and clones to reduce the juvenile period.</p> <p>Collect overseas data relating to the efficacy of Cultar® in reducing juvenile period.</p> <p>Growers to re-apply to NRA via QFVG under the Minor Use process for Cultar® registration</p>	<p>An assessment as to its potential to be made by 2004. <i>D. macrantha</i> has already fruited in 5 years from planting.</p> <p>Cultar® was registration in 1998 to 2001.</p>
Cultural practices	2.5	Identify the most suitable planting practices for Australian conditions.	<p>Overseas data to be gathered and extrapolated to Australian conditions.</p> <p>Clonal differences relating to canopy sizes in designing planting systems to be noted.</p>	<p>10 metres by 10 metres is the current recommended planting spacing.</p> <p>Differing canopy shapes can be inspected at the ZTR-1A field day in 2002.</p>
Pollination	1.9	Identify the most suitable planting design for optimum pollination for Australian conditions Identify insect, animal and bird pollinators.	<p>Researchers to inform growers of their pollination experiences with different varieties Investigate attracting bee pollinators to orchards with native tree plantings.</p> <p>Assisted pollination studies on new clones. Liaise with MARDI for latest data on the new varieties.</p>	<p>Publish data collected by Dr T.K. Lim for RIRDC Boosting Durian Productivity Project.</p> <p>Future Phase 2 of ZTR-1A Regular contact with MARDI commenced.</p>
Pruning	2.4	Identify the best pruning practice to assure tree survival during cold winters and strong winds.	<p>Researchers and growers to demonstrate best practice for the desired tree structure and tree survival at research stations and field days.</p> <p>Conduct farm walks on properties where growers have pruned. Evaluate success or otherwise of these prunings.</p>	<p>Coordination through local grower associations and local DPI's.</p> <p>Kuradui Estates has held field days in 1997 and 1998 and ZTR-1A will hold a field day in 2002.</p>

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Organic production	2.3 Innisfail	Examine the potential for Durian to be successfully produced via organic methods.	Monitor organic growers' performance v's other producers. Hold field days as required. DPI to assist organic growers to convert recommended rates of chemical fertiliser to the organic equivalent.	Organic growers and researchers to continue discussions.
Cyclone Susceptibility	3.3	Identify the most wind resistant rootstocks and clones.	Growers and researchers to observe damage to rootstocks and clones after natural disasters and pass on recommendations to growers. Windbreak design and species performance on affected farms should also be monitored.	As required in both NT and NQ. Cyclone Thelma hit the Darwin Region in early December 1998 with minimal damage recorded. Cyclone Rona hit NQ orchards in mid February 2000 with major damage to areas north of Cairns.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
1.4. Pest and Disease Control				
Phytophthora Pythium and other disease susceptibility	1.9	<p>Establish the incidence and identity of diseases in orchards.</p> <p>Identify disease spread and epidemiology, cultural, biological and chemical controls.</p>	<p>Effectuated growers make DPI aware of their current problems and by supplying in samples.</p> <p>DPI to analysis these samples and record a disease inventory of infected farms. Screen varieties and rootstocks for possible tolerance/resistance by DPI and DPI & F.</p> <p>Industry, through Rambutan and Tropical Exotics Assn and QFVG to apply to NRA for minor use registrations of: Phosjet® and any other fungicides.</p> <p>Conduct farm walks to demonstrate different farm practices.</p> <p>Industry to strongly support the joint ACIAR/RIRDC project.</p> <p>Encourage mound planting, cover crops, and tolerant rootstocks and investigate beneficial microbial agents.</p> <p>Information transfer from other crops: avocado.</p>	<p>Continue to improve grower understanding of this major problem.</p> <p>DPI contacts –Peter Langdon and Lynton Vawdrey, Wet Tropics and Ron Peterson, Mareeba. NT DPIF contact – Chris Wicks</p> <p>NRA no longer requires residue data for Phosjet registration.</p> <p>ZTR-1A field day in 2002.</p> <p>The three year joint ACIAR/RIRDC Phytophthora project has commenced and been extended by 18 months.</p> <p>Dr's David Guest and Emer O'Gara from the University of Melbourne are involved as well as Thai and Vietnamese researchers.</p> <p>Other contacts: CRC for Tropical Plant Pathology Andre Drenth Ph 07 3365 4772.</p>

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Insect pests	1.5	Establish incidence and identity of pests in durian orchards. Develop IPM strategies for durian.	DPI to undertake an insect inventory in durian orchards commencing in 1997 to 2000. Develop IPM guidelines from results of fauna inventory and other research into IPM. Transfer any finding from RIRDC Project DAQ-27A Rambutan IPM development if suitable. Apply for minor use registrations from NRA. Published updates in Durian newsletter	David Astridge DPI has completed the 3-year insect survey and is currently working on RIRDC Project DAQ-27A Rambutan IPM development. Preliminary IPM guidelines to be developed as the insect inventory proceeds. NRA Minor use registration approved by 2004.
New technology transfer	1.8	Monitor new technological developments in similar horticultural crops.	Demonstrate at grower field days.	Kuradui Estates has held field days in 1997 and 1998. ZTR-1A will hold a field day in 2002.
1.5. Nutrition				
Industry standards	1.6	Develop recommended leaf and soil levels for macro and micro elements.	Collect leaf and soil samples from interested growers and collate into a database. Develop diagnostic guidelines of macro and micro nutrient deficiency. Expand the existing leaf sampling grower group with the commencement of RIRDC Project No. DAQ – 288A “Nutrition of Durian and Mangosteen Orchards in North Queensland”	4 years data available from TK Lim, Boosting Durian Productivity, J. Mansfield’s Phenology Report and data from ZTR-1A. Growers to support RIRDC Project No. DAQ – 288A “Nutrition of Durian and Mangosteen Orchards in North Queensland”.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Application rates and timing	1.6	Develop a nutrition plan recognising the climatic seasonal variations between N T and N Q.	Growers to participate in RIRDC nutrition project DAQ-288A.	Data available from Boosting Durian Productivity, J. Mansfield's Phenology Report and data from ZTR-1A. Growers to support RIRDC nutrition project DAQ-288A.
1.6. Irrigation				
Plant requirement and timing	1.6	Identify Durian plant requirements during growth and fruiting phases.	Compare NT and NQ weather data and superimpose on existing crop information. Monitor water uptake during vegetative and fruiting phases. Lobby NT Horticulture Branch to undertake soil moisture monitoring and crop response on farms to assist farm management eg. floral induction, timing of flower opening, fruit size and quality.	Growers to discuss during the RIRDC Project ZTR 01 field day in 2002. Growers to support RIRDC nutrition project DAQ-288A.
Fertigation	Steering Group issue	Identify Durian plant requirements during growth and fruiting phases.	Develop a nutrition fertigation program based on crop requirements.	Growers support RIRDC nutrition project DAQ-288A.
1.7. Harvest Maturity				
Grower training	1.6	Training of growers during harvesting by experienced personnel and qualified durian samplers.	Hold grower field days coinciding with fruit harvest to emphasise fruit quality and maturity standards eg: rattle, smell, no stings or cracks and the fruit is light for its size. Conduct field day during harvest season each year. Grower organisations investigate ways of producing and funding a maturity standard leaflet.	Improve grower education by 2002. Fruit maturity field days to begin by 2003. Design of the maturity leaflet to be finalised by 2004.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Harvesting index	Steering Group issue	Develop a heat sums index.	Use temperature readings collected by weather recording sites to develop an equation.	Index model developed as information is available.
Uneven Fruit Ripeness (UFR) and Wet Core	1.9	Investigate the causes of UFR and Wet Core in ripe fruit. Identify solutions to UFR and wet core.	Growers and researchers to monitor clones, fruit size and weather patterns to identify which varieties are affected. Interested growers to monitor crops using standardised monitoring forms. Information collated and interpreted by DPI coordinator	Growers to discuss during the RIRDC Project ZTR 01 field day in 2002. Improve grower education by 2004.
Existing production	2.4 Innisfail	Build on grower's experience to further develop this industry.	Successful growers to hold field days during fruiting seasons to encourage information exchange. Further develop interaction between NT and NQ growers by the formation of an Australian Durian Growers Group.	Hold at least 1 field day in each durian producing region annually. Continue with industry newsletter. Invite NT growers to attend any NQ field days.

Section 2. FUTURE INDUSTRY DIRECTION

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
2.1. Industry Infrastructure				
Industry size	1.8	Identify all growers and the production areas.	Establish accurate tree planting numbers for a census. Publish a regular industry newsletter.	More than 12,000 trees planted at 1999. Annual updates of census via newsletter and field days.
Industry growers associations	1.9	Durian growers to have membership of existing grower groups.	Encourage participation on Rambutan and Tropical Exotics Association and the NT Horticultural Association. Establish a separate Australian Durian Growers Group.	Most growers are members of local grower groups. Australian Durian Growers Group to be established in 2004 and affiliated with the NTHA and QFVG.
Industry planning	2.0	Industry to use the strategic planning process to identify the most important R&D issues.	Use strategic plan effectively. Review strategic plan annually. Industry to be an effective lobby group Industry and researchers to set Research Priorities.	Apply for R & D funds for high priority issues eg: SWOT issues with a Rating less than 2.0.
Industry R&D funding	2.1	Ensure adequate industry funding for R&D&E.	Apply for R & D funds for high priority issues. Industry to establish a research fund via levies or grower grants.	Hold regular meetings with growers, researchers and R&D&E funding providers.
AQIS liaison and plant health	2.0 Darwin	Ensure Australia remains free of Asia's seed borers.	Industry to lobby where necessary by using scientific data to ensure durian seed borer doesn't enter Australia. If any application for fresh imports is lodged and these do entry Australia, ensure that AQIS and Biosecurity Australia enforce the Import Risk Analysis (IRA) conditions. Thailand has not agreed to the IRA conditions finalised by AQIS in August 2000.	QFVG / NTHA to continue contact with Biosecurity Australia and AQIS. (A. Zappala to coordinate) Continue to monitor if Thailand does sign off on the Durian IRA and if import permits are issued by AQIS. Plant Biosecurity contact is Dr B. Stynes. Ph: 02 6271 6337 Fax 02 6272 3307

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Economic analysis	2.5	Establish the economic potential for durian in Australia.	RIRDC have commissioned Hassell and Associates to conduct an industry economic analysis.	Durian was identified as one of the “best bet” five crops requiring R&D input at the RIRDC Cairns workshop in 1997. RIRDC Hassell’s report is available.
Production costs	2.2	Reduce costs by high technology farm management practices.	Use latest technical improvements to become more efficient.	As required.
Cross crop technology	1.7	Liaise with fruit industries with similar problems to fast track any new farming technology.	Visit other crop field days especially Avocado. Hold regular group discussions.	As required.
QHI tropical fruit R&D&E expertise	2.4 Innisfail	Improve DPI tropical tree fruit expertise.	Lobby DPI to improve research on tropical tree crops. Growers and researchers to liaise on strategic planning issues and work plans.	DPI has appointed several new staff to assist on tropical tree fruits research from 1999 to 2001. Hold another industry strategic planning review by 2004.
2.2. Tropical Tree Crop Research Liaison				
Variety list	1.8	Development of a recommended planting guide.	Growers to assist researchers with their personal experiences. Industry to request DPI and DPI & F to establish a recommended clonal planting list which will be updated regularly.	Current recommendations are Luang, Gumpun and Gaan Yaow and Hew 1. Findings from ZTR-1A have identified another 7 new clones to be added to the current list.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Lack of production information	1.5	Record clonal yield performance.	Growers and researchers to maintain accurate records.	Improve production data by 2004.
Lack of registered chemicals	1.9	Improve grower access to chemicals for the durian industry.	Industry to request QFVG's environmental officer Janine Clark to apply to NRA for minor use chemical registrations. Industry and researchers to Janine Clark prepare suitable application forms	Increase acceptable chemical registration by 1999. Janine Clark to act as coordinator with NRA.
Loss of registered chemicals	2.3	Industry to monitor the use of chemical which could be banned. eg Endosulfan®.	Industry and researchers to identify alternative products and control methods based on IPM strategies. Industry and researchers to assist Janine Clark prepare suitable application forms	Increase alternative chemical registration by 2002. Janine Clark to act as coordinator with NRA
Shared research resources	1.9	Improve cooperation and communication between all research agencies.	Regular communications between Australian research organisations.	Hold another industry strategic planning review meetings in NT and NQ.
Information transfer	1.6	Expand the contacts between Australia and the Asian producing Nations	Further develop the direct overseas contacts between growers and researchers. Translate overseas data into an industry newsletter. Lobby QFVG for newsletter assistance.	"Talk about Durian" newsletter commenced in 1997. 7 issues mailed out to June 2000. Next issue due out in June 2002.
2.3 International Cooperation				
Overseas grower and researcher contacts	1.6	Improve cooperation and communication between Asian and Australian grower and researcher.	Regular communications between interested research organisations and growers.	Plan a future Asian study tour by 2004.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Joint research	1.9	Utilise Australia's foreign aid packages to develop farm management benefits to Asia and Australia.	Industry to strongly support any potential Durian ACIAR project with cash and in-kind contributions eg: Phytophthora project. Streamline contacts between researchers in NT and NQ involved in the joint ACIAR/RIRDC project.	An ACIAR grower meeting was held in Innisfail September 2001. Various field trips and exchange visits have already occurred between researchers involved in the project.
Variety identification	2.2	Utilise Australia's foreign aid packages to develop farm management benefits to Asia and Australia. Utilise CSIRO's research capacity where possible with cross crop identification techniques.	Support any potential ACIAR clonal identification project re: DNA finger printing, which will enable the DNA research results from Australia to be compared against the Asian clonal pool as "standards." Industry to contact CSIRO Brisbane laboratory to provide samples for identification.	Maintain annual contact with Greg Johnstone from ACIAR. Leaf samples were sent to Dr V. Vithanage from CSIRO for DNA finger print testing and results are discussed in the ZTR-1A final report.

Section 3. MARKETING STRUCTURE

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
3.1. Maturity Standards				
Maturity guidelines	1.8	Develop guidelines relating to fruit quality.	Growers adopt guidelines as stated in Section 1.7 re: rattle, smell, no stings or cracks and the fruit is light for its size.	Grower meetings as in Section 1.7.
Post harvest treatment	1.9	Identify the optimum post harvest holding temperature and any chemical treatments to extend shelf life.	Use existing data from Asia to advise growers of the required post harvest treatments. Identify any post harvest rots and suitable control methods if required.	15°C is the preferred storage treatments for durian in overseas countries.
Identification of Inferior fruit	2.1 Mossman	Develop an easily useable method to identify poor quality fruit and wet core.	Researchers and growers to pool results and identify which fruiting clones have acceptable qualities by: fruit shape, quality, recovery. Growers to refrain from selling inferior fruit. New technology eg: NIR needs to be monitored.	This task is tied to clonal identification of the early introductions.
3.2. Promotion				
Unique product image	1.8	Increase public awareness of the taste, nutrition value and aroma for “King of Fruits”.	Identify appropriate promotion messages in line with present industry capacity. Liaise with QFVG on promotion and a market Survey.	Promotion to commence when good quality fruit is available. Thai frozen imports are currently 550 tonnes annually
Industry funding	1.8	Investigate a system to raise industry funds to via existing LPA ‘S.	QFVG promotion of tropical fruit.	Develop funding options by 2004.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
3.3. Transport				
Product compatibility	1.9	Identify compatible transport systems.	<p>Researchers to develop a recommended list of compatible products and transport methods.</p> <p>Support any research projects relating to transport of mixed loads.</p>	<p>Recommendations to be established by 2000.</p> <p>The development of suitable "Odour proof packaging" would solve this problem</p>
3.4. Packaging				
Packaging design	1.9	Develop suitable industry packaging.	<p>Replace the current polystyrene boxes with an industry standard size cardboard carton.</p> <p>Industry to liaise on design for punnets packs. Re-apply for odour-proof packaging funding with industry support</p>	<p>Fibre Containers made sample cartons for NT and NQ growers to view in 1999.</p> <p>Contact: Dr Stephen Morris Ph: 02 9490 8333</p>
Loss of packaging patent	1.8 Darwin	Identify manufacture awareness.	<p>Industry to liaise with the manufacturer re: product suitability and availability.</p> <p>Ensure patent remains in Australia.</p>	<p>A demonstration pack was trialed by successfully air freighting of durian from Sydney to Cairns in June 1998. Growers to further investigate with Dr Stephen Morris by 1998.</p>
3.5. Marketing				
Marketing systems	1.8	<p>Review the present marketing system.</p> <p>Investigate a durian marketing group.</p>	<p>Improve any weaknesses relating to consumer satisfaction and grower returns.</p> <p>Establish a marketing group using the extended fruiting season from NT and NQ.</p>	<p>DPI and NT DPI&F to facilitate improved marketing systems, as production becomes available.</p> <p>Growers and researchers to monitor cost of production and market trends.</p>
Consumer focus	1.9	Develop a suitable consumer focus.	Recognise the requirements of local and domestic market preferences over time.	Reduce risk in the market by supplying quality fruit.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
Local market	2.4	Further develop local markets	Suppling quality fruit with shorter shelf life to local markets.	Strong markets exist in Darwin and Cairns.
Domestic market	1.6	Satisfy consumer demand.	Target sales to replace frozen imports currently at 500 tonnes per year. Consider a future market survey.	Reduce demand for frozen imports by 2005.
Market returns	1.6	Maintain Australian prices in line with excellent Asian grower returns.	Supply a quality product. Identify Australian market preferences. Monitor overseas prices.	Gross returns from 10 year old producing trees estimated at \$60,000 per hectare.
Import replacement	1.8	Supply quality fresh fruit to consumers.	Promote the fresh Australian product.	Premium market established for the fresh local product.
AQIS liaison	2.0 Darwin	Establish if any abnormal chemical levels are in the frozen imports.	Industry to liaise with AQIS: re import protocols and chemical residue levels. Industry to lobby where necessary to ensure any frozen imports are tested for chemical residue.	Industry discussions already commenced with AQIS. Chemical residue level information available by 2002.
3.6. Export Potential				
Off-season production	1.8	Investigate potential export markets to develop and supply during Asia's off-season.	Monitor Thailand and Malaysia's export data to identify market supply volumes and varietal preferences if any.	DPI to research market opportunities in line with industry development.
Export market	1.9	Develop exports in line with production.	Develop quality standards and consistent supply based on Thailand's existing standards.	Future industry growth depends on improved grower management.
Indonesian production	1.9	Recognise that Indonesian production if developed in a systematic way, could compete with Australia.	Monitor Indonesian durian industry progress for Quality control improvements. Monitor Indonesian durian industry progress for possible economic recovery	Industry and researchers to collate relevant information.

ISSUE	SWOT PRIORITY RATING	STRATEGIES	ACTIONS	PERFORMANCE INDICATOR / RESOURCE AVAILABILITY
3.7. Value Adding				
Minimal processed products	Steering Group issue	Develop the potential of minimal processed products for durian (punneted flesh).	<p>Use this method to check on fruit quality.</p> <p>Researchers to advise growers of suitable storage temperatures and wraps for punnets.</p> <p>Identify new and existing Australian uses and introduce consumers to this market.</p> <p>Supply samples for research into keeping qualities of fresh arils</p>	<p>Growers innovation for product presentation.</p> <p>NT DPI&F, DPI and CSIRO have post harvest research facilities and staff.</p> <p>Samples were sent to Rhonda Selleck (a researcher developing new fresh cut fruit technology in Victoria) in 2001 and 2002 with excellent results.</p>
By-products	2.2	<p>Develop the by-product potential of durian.</p> <p>eg: durian ice cream, freeze dried powder for cakes and biscuits, candies, wine, jam</p>	<p>Identify Australian users and introduce consumers to this market, as suitable product is available.</p> <p>Use cross crop experiences to help shorten the development phases.</p> <p>Liaise with MARDI on this technology.</p> <p>Industry to supply fruit samples (as production increases) for researchers to gain experience with durian by- product manufacture.</p>	<p>Funding would be required for any value adding.</p> <p>The DPI Centre for Food Technology operates as a fully user pays service provider.</p> <p>Regular contact with MARDI to continue as required.</p> <p>Samples to be provided by 2003.</p>

Section 4. Implementation/work programs

Table 1. DPI input

Date	Strategic Planning Issue	Contact	Status
1999-2002	Technical staff required to assist the permanent personnel for tropical tree fruit R&D&E, replacement required for Phil Ross.	R. Williams	Peter Langdon appointed in 2001 and Pedro O'Connor appointed in 2002.
1999-2006	Post entry quarantine facility and AQIS liaison	Peter Langdon	Facility fully operational in 2001
1998-2004	Phytophthora, Pythium and other diseases, rootstock-scion interactions Intergrated Management of Phytophthora	Lynton Vawdrey, Peter Langdon	ACIAR/ RIRDC project extended by 18 months
2000-2004	Insect pests control strategies (fruit spotting bug), fauna surveys, research results from other tropical crops	D. Astridge and H. Fay	RIRDC Project DAQ-274A on Rambutan IPM nearing completion.
2000-2004	Nutrition standards for industry, application rates and timing Irrigation application rates and timing	Yan Diczbalis	RIRDC Project DAQ-288A has commenced.
2000-2004	Product compatibility, packaging design, storage temperatures, fruit rots, new technology patent loss, NIR technology	Post Harvest Section	
2000-2004	Value adding	Food Technology section	
2000-2004	Market survey, marketing systems review, import replacement, consumer focus, local and export market and economic analysis	Marketing and economics section Mareeba	Chris Horsburgh, Mareeba Office DPI

Table 2. NT DBIRD input

Date	Strategic Planning Issue	Contact	Status
1998-2004	Integrated Management of Phytophthora	C. Wicks	ACIAR/ RIRDC project extended by 18 months
1999-2005	Clonal genepool introduction, evaluation and characterisation, Crop phenology, information on cultural practices: pollination, pruning and reduction of juvenile period, rootstock-scion interaction, recommended planting list with current data, contacts for overseas data translation Harvesting index (heat sum) Days after flowering (DAF)	To be advised	Matt Darcy has been appointed as replacement for TK Lim in 1999.
1997-2004	Nutrition standards for industry, application rates and timing Irrigation and fertigation application rates and timing	C. Wicks	4 years data & RIRDC ZTR 01
1997-2004	Insect pests control strategies (fruit spotting bug)	S. Smith	Funding required
1998-2006	Product compatibility, packaging design, storage temperatures, fruit rots, new technology patent loss	M. Gosbee	Funding required

Table 3. Non-government agencies input

Date	Strategic Planning Issue	Contact	Status
1998-2004	Support research priorities, grower liaison, information transfer, AQIS lobbying, grower newsletter assistance, lack of production information, market survey and marketing systems review	QFVG'S area delegate: J. Zappala, Innisfail. NT Horticultural Association	Rambutan and Tropical Exotics growers Association linked to QFVG
2000-2010	Support industry research priorities, collect industry research and product promotion levies, lack of registered chemicals, loss of registered chemicals, AQIS lobbying	QFVG: Trevor Dumall, (R&D Executive Officer) Janine Clark (Environmental Officer)	NRA minor use applications being processed

Table 4. NT and NQ Grower input

Date	Strategic Planning Issue	Contact	Status
1992-2005	Clonal genepool introduction, evaluation and characterisation, rootstock-scion interaction, reduction of juvenile period, Biosecurity Australia and AQIS liaison on frozen and possible fresh fruit imports, possible AFFA economic policy branch investigations, contacts for overseas data translation and packaging and processing developments.	Joe Zappala Alan Zappala	40 clones now imported RIRDC ZTR-1A now completed
1998-2004	Site selection, seedling evaluation and yield data collection	Individual durian growers	Tick sheet to be used.
1997-2004	Planting stock, cutting and rootstock evaluation	Durian nurseries	
1997-2005	Marketing coordination, survey, marketing systems review, price monitoring and Indonesian production monitoring	Individual durian growers	
1999-2005	Farm visits for cultural practices, pollination, pruning, wind-break design, cover crops, cyclone susceptibility and pest and disease management demonstration	Individual durian growers	
2000-2005	Organic production and species introduction	Organic Producers Association of Queensland contact Andre Leu, Ph:40 987610	Commenced
2000-2006	Industry census, industry growers associations, industry planning, industry R&D funding, AQIS liaison, lack of registered chemicals, loss of registered chemicals, market price monitoring, loss of packaging patent, durian PFF/Q Fly certification and exemption Purchase of RIRDC Boosting Durian Productivity report DNT 13A, information transfer via newsletter and meetings	Rambutan & Tropical Exotics Assn. NT Horticultural Assn NT & NQ growers	Rambutan & Tropical Exotics Assn. group meets monthly DNT-13A report available
2000-2006	Post harvest treatments - growers to supply fruits, product compatibility and packaging designs	Individual durian growers/researchers	
2000-2002	Economic Analysis, assist Hassall's (RIRDC consultants)	Shoo Chin Siah	Available from RIRDC
2000-2006	Harvest maturity, fruit tasting and quality standards and training	Individual durian growers	

Table 5. CSIRO, CRC, University input

Date	Strategic Planning Issue	Contact	Status
1999-2004	Species and clonal confirmation using DNA finger printing	Dr V. Vithanage, Cameron Peace	Results discussed in ZTR-1A report
1999-2006	Tropical tree fruit research liaison, cross crop technology, industry resource improvement, local and overseas information collection and transfer	CSIRO Horticulture Dr N. Scott	Links to other industries
1999-2006	Odour proof packaging, wraps, punnets.	Dr S. Morris, Jenny Jobling, Rhonda Selleck	“Supermarket to Asia” Program application Comet funding.
1999-2004	Intergrated Management of Phytophthora Phytophthora, Pythium and other diseases identification, control methods, assistance and advice, lobby for continuation of the CRC for Tropical Plant Pathology UQ Brisbane	Dr D. Guest Dr E. O’Gara Uni of Melbourne	ACIAR/ RIRDC projects extended for 18 months
1998-2005	Post graduate student assistance available for specific projects eg: Insects pests and diseases, IPM strategies, rootstock compatibility studies, marketing surveys	Prof R. J. Lawn James Cook University, Townsville	

Table 6. Funding Bodies input

Date	Strategic Planning Issue	Contact	Status
1998-2001	Integrated Management of Phytophthora	RIRDC	RIRDC DNT-24A commenced 1998
1998-2002	Integrated Management of Phytophthora	ACIAR	Project PHT95/134 commenced 1998
1997-2008	Commitment to planned industry development by funding research priorities, economic analysis by Hassall’s	RIRDC	RIRDC ZTR 01 and Hassall’s economic analysis completed. RIRDC Nutrition project DAQ- 288A has commenced.
1999-2005	Joint international research, information transfer, maturity standards, MRL’s	ACIAR	

Table 7. Australian Durian Plantings, 1999 - 2007

Source: NT DPI&F, DPI, Rambutan and Tropical Exotics Local Growers Association and Organic Producers Association of Queensland, November 1999

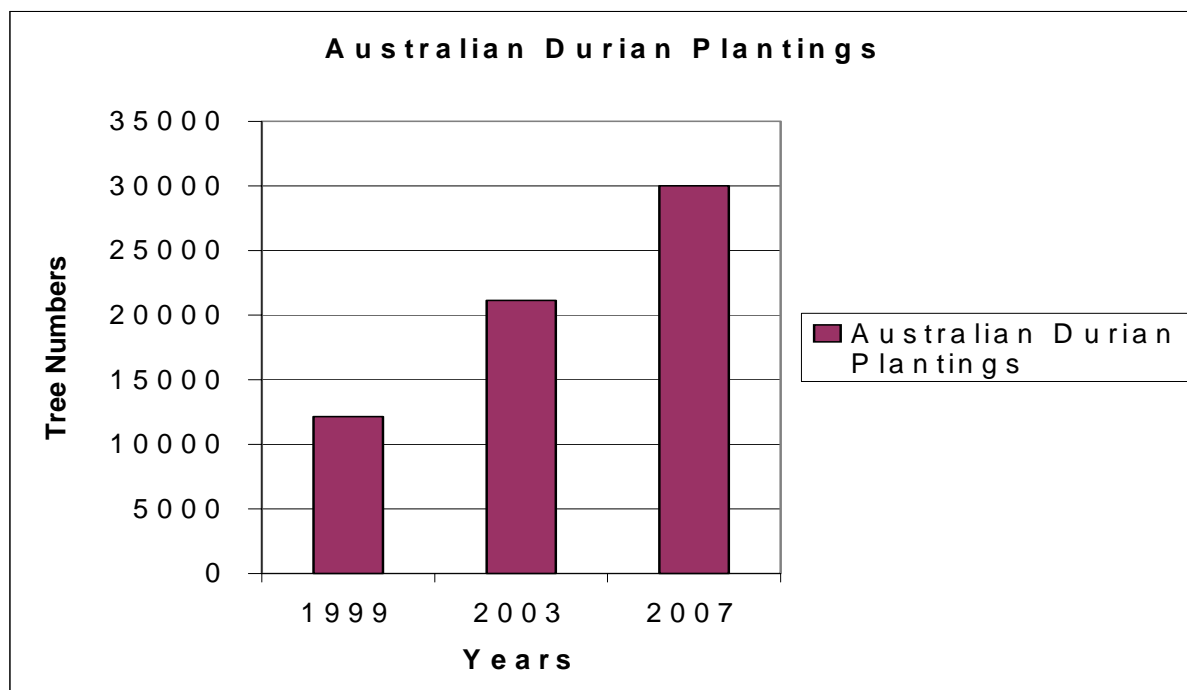


Table 8. Australian Durian Industry Value Forecasts to 2010

Source: NT DPI&F, DPI, Rambutan and Tropical Exotics Local Growers Association and Organic Producers Association of Queensland, November 1999.

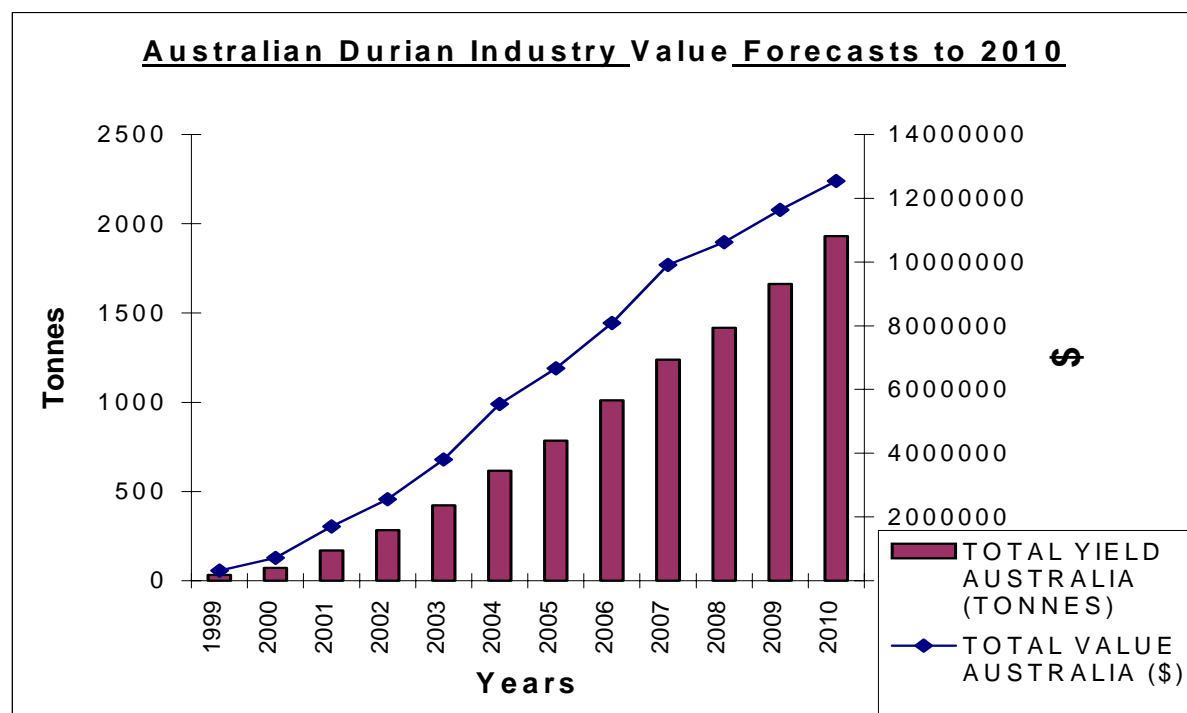


Table 9. Comparison of Northern Territory and North Queensland Industry Value
 (Source: AFFA Economic Policy Branch November 1999, following updated Industry Tree Census, November 1999)

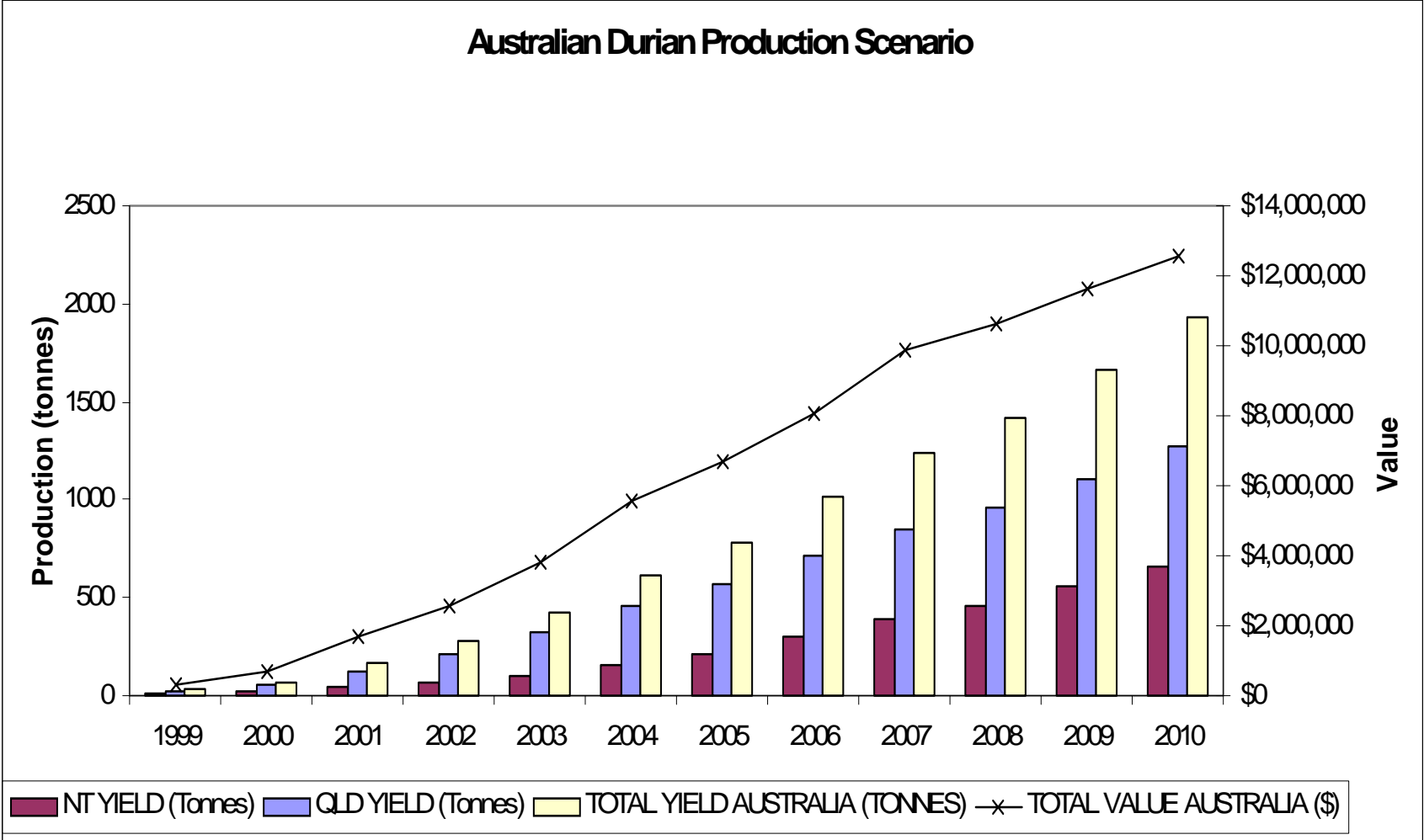


Table 10. Climatic Comparisons for Australian and other World Durian Production Areas

<u>Location</u>	<u>Latitude</u>	<u>Mean Max. Temp (°C)</u>	<u>Mean Min. Temp (°C)</u>	<u>Annual Rainfall (mm)</u>	<u>Annual Evaporation (mm)</u>	<u>Months Moisture Deficit</u>
Chantaburi Thailand	12. 36° N	33.4	19.6	3015	1556	6
Alor Setar Malaysia	6.12° N	34.4	21.7	2197	1760	4
Jakarta Indonesia	6.11° S	32.9	22.9	1823	1035	4
Darwin N.T.	12. 25° S	33.1	19.3	1665	2685	8
South Johnstone N.Q.	17. 36° S	31.2	14.4	3308	1572	4

Table 11. Comparison of Durian Flowering and Fruiting Patterns in Australia.
(from grower's experiences in NT and NQ 1999 to 2002.).

Location	Northern Territory											
Tree Status	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Flowering												
Fruit Development												
Harvest												
Location	North Queensland											
Flowering												
Fruit Development												
Harvest												

Legend.

Nil	Light	Medium	Heavy

Table 12. Malaysian Climatic Data East and West

Source: The ASEAN compendium of climatic statistics (ASEAN 1982).

Month	Rainfall (mm)				Maximum Temp (C)			Minimum Temp (C)		
	Kuala Kangsar	Bukit Tangga	Kuching	Miri	Bukit Tangga	Kuching	Miri	Bukit Tangga	Kuching	Miri
	1980-92	1988-93	1959-91	1973-91	1988-93	1959-91	1973-91	1988-93	1959-91	1973-91
Jan	115	11	627	264	32.0	30.8	34.5	21.0	22.9	22.5
Feb	160	20	498	139	34.0	31.2	35.0	21.0	23.1	21.7
Mar	175	128	356	125	34.0	32.0	34.7	22.0	22.9	21.0
Apr	225	170	303	216	34.0	33.1	36.0	25.0	23.1	24.0
May	190	168	268	203	34.0	32.3	35.0	24.0	23.2	21.0
Jun	85	124	190	187	33.0	33.1	36.5	24.0	23.1	23.0
Jul	130	132	194	172	32.0	33.0	36.0	23.0	22.8	22.5
Aug	127	145	221	174	32.0	32.9	35.0	23.0	22.5	22.3
Sep	220	184	256	220	32.0	32.5	34.8	22.0	22.8	21.8
Oct	225	221	301	252	32.0	32.7	34.5	22.0	22.4	22.0
Nov	235	187	370	302	31.0	31.9	35.0	22.0	22.2	23.0
Dec	140	63	477	330	31.0	31.4	35.0	22.0	22.1	23.5
Total	2027	1553	4061	2584	32.6	32.2	35.2	22.6	22.8	22.4

Locations: Kuala Kangsar is on the west coast of peninsular Malaysia, approximately halfway between Kuala Lumpur and Penang

Kuching is the capital of Sarawak

Miri is in northern Sarawak city near Brunei

Bukit Tangga is in Perlis state, northern peninsular Malaysia

Table 13. Industry Strengths

	NT	NQ (I)	NQ (M)	ALL
Production Issues				
Genepool of world class cultivars are currently being multiplied.	1.1	1.3	1.6	1.3
RIRDC has approved a 5-year clonal evaluation program which already has commenced.	1.6	1.7	1.8	1.7
Pest and disease information already available for other fruit trees are also relevant for durian (Phytophthora and fruit spotting bug control measures).	1.8	1.7	1.8	1.8
NT DPI&F has a world renowned durian researcher on staff.	1.7	2	1.9	1.9
Healthy durian trees have a long production life (approx 50 years +).	1.7	2.6	2.7	2.3
Most orchards are suited to mechanisation for cost effective farm management.	2.6	3.2	2.9	2.9
Availability of productivity data (TK LIM).	-	1.6	-	-
Existing production/marketing	-	2.4	-	-
Marketing, Packaging, Transport, Value Adding Issues				
Highest priced tropical fruit even in Asian countries with excellent dollar per hectare returns	1.4	1.6	2.1	1.6
A unique product with an addictive taste that is always in demand.	1.9	1.7	1.3	1.7
An increasing Asian/Pacific population providing a domestic market base for quality fruit.	1.7	1.7	2.6	1.9
Durian is non host for the Papaya Fruit Fly (PFF).	2.7	1.7	2.3	2.2
Durian flesh is suited to processing.	2.6	2.2	2.4	2.4
Strong local markets exist in both Darwin and Cairns.	2.2	2.4	2.9	2.4
Excellent dollar per hectare returns for quality fruit.	-	1.8	-	-
Ripens after harvest	-	2.4	-	-
Little odour when picked mature (transport)	-	2.5	-	-
Industry Issues				
Industry has access to research funds.	1.4	1.2	1.6	1.4
Australia is free of durian fruit and rind borers which are major insect pests in Asia.	1.7	1.5	1.6	1.6
Direct contacts are available with overseas researchers and growers.	1.5	1.7	1.6	1.6
The industry has a group of dedicated growers.	1.5	2	1.9	1.8
The industry is shaping it's own future.	1.8	1.9	1.6	1.8
Australian fruit ripens during Asia's off season (Thailand season is March to May, Malaysia produces June to August).	1.6	1.9	2.1	1.8
Both potential production regions of Australia complement each other.	1.6	2.1	2	1.9
Geographically diverse area suitable for an extended production season (November to January in NT and January to April in NQ)	1.8	2.1	2.2	2.0
An additional crop for exotic fruit growers to spread their risks and optimise farm resources.	2.3	2.3	2.3	2.3

Table 14. Industry Weaknesses Production Issues	NT	NQ (I)	NQ (M)	ALL
Scarce availability of quality planting material	1.3	1.4	1.6	1.4
Lack of information and grower management experiences regarding:· growing, harvest and post harvest	1.6	1.5	1.5	1.5
No DPI and NT DPI & F recommended variety list	1.6	2.1	1.7	1.8
Susceptibility to the root diseases (Phytophthora and Pythium)and no prevention strategies	1.8	2	2	1.9
Confusion over old cultivar identification	1.8	2.3	1.9	2.0
No new clonal introductions from Sri Lanka, Vietnam and the Philippines	2.7	2.4	2.6	2.6
Long juvenile period (Expect first fruiting at year 5)	2.3	2.7	3.2	2.6
Five year clonal evaluation program not sufficient time frame	2.2	-	-	-
Lack of information regarding other durio species	2.2			
No economic analysis	-	-	2.5	-
No new clonal introductions from Indonesia	2.7	-	-	-
Marketing, Packaging, Transport, Value Adding Issues				
No industry fruit maturity standards	1.6	1.9	1.7	1.8
No market strategies	1.6	1.9	1.8	1.8
Lack of information on post harvest storage and odour proof packaging for transport	1.6	2.1	1.8	1.9
Lack of a consistent supply of quality fruit to market	1.7	2.2	1.8	1.9
No market strategies/research/promotion	-	1.9	-	-
Lack of information on post harvest storage and packaging technology for transport	-	2.1	-	-
No method to identify inferior fruit.	-	2.1	-	-
Short shelf life.	-	2.3	-	-
Industry Issues				
Sale of inferior fruit gives industry a bad name	1.7	1.9	1.4	1.7
No industry direction, infrastructure, research and promotion levies or statistics	1.5	2.1	1.8	1.8
Lack of registered chemicals	1.7	2.2	1.6	1.9
Some growers have never tasted a quality durian.	2.4	2.9	1.9	2.5
Some production areas are at the climatic limit for optimum tree growth.	2.5	3.1	2.9	2.8
Cyclone susceptibility	2.9	4.1	2.4	3.3
Lack of expertise re: DPI tropical fruit tree research.	-	2.4	-	-
No ICA (PFF).	-	2.5	-	-

Table 15. Industry Opportunities

	NT	NQ (I)	NQ (M)	ALL
Production Issues				
To supply a consistent, quality product	1.1	1.4	1.3	1.3
To transfer and adopt information from other horticultural industries regarding: Phytophthora (Avocado Industry)· Fruit spotting bug (Avocado, Cashew and approx 20 other crops)	1.7	1.8	1.4	1.7
To adopt new technology for farm management (sidewinder injector for Phytophthora)	1.7	1.9	1.5	1.8
Identify promising seedlings as future cultivars/rootstocks	-	2	-	-
Organic production	-	2.5	-	-
Identify existing cultivars other than in the current RIRDC Project ZTR-1A	-	2.6	-	-
Marketing, Packaging, Transport, Value Adding Issues				
To increase domestic demand	1.6	1.6	1.8	1.6
To promote a clean green product image	1.6	1.7	2.2	1.8
To establish coordinated marketing by developing:· fruit standards, market strategies, Quality Assurances systems using a clean green product image	1.7	1.9	1.6	1.8
To adopt new technology for packaging, (odour proof) and transport	1.6	2	1.6	1.8
To replace frozen imports	1.5	1.8	2.4	1.8
To supply export markets during Asian's off season	1.8	2	2.1	1.9
To promote value adding and downstream processing for: freeze dried powder for cakes and biscuits ice cream flavour, candies,·durian wine and durian jam.	2.2	2.3	2.1	2.2
Industry Issues				
To accurately identify existing cultivars	1.1	1.6	1.7	1.4
To increase supplies of recommended planting material	1.3	1.5	2	1.5
To increase the flow of information between growers, researchers, funding bodies and consumers	1.6	1.7	1.4	1.6
To encourage and benefit from combined international research through ACIAR Projects (Phytophthora)	1.9	2	1.8	1.9
To establish Industry representation on horticultural bodies eg: Rambutan and Tropical Exotics Association N.Q,·Queensland Fruit and Vegetable Growers, NT Horticultural Growers Association.	1.8	2.2	1.6	1.9
To develop a planned industry structure	1.9	2.1	1.7	2.0
To become an effective lobby group	2.2	2.2	1.6	2.1
Overcome fruit quality issues by variety registration	-	-	1.8	-
Liaise with AQIS and other government bodies re: pest and disease protocols, imported fruit residue levels	-	-	2	-
Potential to develop a Grower Association.	-	2.7	-	-

Table 16. Industry Threats	NT	NQ (I)	NQ (M)	ALL
Production Issues				
The introduction of new strains of pests and diseases into Australia(Thailand's fruit borers and rind borers larvae)	1.1	1.6	1.7	1.4
Durian is susceptible to serious root diseases eg: Phytophthora and Pythium	1.3	1.4	2	1.5
Durian is also susceptible to serious insect pests eg: Fruit spotting bug, fruit moths and bark girdling borers	1.5	1.6	1.7	1.6
Marketing, Packaging, Transport, Value Adding Issues				0.0
Imports of fresh Asian fruit if the existing Australian quarantine restrictions are dropped	1.4	1.7	1.4	1.5
Danger to industry if inferior fruit is marketed	1.7	1.9	2.1	1.9
Lack of funding for research and development projects relating to Marketing, Packaging, Transport, and Value Adding	1.9	1.9	1.9	1.9
High pesticide residue levels could effect markets.	1.8	1.9	2.6	2.0
Erroneous identification of existing cultivars could effect market sustainability.	2.1	2.3	2.2	2.2
Danger of loss of odour proof packaging technology developed in Australia to other countries.	1.8	-	-	-
Industry Issues				
Lack of industry direction	2.1	2.1	1.7	2.0
Industry will fade due to lack of financial commitments from growers, state governments, federal funding bodies and other organisations relating to research, development and extension projects	1.9	2.2	2.2	2.1
Increasing production costs	2	2.4	2.3	2.2
Loss of registered chemicals due to increased environmental concerns	2.1	2.2	2.8	2.3
No go for fruit in some resorts (odour)	-	1.8	-	-
Foreign competitors	-	-	1.9	-
Pests in imported packaged durian	2.1	-	-	-

Table 17. Durian SWOT Meeting Attendance

	28 October 1996	30 October 1996	19 November 1996
DURIAN WORKING GROUP	South Johnstone	Mossman	Darwin
Joe Zappala	Mick Thomson	Andre Leu	Ted Whiteaker (RFCA)
Alan Zappala	Dick Finney	Colin Gray	Jane Bailey
Kevin Jensen	Paul Koy	Mark Gray	Richard Sadowski
Pedro O'Connor	Pedro O'Connor	Peter Mansfield	Meredith Sullivan (DPI & F)
David Chandlee	Alf Uechtritz	Dieter Kirchner	Doris Marcsik
Andre Leu	Lindsay George	Darell Burke	Yvonne O'Neill
Colin Gray	Marilyn Groom	Charles Massom	Bert Jaminon
Bert Jaminon	Fred Groom	Bruno Scomazzon	T. M. Siah
Richard Sadowski	Tom Meredith	Noel Evennett	S.Y. Siah
	Ray Flugenhaeur	Paul Koy	Jerry Warrwer
Industry	Margaret Flugenhauer	Joe Zappala	Sue Warrwer
Megan Farr (QFVG)	John McCormack	Alan Zappala	Mike Poffley
Paul Koy (Rambutan Assn)	David Chandlee	Phil Ross (QHI)	Bruce Toohill
Packaging	Chris Anderson	Chris Horsburgh (QHI)	Barry Conde (DPI & F)
Maurice Pedrola	Les Williams	Roger Goebel (QHI)	T. K. Lim (DPI & F)
Marketing	Kerry McAvoy		Yan Diczbalis (DPI & F)
Barry Kanowski	Kevin Jensen		Alan Zappala
Transport	Gavin Jensen		Joe Zappala
Malleys	Lu Brunello		Chris Horsburgh (QHI)
Government	Alan Zappala		Phil Ross (QHI)
QHI CWTA	Peter Selaras		Ian Baker
NT DPI & F	Joe Zappala		
	Steve Scopelliti		
	Chris Horsburgh (QHI)		
	Phil Ross (QHI)		
	Total 25	Total 15	Total 21

Attachment 1. Initial SWOT Circulated Information

Industry Strengths

Production Issues

- Genepool of world class cultivars are currently being multiplied.
- RIRDC has approved a 5 year clonal evaluation program which already has commenced .
- NT DPI&F has a world renowned durian researcher on staff.
- Pest and disease information already available for other fruit trees are also relevant for durian (*Phytophthora* and fruit spotting bug control measures)
- Healthy durian trees have a long production life (approx 50 years +)
- Most orchards are suited to mechanisation for cost effective farm management
-
-
-
-
-

Marketing, Packaging, Transport, Value Adding Issues

- Highest priced tropical fruit even in Asian countries with excellent dollar per hectare returns.
- A unique product with an addictive taste that is always in demand.
- An increasing Asian/Pacific population providing a domestic market base for quality fruit.
- Strong local markets exist in both Darwin and Cairns.
- Durian is non host for the Papaya Fruit Fly (PFF)
- Durian flesh is suited to processing
-
-
-
-
-

Industry Issues

Industry has access to research funds

Direct contacts are available with overseas researchers and growers

Australia is free of durian fruit and rind borers which are major insect pests in Asia.

The industry has a group of dedicated growers

Geographically diverse area suitable for an extended production season
(November to January in N.T. and January to April in N.Q.)

Both potential production regions of Australia complement each other

Australian fruit ripens during Asia's off season.
(Thailand season is March to May, Malaysia produces June to August)

The industry is shaping it's own future

An additional crop for exotic fruit growers to spread their risks and optimise farm resources.

Industry Weaknesses

Production Issues

- No DPI and NT DPI&F recommended variety list
- Confusion over old cultivar identification
- Scarce availability of quality planting material
- No new clonal introductions from Sri Lanka, Vietnam and the Philippines
- Lack of information and grower management experiences regarding:
 - farm design (pollination)
 - plant nutrition requirements
 - pest control (fruit spotting bug, bark girdling borers)
 - disease control (*Phytophthora*, *Pythium* and unidentified branch dieback)
 - irrigation requirements
 - harvesting maturity
 - IPM and biological control methods for pests and diseases (*Mycorrhizac*, *Phytophthora* and Fruit Spotting Bug)
 - disease tolerant and compatible rootstocks
- Long juvenile period (Expect first fruiting at year 5)
- Difficult crop to grow due susceptibility to the root diseases (*Phytophthora* and *Pythium*)
-
-
-
-
-

Marketing, Packaging, Transport, Value Adding Issues

- No market strategies
- No industry fruit maturity standards
- Lack of information on post harvest storage and odour proof packaging for transport
- Lack of a consistent supply of quality fruit to markets
-
-

Industry Issues

No industry direction, infrastructure, research and promotion levies, or statistics

Sale of inferior fruit gives industry a bad name

Some growers have never tasted a quality durian

Lack of registered chemicals

Some production areas are at the climatic limit for optimum tree growth

Cyclone susceptibility

Industry Opportunities

Production Issues

To supply a consistent, quality product

To transfer and adopt information from other horticultural industries regarding:

- *Phytophthora* (Avocado Industry)
- Fruit spotting bug (Mango, Avocado, Cashew and 20 other crops)

To adopt new technology for farm management (sidewinder injector for *Phytophthora*)

Marketing, Packaging, Transport, Value Adding Issues

To increase domestic demand

To promote a clean green product image

To replace frozen imports

To adopt new technology for packaging, (odour proof) and transport

To establish coordinated marketing by developing:

- fruit standards
- market strategies
- Quality Assurances systems using a clean green product image

To promote value adding and downstream processing for:

- freeze dried powder for cakes and biscuits
- ice cream flavour
- candies
- durian wine
- durian jam etc

To supply export markets during Asian's off season

Industry Issues

To increase supplies of recommended planting material

To accurately identify existing cultivars

To develop a planned industry structure

To become an effective lobby group

To increase the flow of information between growers, researchers, funding bodies and consumers

To establish Industry representation on horticultural bodies eg:

- Rambutan and Tropical Exotics Association N.Q.
- Queensland Fruit and Vegetable Growers
- Horticultural Growers Association

To encourage and benefit from combined international research through ACIAR Projects (*Phytophthora*)

Industry Threats

Production Issues

The introduction of new strains of pests and diseases into Australia (Thailand's fruit borers and rind borers larvae)

Durian is susceptible to serious root diseases eg: *Phthorhthora* and *Pythium*

Durian is also susceptible to serious insect pests eg: Fruit spotting bug, fruit moths and bark girdling borers

Marketing, Packaging, Transport, Value Adding Issues

Imports of fresh Asian fruit if the existing Australian quarantine restrictions are dropped

Danger to industry if inferior fruit is marketed

Erroneous identification of existing cultivars could effect market sustainability.

Lack of funding for research and development projects relating to:

- Marketing
- Packaging
- Transport
- Value Adding

High pesticide residue levels could effect markets

Industry Issues

Lack of industry direction

Industry will fade due to lack of financial commitments from growers, state governments, federal funding bodies and other organisations relating to research, development and extension projects

Loss of registered chemicals due to increased environmental concerns

Increasing production costs

Appendix 2.

1998 Meeting Handout for the review of the Durian Strategic Plan

Update of Achievements since the last series of Durian Growers Meetings held in NQ & NT October & November 1996

- **Industry Strategic Plan completed on time for RIRDC through the assistance of growers, NT DPI&F and DPI and other participants** (June 1997)
- **Durian was identified as one of the five fruit crops at the RIRDC Cairns**
- **Workshop which will increase our chances for Research projects** (July 1997)
- **Further Clonal Introductions from Malaysia** (November 1997)
- **RIRDC and representatives of Industry met in Cairns to decide on which projects would be funded by RIRDC** (January 1998)
- **A Minor use chemical application list was prepared and forwarded to the NRA via QFVG's Environmental officer: Shauna Dewhurst** (January 1998)
- **ICA-13 approved for Durian relating to Papaya Fruit Fly (PFF)** (January 1998)
- **ACIAR / RIRDC Phytophthora project researchers asked to develop a full proposal** (February 1998)
- **Australian Tropical Fruit Research and Advisory Group formed to lobby RIRDC for increased funds** (February 1998)
- **RIRDC advised Australian Tropical Fruit Research and Advisory Group that an extra \$100,000 will be made available for research projects from October 1998** (March 1998)
- **AQIS approved funds to relocate the Kamerunga post entry Q house to South Johnstone** (April 1998)

1998 Meeting Handout for the review of the Durian Strategic Plan

Major TO DO LIST items still to be completed in 1998/99.

- **Replacement for Nic Richards (QHI) still to be appointed**
- **Industry statistical information not completed**
- **Grower database partly completed**
- **Industry newsletter commenced**
- **Odour proof packaging project rejected twice by RIRDC**
- **Basic site guidelines needs updating**
- **Seedling evaluation commenced**
- **Insect survey commenced in NQ**
- **AQIS liaison commenced**
- **Threat of FRESH imports from Thailand**
- **QHI economist to evaluate our industry**

Figure 1: Strategic Planning Process Model

