



Australian Government

**Rural Industries Research and
Development Corporation**

Exotic Crop Review Workshop

**Summary of proceedings
and outcomes
of a workshop
held at South Johnstone
12-13 February 2003**

**A report for the Rural Industries Research
and Development Corporation**

By Pedro O'Connor and Yan Diczbalis

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Foreword

This report, prepared by the Queensland Department of Primary Industries, presents the proceedings and findings of a workshop aimed at determining the priority of existing, new and emerging crop opportunities which could complement current farming systems in tropical north Queensland, Western Australia and the Northern Territory.

The impetus for the workshop follows on from an initial workshop conducted in July 1997 (Ross 1997). At that time 5 major tree crops, prioritised from a group of 40 fruits, nuts and vegetables, were identified as having the most commercial potential. Since that time, 4 of the crops identified have received funding for production based and marketing issues. The future growth of these industries is dependant on building domestic market consumption along with export markets.

A decline in the profitability of sugar cane farming is resulting in many farmers seeking crops to diversify into so as to spread their risk. Potentially, crops identified at the workshop could assist farmers in making correct decisions for alternative crops based on market demand. The diverse climatic regions represented allowed a vast array of products to be considered however a shortlist with strong commonality emerged.

This project was funded from RIRDC Core Funds, which are provided by the Australian Government.

This report is an addition to RIRDC's diverse range of over 900 research publications, forms part of our New Plant Products R&D program, which aims to facilitate the development of new industries based on plants or plant products that have commercial potential for Australia

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

- downloads at www.rirc.gov.au/reports/Index.htm
- purchases at www.rirc.gov.au/eshop

Simon Hearn

Managing Director

Rural Industries Research and Development Corporation

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The workshop was the culmination of many people's efforts, in particular Stewart Lindsay (Extension Officer-Bananas, QDPI) who skilfully facilitated day two of the workshop, which allowed the thoughts and ideas, generated during day one to be synthesised into workshop recommendations. Thanks must go to the farmers who forfeited time on their farms so as to provide much needed practical input and experience.

Appreciation is also extended to all the other participants for their valuable contributions:

- Simon Hearn, Managing Director, RIRDC
- Tony Byrne, Manager Asian Vegetable program, RIRDC
- Max Bourke, Manager New Plant Products (NPP) program, RIRDC
- David Evans, former Manager NPP program, RIRDC
- Ray Collins, Associate Professor, University of Queensland
- Alan Carle, Collector, Botanical Ark, Mossman
- Sonya Maley, Bamtek, Tully
- Keith Noble, Director, Australian Tropical Marketing, Tully
- Alan Zapalla, President, Rambutan and Tropical Exotic Growers Association, Qld
- Gerry McMahon, Horticulturist, DBIRD, Northern Territory
- Peter Johnson, Agronomist, Western Australian Department of Agriculture
- Chris Horsburgh, Marketing Officer, QDPI, Mareeba
- Peter Tonello, Principal Development Extension Officer, QDPI, Mareeba

The workshop would not have been possible without the financial support of the Rural Industries Research and Development Corporation. Thanks go to the Corporation and especially to Mr. Max Bourke, Manager of the New Plant Products Program, for his initiative in advocating the need for the workshop.

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Executive Summary

A workshop was held to review the performance of five tree crops, namely rambutan, mangosteen, durian, longan and abiu that were identified in 1997 as the crops with most commercial potential for northern Australia. A recent market analysis was able to document the actual demand of the above crops as well as a selection of other less known fruit and vegetables. Participants included representatives from grower associations, research agencies, marketing companies, tertiary institutions and individuals who provided a perspective on alternative crops that currently have not received consideration.

Participants at the workshop came to a unanimous decision that, of the crops considered, rambutan is presently showing the best commercial return to growers and should be given priority in any research proposals. Other fruits that could be considered are taro, mangosteen, pitahaya, starapple, pummelo and jackfruit. Longan's priority has declined because the use of potassium chlorate (a flower induction agent) in Thailand has allowed growers there to export to Australia's previous markets during Australia's supply window. Durian did not figure as prominently as in the past due to a number of grower's adverse experiences of tree losses from phytophthora during recent wet seasons. The recent research finding through RIRDC Project ZTR-1A and the ACIAR Durian *Phytophthora* PHT 95/134 is expected to assist this industry greatly in the future.

From the marketing intelligence that was commissioned for the workshop one very clear message came through. Consumer demand is for the tropical fruit category rather than any one individual fruit and the market growth will be more easily achieved by moving the category forward, rather than individual crop segments. This now becomes a challenge to industry to establish a supply chain strategy that encompasses all fruits that are considered tropical in the eyes of the consumer, not the grower.

As in many of the more established horticultural industries, the advantages of co-operative marketing groups were heavily emphasised. In recent years, sectors of the exotic tropical fruit industry have experienced the benefits to be gained from a co-ordinated approach to marketing. The established marketing alliances now need to position themselves as part of a supply chain. Put simply, this is a chain of activities and relationships that links consumers with producers and producers with consumers, without which benefits cannot be delivered to the consumer. It was also recognised that there will be a great need for promotion of the various products to increase the consumer awareness and demand for these new and exciting fruits.

There was a strong feeling that industry needs to invest in documenting and evaluating the existing germplasm of exotic plants currently in Australia. This could be used to update the Australian Quarantine and Inspection Service (AQIS) import database (ICON). It is hoped that closer ties with AQIS can be established so as to streamline the process of introducing new plant species, which may have commercial potential, into Australia.

1. Background to the Workshop

Exotic tropical crops were first introduced to Australia in the 1970's by a number of enthusiastic collectors and growers who were inspired by Brian Watson who was the Officer in Charge of the Kamerunga Research Station, QDPI, Cairns. A number of nurseries began propagating material for release to the public. In the 1980's cane and tobacco growers, looking for alternative crops for on farm diversification, became the first commercial growers. The Rare Fruits Council of Australia was very active through this period and played a key role in the distribution of many varieties of fruit and nut trees throughout the tropics (Zapalla 2003).

During the late 1980's and early 1990's there was an obvious commercialisation phase when growers began planting large numbers of selected varieties, which had been found suitable to local climatic conditions. Growers were learning of the intricacies of the nature of the trees from year to year by empirical observations. Queensland Government departments were conducting very little research into these new crops, whereas the Northern Territory was actively involved in research on rambutan and durian in particular.

A RIRDC sponsored workshop, which was the initiative of the Manager, New Plant Products, was held in Cairns in 1997. This brought together a wide range of interested parties in the "emerging" tropical crops sector. The rationale was to pool information and come to a consensus as to which of a wide range of commercially under-exploited crops had the best market potential and hence were worthy of the expenditure of research and development funds. The workshop objectives were:

1. To assess a range of under-exploited tropical fruits, vegetables and nuts for their domestic and export market potential.
2. To arrive at a shortlist of crops considered having the best market and developmental potential.
3. To identify major research priorities which would limit the developmental prospects of the crops.

The methodology was very exhaustive and detailed. It can be found in RIRDC Research Publication No 97/ 80, RIRDC Project No DAQ WS967-19.

The shortlist arrived at consisted of

1. Rambutan
2. Mangosteen
3. Durian
4. Longan
5. Abiu

Since 1997, there have been five research projects conducted on rambutan, two on durian, three on longan and two on mangosteen. These individual projects are detailed later in this document. No work has been performed on abiu as there are very few growers persevering with this crop because of its inherent postharvest problems.

A new manager was appointed to the NPP program in 2001 and visited north Queensland to familiarise himself with the industry and its members. Under his direction it was decided there was a need to review the crops that were selected in 1997 to ascertain if priorities had changed. The Queensland Department of Primary Industries was asked to organise the workshop, which was held at the Centre for Wet Tropics Agriculture, South Johnstone on 12-13 February 2003.

Workshop Objectives

1. To reassess the priority of crops worthy of research funding.
2. Determine any new and emerging crop opportunities, which can complement current farming systems.
3. To identify a process to improve domestic market awareness and increased consumption of tropical exotic fruits.

Methodology

1. Members of the RIRDC management presented an overview of the current climate for research in Australia within which industries have to work.
2. Representatives from Queensland, Western Australia and the Northern Territory provided updates on the status of the various crops being produced in their state.
3. An agronomic researcher provided an overview of the projects that have been conducted on the five crops identified as having most potential in 1997.
4. A research market analyst presented findings of a recent study assessing retail and consumer perceptions for exotic tropical fruits.
5. Guest speakers provided thought provoking topics on subjects covering marketing alliances, supply chains, alternative crops and germplasm collecting.
6. Participants were divided into working groups to consider the priority of crops worthy of research proposals and the issues associated with the various crops.

2. Presentations from Invited speakers

RIRDC Management Overview

The RIRDC budget this financial year is in the vicinity of \$26 million across four program areas.

The New Plant Products program will receive a budget of approximately \$1.4 million from core funds with another \$100,000 contributed from industry. This money is used to facilitate the development of new industries based on plants or plant products that have commercial potential for Australia.

The program is comprised of six components-

1. Native foods
2. Culinary herbs, spices, beverages
3. Extractive and fibre crops
4. Fruit, vegetable and nut crops
5. Grain and pulse crops
6. Miscellaneous crops and activities

The key strategies are

1. Perform market studies along the whole value chain; aim to make new crops demand-pull rather than supply –push
2. Identify, evaluate, test market new species, varieties, processes or products
3. Develop production, harvesting, processing, marketing systems
4. Link this program to other RIRDC programs to develop potential in nutraceutical and industrial plant crops.

The tropical fruits, which are the main focus of this meeting, have received some \$1 million dollars funding over the past 5 years. This has been spent on 20 different projects covering aspects of tree phenology, canopy management and cultural practices.

RIRDC constantly monitors and evaluates its major programs as the increasing demand for funds means that areas with greatest prospects and demand need to be prioritised. The challenge within the tropical exotic industry is to determine which are the crops with the most potential. What areas of commercialisation need to occur to build the industry so as it can attain a size whereby levies collected can make a greater contribution to research and development?

Minor tropical exotic fruits and their value

Hogs Plum - <i>Spondias</i>	\$243,975
Guava - <i>Psidium guajava</i>	\$109,874
Carambola - <i>Averrhoa carambola</i>	\$78,260

Hogs Plum

Tree numbers - unknown

Growers - unknown

Price/kg - \$3.50-\$5.00

Issues-

Unserviced

Guava

6 major growers

White flesh type

Price/kg \$3.50

Issues-

Unserviced

Tree number - unknown

Varieties

Winged vertebrate pests

Carambola

Tree numbers - 5,000 approx.

5 major growers

Price/kg - \$6.00 avg.

Issues-

Netting

NT Research to date

Varietal Evaluation

Abiu, Rambutan, Durian, Carambola, Longan, Papaya, Pitahaya

Nutrition Studies

Carambola, Durian, Rambutan, Mangosteen, Pitahaya

Irrigation Management

Rambutan, Durian

Canopy Management

Carambola, Rambutan, Durian, Mangosteen

Flowering

Rambutan, Carambola, Durian, Mangosteen

Pest and Disease Control

Rambutan, Carambola, Durian

Postharvest and Quality

Rambutan, Mangosteen

More or new work required

Varietal Assessment

Abiu, Jackfruit, Papaya, Rambutan, Pineapple, Starapple, Pitahaya, Passionfruit

Post-harvest / Quality

Jackfruit, Abiu

Market Identification and Access

Pitahaya, Rambutan

Unserviced / size unknown

Jackfruit, Guava, Hog Plum, Starapple

Orchard Management

Rambutan, Pitaya, Carambola, Guava

Revisit information and review overseas work on

Abiu, Starapple, Carambola, Cupuacu, Papaya, Pitahaya

Summary

Northern Territory's tropical fruit industry is vibrant and growing

Some industries are an unknown quantity

Increasing move towards diversification

But unable to select suitable crops and varieties

Many opportunities yet to be identified

Developments in Exotic Crops in Western Australia

Peter Johnson, Department of Agriculture, Kununurra, Western Australia

Industry Background

Industries in infancy

Sapodilla (largest)

Carambola

Starapple

Jackfruit

Litchi

Longan

Guava

Rambutan

Custard apple

New Opportunities

Database: 715 potential new fruit crops.

Information collection eg Natural Geographic distribution.

Screen against selected criteria eg Market, Production costs, Seasonality, Genetic material.

Categories

Crops which are commercial else where but not in WA (Established markets)

Crops grown on small scale in WA with potential to expand.

Crops not developed.

Existing crops with new use (Eg Pharmaceutical.)

Recent introductions

Pili nut (3)

Langsat (1)

Pitahaya (1)

Recent Trial Work

Sapodilla

-Cultivars selection, Rootstock selection, Test marketing.

-Introduction of superior rootstock, *Manilkara hexandra*

-Custard apple (2), Longan (1)

North Kimberley – North Thailand Comparison

Max/Min Temp, rainfall distribution and volume for both these areas are very similar. On this basis it is conceivable that the following crops could be suited climatically to particular regions in the Kimberley, there are however other logistical impediments.

Site Selection

Zone 1- Coastal Kimberley: Rambutan, Durian, Mangosteen

Zone 2- Plateau Kimberley: Longan, Litchi

Zone 3- Semi-arid tropics: Pitahaya, Langsat, Sapodilla, Pili, Carambola

Impediments

Harsh climates in existing horticultural areas.

Difficulty in obtaining genetic material.

Lack of infrastructure in suitable areas.

What opportunities does this create?

Northern Thailand world leader in tropical horticultural exports: with a similar climate north Western Australia could be a region for counter season production of litchi and longan.

Large plantation crops; coffee, macadamia.

Early domestic production; avocado, mandarin.

BOAB (*Adansonia gregorii*)

Indigenous to NW Australia.

Every part of the plant is useful.

African species, part of indigenous diet.

Wide range of pharmaceutical uses

(Anti Inflammatory- Anti Asthmatic, Anti oxidant, Antidote to strophanthus)

Boab Roots

Potential as a vegetable crop.

Excellent flavour and texture.

Versatile.

Quick growing.

Results

Fully mechanised process for planting and harvest.

Six to eight week crop cycle with yields of 12 tonne/Ha.

Still some problems with germination.

Interest in leaf as salad vegetable.

Wide spread interest.

Commercialising/Marketing required.

Queensland Tropical Horticulture Overview

Alan Zappala, President, Rambutan and Tropical Exotic Growers Association Inc. (RTEGA)

History of Development

Phase 1: Embryonic 1970's

Catalyst:

Brian Watson, OIC, QDPI, Kamerunga HRS.

Growers and enthusiasts included:

Herb Bosworth, Alan Carle, Rod Catton, Brian Dodds, Joe Noli, John Marshall, Arnth Sorensen, their wives, families and others.

Nurseries:

Avondale, Exotic Groves, Fitzroy, Limberlost, Riversdale and Rosebud.

Organisation:

Rare Fruits Council of Australia.

Phase 2: Pioneer Growers 1980's

- Some of the first commercial growers other than the nursery suppliers were cane growers or tobacco growers looking for alternatives eg:

 - Flegler, Fontana, Magro, Scommazon, Zappala and others.

- Visits from overseas researchers and regular grower collecting trips to every south- east Asian country to import clonal material into Australi.,

- Formation of the local grower association (now called RTEGA).

- RFCA Conferences held at Mackay and later at El Arish.

- First contacts with RIRDC.

Phase 3: Commercialisation 1990's to present

Rambutan	28,000 trees
Longan	75,000 trees
Mangosteen	13,000 trees
Durian	9,000 trees
Pummelo	2,000 trees
Jackfruit	10,000 trees
Starapple	2,000 trees

Major quarantine breach of Papaya Fruit Fly (PFF) in 1996 cost Australia more than \$30m to control.

Crop	Current Value	Approximate Projected Value (2010)
Lychee	\$30 M	\$50 M
Longan	\$4 M	\$8 M
Rambutan	\$5 M	\$8 M
Mangosteen	\$0.75 M	\$4.5 M
Durian	\$0.5 M	\$4.5 M
Total	\$40.25 M	\$75 M
Total without Lychee	\$10.25 M	\$25 M

Final crop ratings determined in 1997 RIRDC Workshop

Crop	RIRDC Rating 1997
Rambutan	3.74
Mangosteen	3.66
Durian	3.36
Longan	3.29
Abiu	2.80
Pummelo	2.70
Carambola	2.56
Jackfruit	2.42
Pitahaya	2.32
Soursop	2.31
Caimito (Starapple)	2.19

The top four crops have been the subject of a number of research projects (excepting abiu); the other six have seen increased plantings in recent years. A summary of some of their attributes follows.

Jackfruit (Chempadek)

Used for windbreaks,
Grafted clones produce excellent fruit for a fresh fruit or processing,
Low cost for high volume output,
Domestic production is approximately 80 tonnes.

Pitahaya

New plantings underway on the coast and Tableland,
Israel, Vietnam and Thailand are all expanding their plantings,
Domestic market size is unknown.

Pummelo

1kg size citrus, excellent shelf life,
High prices for special occasions, Chinese New Year, (up to \$4.00/kg)
Some new clones introduced but still to be evaluated,
Domestic sales of up to 150 tonnes are estimated.

Carambola

Unique shape,
Host of fruit piercing moth and suffers insect damage, therefore low recovery ratio of quality fruit,
Needs dry conditions for sweetness.

Soursop

Excellent processing attributes,
Low \$ return per hectare,
Favourite fruit of flying foxes and other pests therefore low recovery ratio of quality fruit.

Caimito (Starapple)

Winter fruit, heavy production,
Haitian and Grimal (main varieties),
Current domestic production is approximately 20 tonnes.

Tropical Flowers

Heliconia, Gingers and cut foliage,
Approximately 30 growers, current value \$1.25M,
Part of the fashion industry, new colours and shapes required.

Queensland Tropical Horticulture Overview

The older rural industries of sugar, dairy and tobacco in NQ are in serious decline.

Dedicated growers and researchers have introduced the best genepool of tropical planting material to Australia.

The climate is suitable for a wide range of crops.

There is a core group of committed growers, mostly with long-term involvement in agriculture.

Active industry bodies and marketing groups are already in place.

Export markets are developing.

RIRDC assistance required for:

Identifying the opportunities to ensure the full development potential is achieved.

Involvement of all stakeholders, in each industry, to seize these opportunities.

Networking with research agencies and industry to ensure the uptake of these opportunities.

Evaluation of Tropical Exotic Fruit Research & Development

Yan Diczbalis, Snr Horticulturist, Centre for Wet Tropics Agriculture, QDPI, South Johnstone

Objectives

Clarify the relationship between industry, R&D providers and RIRDC

Review the outcomes of RIRDC sponsored R&D projects

-pre and post 1997 workshop

-clarify industry perceptions as well as that of researchers

Where to next?

Summary

Rambutan- Nine projects involving rambutan have been completed since 1990, five since 1997. Current value of the industry is \$ 6 million.

For people interested in obtaining more details of the projects, the titles and reference numbers are cited below and can be accessed from the RIRDC website.

DAQ-116A: Control of production patterns in tropical fruit-NQ

Completion date: 30 June 1994

Primary Outcomes:

- Characterization of rambutan varieties
- Detailed description of tree phenology in north Queensland,
- Extensive literature review on control of production patterns.

Industry Perception/comment:

- Limited circulation of report.
- Not available on RIRDC website.

UWS-2A: The postharvest browning of rambutan grown in the NT

Completion date: 30 June 1995

Primary Outcomes:

- Identified major cause of browning in rambutan (dehydration),
- Identified temperature and humidity parameters for correct storage,
- Film wrapped punnets identified as ideal packaging system.

Industry Perception/comment:

- Limited circulation of report outside of NT.
- Not available on RIRDC website,
- Basic science which led directly to improvements in postharvest handling and storage practices in the NT.

DAQ-10A Environmental factors influencing the growth and yield of rambutan in the NT

Completion date: 30 June 1995

Primary Outcomes:

- Documented tree phenology in relation to climate, identified physiological, responses to water deficit, RH and temperature, developed guidelines for tree water requirements and irrigation management.**Industry Perception/comment:**
- Provided an understanding of how rambutans responded to the NT environment. Useful from an irrigation management perspective. Not available on RIRDC website.DAQ-177A:

Optimising canopy management in lychee, longan and rambutan

Completion date: 30 October 1999

Primary Outcomes:

- Detailed analysis of lychee canopy management options based on growing environment,
- Preliminary investigation of longan flush development, documented effects of pruning on rambutan in the NT

Industry Perception/comment:

- The rambutan component is mainly of relevance to the NT industry

RTE-1A: Australian rambutan industry strategic plan

Completion date: 30 December 1997

Primary Outcomes:

- Clear set of industry objectives developed, improved communication between industry members (NT and Qld), set a timetable for future R&D.**Industry Perception/comment:**
- Excellent guide to plan industry development, set research agenda, original recently updated by NT and Qld industry.

DAQ-260A: Market opportunity identification and analysis of the domestic market for Australian rambutan and longan.

Completion date: 30 October 2000

Primary Outcomes:

- Identified size of rambutan market and key buyers, identified key industry weaknesses and opportunities, development of a marketing plan to assist industry.

Industry Perception/comment:

- Exhaustive analysis identifying key consumer groups, emphasized lack of awareness of rambutan amongst the majority of Australians, good basic start to market development.

DNT-26A: Nutrition and irrigation management of rambutan for maximisation of yield and quality-NT.

Completion date: 30 June 2001

Primary Outcomes:

- Developed improved leaf and soil nutrient standards for the NT, improved understanding of irrigation management by NT industry.**Industry Perception/comment:**
- Excellent extension tool which improved production practices in the NT, set new nutrition standards for NT grown rambutans.

DAQ-251A: Nutrition and irrigation management of rambutans and longans for maximisation of yield and quality-QLD

Completion date: 30 June 2001

Primary Outcomes:

- Documented industry fertiliser management practices and the resultant leaf and soil nutrient status, developed leaf and soil nutrient standards for north Queensland, developed a nutrient budget approach to nutrient management**Industry Perception/comment:**

- Helped growers to work together, Benchmark of nutrition data, Nutrition budget critical information in relation to concerns on nutrient runoff and its effect on the Great Barrier Reef,
- stimulated discussion between growers on rates and types of fertiliser being utilised.

DAQ-289A: Floral manipulation and canopy management in rambutan and longan

Completion date: Project current

Primary Outcomes:

- Developed discussion on canopy management issues. Discussed the issue with growers in regions (eg. North of Cairns, central wet tropics, and southern areas around Tully, trial work commenced.) **Industry Perception/comment:**
- Interaction between growers well underway.

Longan- four projects involving longan have been performed, three completed since 1997.

Current industry value \$2 million.

DAQ-177A: Optimising canopy management in lychee, longan and rambutan

Completion date: 29 October 1999

Primary Outcomes:

- Detailed analysis of lychee canopy management options based on growing environment preliminary model developed to predict longan leaf flushing. documented effects of pruning on rambutan in the NT. **Industry Perception/comment:**
- Of little direct use to the longan industry preliminary but work may assist future studies.

LGA-1A: Australian longan industry strategic plan

Completion date: 30 December 1997

Primary Outcomes:

- Clear set of industry development objectives, improved communication between industry members. Developed a list of recommended R&D requirements. **Industry**

Perception/comment:

- Excellent guide to plan industry development, has set research agenda for future projects.

DAQ-260A: Market opportunity identification and analysis of the domestic market for Australian rambutans and longan

Completion date: 30 October 2000

Primary Outcomes:

- Identified size of longan market and key buyers, identified key industry weaknesses and opportunities, development of a marketing plan to assist industry. **Industry**

Perception/comment:

- Exhaustive analysis identifying key consumer groups, emphasized lack of awareness of longan amongst the majority of Australians, good start to market development.

DAQ-251A: Nutrition and irrigation management of rambutan and longan for maximisation of yield and quality-QLD

Completion date: 30 June 2001

Primary Outcomes:

- Documented industry fertiliser management practices and the resultant leaf and soil nutrient status, developed longan leaf and soil nutrient standards for Queensland, developed a nutrient budget approach to nutrient management. **Industry Perception/comment:**
- Helped growers to work together.
- Benchmark of nutrition data.
- Stimulated discussion between growers on rates and types of fertiliser being utilised.

DAQ-249A: Developing a post harvest handling and storage strategy for longan

Completion date: Final report near completion

Primary Outcomes:

- Identified cultivar specific threshold storage temperatures (7.5 – 10°C). Identified optimum RH range (70-90%) and suitable packaging options.
- Identified HCl as an alternative to SO₂ for improving storage life.
- Trials indicate improvements in skin colour even at low temperatures.**Industry**

Perception/comment:

- Some problems experienced in early field trials.
- Still requires field/packing shed confirmation of results.

DAQ-289A: Floral manipulation and canopy management in rambutan and longan

Completion date: Project current

Primary Outcomes:

- Developed discussion on canopy management issues. Investigating the use of KClO₃ a fertiliser/flower induction agent•Time of application
 - Concentration
 - Application method
 - Time of pruning studies**Industry Perception/comment:**
- KClO₃ use taken up commercially.

Durian- five projects involving durian have been funded 2 of these since 1997.

Current industry value \$0.5 million

DAQ-116A: Control of production patterns in tropical fruit

Completion date: 30 June 1994

Primary Outcomes:

- Described durian tree phenology at 2 sites in north Qld Extensive literature review on control of production patterns

Industry Perception/comment:

- Limited circulation of report.
- Not available on RIRDC website.

DNT-13A: Boosting durian productivity

Completion date: 30 July 1996

Primary Outcomes:

- Described cultivars available overseas and in Australia. Highlighted reproductive self incompatibility of some major varieties. Documented tree phenology and nutrient status of trees grown in the NT

Industry Perception/comment:

- Most informative document that related directly to Australian conditions. Stimulated growers to adopt some of the recommended practices, i.e.. cross pollination and fertiliser scheduling. Not available on RIRDC website.

ZTR-1A: Durian germplasm evaluation for tropical Australia-phase 1

Completion date: 30 June 2001

Primary Outcomes:

- Identified seven cultivars which grew well under north Queensland conditions Identification of cultivars utilising genetic finger printing Development of an industry strategic plan.

Industry Perception/comment:

- Well received by durian industry.
- The strategic plan useful to guide further research and development work.

DNT-24A: Integrated management of Phytophthora diseases of durian (NT sub project of national ACIAR project)

Completion date: report near completion

Primary Outcomes:

- Identified extent and virulence of Phytophthora in NT environment. Identified environment and management constraints to durian production in the NT. Mulching and green manuring aids establishments of durian.

Industry Perception/comment:

- Mulching and manuring activities actively taken up by major NT grower.

DAQ-288A: Nutrition and phenology of durian and mangosteen orchards in north Queensland

Completion date: project current

Primary Outcomes: (to date)

- Initiated the collection of durian leaf and soil samples across all north Queensland producing areas. 6 grower co-operators

Industry Perception/comment:

- So little is known of the trees nutritional requirements. We need to establish baseline data and relate to yield capacity.
- Too early to comment on outcomes.

Mangosteen- three projects involving mangosteen have been funded, two since 1997.

Current industry value \$1 million.

DAQ-116A: Control of production patterns in tropical fruit.

Completion date: 30 June 1994

Primary Outcomes:

- Described mangosteen tree phenology in north Qld. Extensive literature review on control of production patterns.

Industry Perception/comment:

- Limited circulation of report.
- Not available on RIRDC website.

RTE-1A: Australian mangosteen strategic plan

Completion date: 30 December 1997

Primary Outcomes:

- Clear set of industry objectives developed, improved communication between industry members (NT and Qld), set a timetable for future R&D
- Consolidated opinion on industry direction prompted collection of accurate data re tree numbers. Focussed resources to concentrate on priority issues.

DAQ-288A: Nutrition and phenology survey of durian and mangosteen orchards in north Queensland

Completion date: project current

Primary Outcomes: (to date)

- Initiated the collection of mangosteen leaf and soil samples across all north Queensland producing areas, 6 grower co-operators

Industry Perception/comment:

- So little is known of the trees nutritional requirements. We need to establish baseline data and relate to yield capacity, too early to comment on outcomes

Abiu- nil projects.

Current industry value unknown but assumed low.

Where to next???

All of the top five crops nominated in 1997 could benefit from more production based R&D.

Consistent still cropping remains an issue.

Currently most of the top five fruits suffer a price drop during peak production periods indicating oversupply on current markets.

Increased demand for crop (domestic or export) will fuel further R&D.

How does the tropical fruit community get the most value out of the RIRDC funds?

Continue as is?

Focus on marketing the more commercially viable crops?

Look for complimentary alternatives?

These are the issues, which this group needs to deal with at the workshop.

A Market Performance Review of Selected Crops

Chris Horsburgh and Judy Noller, Rural Market Development
Officers, QDPI, Mareeba

Acknowledgements

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Introduction

This report addresses the following issues raised by RIRDC at a meeting of stakeholders from tropical exotic fruit and vegetable industry, government and RIRDC held in Cairns on 12th September 2002:

- Which tropical fruit and vegetable industries have commercially emerged since the previous workshop in 1997*
- How have these crops performed in the marketplace

The research results were formally presented at a national industry workshop held at the QDPI Centre for Wet Tropics Agriculture in South Johnstone on 12th February 2003.

The researchers have responded to these issues by interviewing or surveying via email over 30 respondents from industry. This group of respondents included primary producers, wholesalers and retailers involved in the marketing of tropical and exotic fruits and vegetables. Many responded in detail, while others provided valuable, though limited responses. All of these responses have been collated and included in the report.

The following crops were reviewed:

- Rambutan
- Mangosteen
- Longan
- Durian
- Abiu
- Jackfruit
- Soursop
- Pitahaya
- Pummelo
- Guava
- Bamboo Shoots
- Taro
- Carambola
- Black Sapote

Limitations – the report is based mainly on the opinions of a constrained set of respondents and published sources. Limited empirical data was available and limited time/resources were available to gather the data. For this reason, the report focuses on trends and the key issues within the context of the workshop, including selecting priority industries for research and development funding.

*See report “Opportunities for Commercially Under-exploited Tropical Fruits, Vegetables and Nuts” RIRDC Publication 97/80 available on the RIRDC website at www.rirdc.gov.au.

Results

The results of the research are presented in two sections:

- Results general to emerging tropical fruits and vegetables; and
- Results for each specific crop reviewed

General Results

There is strong demand for interesting new tastes in food and plenty of consumer interest in exotic fruits and Asian vegetables. However, sales for individual fruit varieties are growing more as a result of supply than product specific demand. While some crops have high market appeal, the trend is based on demand across the categories of exotic fruits and Asian vegetables, than for specific individual crops. These emerging market categories are not limited by the products covered in this report however, and may include other products as well.

Limited supply and short seasonal windows significantly hamper the marketability of most of the seasonal fruit crops, in particular. The market feedback suggests that demand just starts to build up momentum and then there is no more fruit.

Retailers and wholesalers indicated that they often do not understand the product well with regards to handling practices. Their comments also indicated that communication between growers and wholesalers was limited, particularly on issues such as when seasonal supply will begin and end, volumes that will be marketed in a given season and with regards to growers dumping a market completely for small price gains in other markets.

Industry Specific Results

Rambutan

Market Size

- 1000 tonnes with demand growth expected to increase in line with production growth over the next few seasons.

Commercial Demand Evidenced

- Strong commercial demand exists for rambutan in the domestic market where quality is acceptable. Exports have been developed to Japan.

Market Reaction To Crop – Feedback

- Market acceptance of rambutan has been high. The fruit is visually appealing and has good presentation when quality is acceptable. It eats well.

Indicative Market Comments

- Likely to emerge as a mainstream exotic fruit (as for mangoes, lychees etc.). This will be limited by price, small fruit being supplied to market and poor quality, such as blackened follicles on fruit.
- Product education for higher income non-ethnic segments may assist market development, particularly how to peel and handle fruit.

Current Market Growth Potential

- The rambutan market in Australia is growing and will continue to grow over the next few years. The fruit has high appeal in non-Asian segments, but this demand is limited by relatively high prices.

- Exports will continue to grow, not just in Japan, but also into new phytosanitary markets, as disinfestation research is carried out upon the crop in the future.
- Rambutans would be an important part of a ‘tropical exotic fruit category’.

Longan

Market Size

- 800 tonnes

Commercial Demand Evidenced

- Strong commercial demand exists for longans in the Asian ethnic market segment.
- Exports are no longer viable due to overseas competitors blocking the counter seasonal window that existed for Australian fruit by manipulating the fruiting season of their crop.

Market reaction to crop – feedback

- Longans have high appeal to Asian consumers and some non-Asian appeal.

Indicative Market Comments

- An important symbolic fruit, used as prayer and offerings fruit.
- Some European demand, but strong resistance to small and darkly coloured fruit with blemished or inconsistent skin.

Current Market growth potential

- Some potential exists to expand the domestic market for longans, but this is currently limited.
- Resuming exports may be viable into phytosanitary markets through emerging disinfestation technology in the future.
- Longans would be an important part of a ‘tropical exotic fruit category’.

Bamboo Shoots

Crop Size

- 250 + hectares planted
- Commercial production not known, but yield after year 3 is 10 + tonnes per hectare = potentially 2500 tonnes.

Commercial Growth Evidenced

- Volume is growing, but will be unlikely to cope with rapid increase in production as new plantings come on-line.

Market reaction to crop – feedback

- Quality is inconsistent with some growers not using good crop ‘hygiene’ and packing. Good product sells well.

Indicative Market Comments

- New category like fresh asparagus was a few years ago. Needs to have key uses where fresh is much better than canned. Canned still easier.
- Time consuming to prepare. Toxin issue makes it harder to sell.

Current Market growth potential

- The market for this crop is growing and it has the potential to grow further. Preparation time is a big drawback and the industry is aware that some form of semi-processed product will be required in the future if demand growth is to continue.

- The market category potential for bamboo shoots is unclear.

Taro

Market Size

- Domestic production unknown. A grower survey currently being done by the association.
- Demand is above 5000 tonnes per year in total, including mainly imports and emerging local supply

Commercial Growth Evidenced

- Relatively strong growth in domestic supply has occurred, but the market has absorbed the volume and can grow further.

Market reaction to crop – feedback

- Bunlong (Chinese) demand for Asians is good and receives better prices. Imported Samoan taro is mainly purchased by Polynesians and receives a lower price. Japanese or Greek taro, which is smaller also has good demand. Quality is inconsistent across growers with some suppliers consigning product that is not clean and has holes in it.

Indicative Market Comments

- Lacks wider European appeal. Limited to Asian and Polynesian markets.
- Good demand. Limited supply.
- Hard to establish a season. When does taro fit into eating patterns – winter foods or summer foods?

Current Market growth potential

- Supply has been light recently. The market has potential to grow further and to date there has been no significant over-supply problems, except marginal periods where poor quality product is in strong supply.
- The market category potential for taro is unclear.

Durian

Market Size

- Substantial Frozen Imports that may equate to 1000 tonnes per year.
- Domestic production is limited at approximately 50 tonnes, without evidence of substantial production growth.

Commercial Growth Evidenced

- Strong ethnic market segment. Demand is established, but not growing strongly. Fresh product is not supplied in any significant commercial volumes to the major wholesale markets.

Market reaction to crop – feedback

- Prices based on import volumes and seasonal market demand. The market is well supplied and while product quality is lower than if fresh product was available, the market is used to frozen durian. Differentiating fresh durian should be easy however if it was available.

Indicative Market Comments

- Strong smell will limit non-Asian demand. Good demand and premium for fresh fruit for Asian market.
- May need to promote to second generation Asians to get them to buy it, as mostly older Asians eat it.

- Fruit size and difficulty handling it will limit demand.
- Current Market growth potential
- Market growth is unclear due to lack of fresh product.
 - Durian is unlikely to be included in a 'tropical exotic fruit category'.

Jackfruit

Market Size

- 200 tonnes

Commercial Growth Evidenced

- Demand is strong, but limited by supply of quality fruit. The product is perceived as high risk from a quality perspective and the market drops easily if larger volumes hit the floor.

Market reaction to crop – feedback

- 2 segments in the market one for cooking, the other for fresh eating. The fresh segment is often poorly supplied with inconsistent quality fruit. Some lines are excellent and fruit from these growers sells easily.

Indicative Market Comments

- Good eating and well accepted. Breaks down easily.
- Great for fresh eating or juicing. Supply is inconsistent and fruit size too big.
- Good ingredient and fresh product. Unpleasant latex in fruit. Fruit too big. Great in curries.
- Undersold because sold as whole fruit which is too large and cumbersome for impromptu eating – would appeal more as sections.

Current Market growth potential

- Potential for growth is present, especially with high quality and consistent lines of fruit. Processing potential may exist to break down the large fruit into portion size packs.
- The market category potential for jackfruit is unclear.

Pummelo

Market Size

- 150 tonnes

Commercial Growth Evidenced

- Commercial production is dominated by a small number of growers, with several other minor producers. Production is increasing.

Market reaction to crop – feedback

- Pummelo is a popular fruit due to its size and lower price per kilo. It is not viewed as very exotic (which translates as less difficult to market, handle, etc). Quality is seen as inconsistent, based on variable supply from across different growers.

Indicative Market Comments

- Sweet varieties sell better. Fresh eating and juice fruit. Better colour would help market appeal.

Current Market growth potential

- The market for pummelo has potential to continue growing. The fruit is used as an offering and as a gift, but is also popular as a ‘family’ eating fruit with a meal.
- Pummelo would be an important part of a ‘tropical exotic fruit category’.

Mangosteen

Market Size

- 100 tonnes

Commercial Growth Evidenced

- Fluctuating volumes with small supply last year and expected large crop this year. This makes a baseline view of the market growth pretty difficult.

Market reaction to crop – feedback

- Prices have fluctuated with supply. As a minor crop, agents are not able to do very much to prepare the market for increased volumes, so prices drop to enable the fruit to move. Quality is variable.

Indicative Market Comments

- Great eating, flavour and easy to peel, but quality inconsistent.
- Larger fruit sell better.
- Inconsistent supply and wrong presentation for European consumers.
- Stunning taste, unusual appearance, bruises easily.
- Has unlimited foodservice applications due to presentability and flavour.

Current Market growth potential

- Product has potential if the industry can get it right, at low volumes, it is seen as a risk as growers send poor or inconsistent quality product to get a share of higher prices.
- Mangosteen would be an important part of a ‘tropical exotic fruit category’.

Pitahaya

Market Size

- 60 tonnes

Commercial Growth Evidenced

- One large grower dominates production. Plantings are occurring elsewhere and commercial production has been increasing. Production is mixed between red and white types.

Market reaction to crop – feedback

- The market is dominated by the production of one grower. White-fleshed fruit is preferred based on inconsistent performance of red-fleshed types with regards to shelf life and quality. Given small volumes and the likelihood that minor supplies from several small growers are very variable, these comments regarding red-fleshed types cannot be extrapolated to derive its commercial potential.

Indicative Market Comments

- Growing market with European and Asian appeal.
- Great display fruit, good eating. Gifts and offerings fruit for Asians.

Current Market growth potential

- Overall the market potential for pitahaya is regarded as limited over the next 5 years. The fruit is used in the gift, offering and food service (display fruit) segments.
- Pitahaya would likely be a minor part of a ‘tropical exotic fruit category’.

Carambola

Market Size

- 50 tonnes

Commercial Growth Evidenced

- Market supply is varied from several growers and quality is inconsistent across growers, with no standard. Supply has been growing slowly and the market has grown along with this.

Market reaction to crop – feedback

- Carambola has an established demand that is mainly limited by inconsistent quality fruit supplied to the market. Various ‘types’ are consigned with different appearance and flavour characteristics.

Indicative Market Comments

- Versatile, decorative, colourful and flavourful fruit when quality is good.
- Stores well whole chilled, but discolours easily once cut. Great fruit salad or fruit platter display fruit.

Current Market growth potential

- Carambola has an established demand that is mainly limited by inconsistent quality fruit supplied to the market. Various ‘types’ are consigned with different appearance and flavour characteristics.
- Carambola would likely be a minor part of a ‘tropical fruit category’.

Soursop

Market Size

- 50 tonnes

Commercial Growth Evidenced

- Fruit in light supply. Volumes have been variable. The market appears to be growing steadily.

Market reaction to crop – feedback

- Soursop is a limited use product. Quality has been variable, especially harvest maturity and shelf life.

Indicative Market Comments

- Strong demand around Chinese New Year, but poor demand for rest of year.
- Fragile fruit when ripe, browns easily.

Current Market growth potential

- Some growth potential exists, but unlikely to be significant in the foreseeable future.
- Soursop is unlikely to be included in a ‘tropical exotic fruit category’.

Black Sapote

Market Size

- 40 tonnes

Commercial Growth Evidenced

- Fruit is supplied over two time periods in a year. Currently volumes are small and demand has not grown significantly.

Market reaction to crop – feedback

- The fruit goes ‘off’ quickly if not held properly, but can be stored until ripe quite readily. Black Sapote is easier to handle than Abiu. Ingredient usage rather than fresh eating.

Indicative Market Comments

- Ingredient product with limited fresh eating appeal.

Current Market growth potential

- This crop is not viewed as having significant growth potential in the fresh fruit market for foreseeable future. Some commercial interest exists for ingredient and food processing uses for black sapote, but demand levels are not known.
- The market category potential for black sapote is unclear.

Abiu

Market Size

- 10 tonnes

Commercial Growth Evidenced

- Limited presence in the market and no indication of the market trend was given. If growth is occurring, it is not perceived as significant.

Market reaction to crop – feedback

- The fruit bruises easily and does not have a good shelf life. It is in demand when good fruit is available.

Indicative Market Comments

- Small market because fruit has limited exposure / availability.
- Fruit discolours easily and often has latex around flesh.
- Not familiar with this fruit.

Current Market growth potential

- Unknown due to lack of good quality supply, but thought to be limited.
- Abiu is unlikely to be included in a ‘tropical exotic fruit category’.

Guava

Market Size

- NA

Commercial Growth Evidenced

- Demand exceeds production and has for some time.

Market reaction to crop – feedback

- Fruit packed in trays does better than bulk packed (one grower mentioned has great fruit, but bulk packs it to his own disadvantage). Quality is quite low from some growers. The market is undersupplied.

Indicative Market Comments

- Good potential, supply inconsistent. Versatile product.

Current Market growth potential

- The market can grow considerably in relative terms.
- Guavas would likely be a minor part of a ‘tropical exotic fruit category’.

Discussion of Results and Conclusions

The research findings indicate that strong demand exists for exotic ‘new’ food tastes. However, market demand for some of the crops assessed in this study is likely to commercially develop at a faster rate than for others. The commercial market potential for several other crops is unclear at this point. The crops covered in this study can be categorized as per below:

Commercially Developing Markets

Bamboo Shoots

Durian

Jackfruit

Longans

Mangosteen

Pummelo

Rambutans

Taro

Gradually Emerging Markets

Carambola

Pitahaya

Crops with Unclear Market Status

Abiu

Black Sapote

Guava

Soursop

The emergence of an exotic fruit category and the need for improved interaction along the marketing chain for these emerging crops is amply evident from the comments made by respondents. What is also apparent is that the industry – primary producers and their associations, will probably need to take the lead and engage wholesalers and retailers in the processes that lead to the required supply chain development.

Recommendations

The opportunity exists for a category approach to marketing exotic tropical fruits to be developed and that improved information systems are needed. Therefore, based on this, the following recommendations were made by the researchers at the industry workshop held on 12th February 2003:

Recommendation 1 – that industry support the development of a tropical exotic crop ‘category’ through to the retail level. Industries and individuals have championed their own crop, but failed to achieve significant in-roads to retail awareness. It is demand for the category rather than any individual crop that is emerging at the consumer level. Developing greater supply chain awareness from growers through to retailers for several crops in a supply window is necessary for the category to emerge.

Recommendation 2 - to conduct a basic review of commercial crop market performance annually and report this through industry associations or a newsletter. This information should also be reported down the marketing chain at all levels, along with information on handling systems and practices. It will be necessary in future to review crop market performance and track industry growth more closely than every 5 years. The commercial development of several industries not foreseen by the previous workshop and lack of commercial performance of some of those selected as a priority crops shows that a review period of 5 years is probably too long.

Co-Operative Marketing Groups In Horticulture

Associate Professor Ray Collins, School of Natural and Rural Systems Management, University of Queensland

STRATEGIES AND PITFALLS

1. What is the attraction of co-operative marketing to horticultural producers?

- More product under the control of one entity
- More potential for quality, reliability and consistency
- Expanded market opportunities
- More resources to direct at marketing activities
- Provides a vehicle for small producers
- Producers can employ professionals to do their group's marketing

2. A typical approach to getting started goes as follows:

- By meeting or invitation, see who wants 'in'
- Identify types, volumes and timing of supply
- Short list markets/customers
- Consultant helps to develop the group's strategy
- Adopt a quality system; create brand/packaging
- Agree on operational details
- Complete a trial cycle/season and evaluate it

And does it work?

Why co-operative marketing in the first place?

- More product under the control of one entity
- More potential for quality, reliability and consistency
Sometimes this just means more potential for mediocrity
- Expanded market opportunities
- More resources to direct at marketing activities
But sometimes without a realistic marketing strategy: more volume alone is of little interest in markets
- Provides a vehicle for small producers
But if everyone has equal voting rights....?
- Producers can employ someone to do their group's marketing
And sometimes this person works in their own personal interest and/or doesn't have the skills

A typical approach was

- By meeting or invitation, decide who is 'in'
This frequently fails to achieve the essential mix of people who can work together
- Identify types, volumes and timing of supply
Marketing cannot be driven by the existing supply of product alone – but this hasn't stopped groups trying
- Short list markets/customers
Usually drawn from existing channels – lack of vision and objective evidence
- Consultant helps to develop the group's strategy
Strategies developed by consultants are quicker and easier but they lack ownership by Producers.
- Adopt a quality system, create brand/packaging image
Quality systems rely on proper training; brands and packages do differentiate – in the wrong way
- Agree on operational details
When you say 'yes', do you really mean 'yes'?
- Complete a trial cycle/season and evaluate it
The GIGO principle applies; data is meaningless until turned into information and knowledge

So what can we conclude about our co-operative marketing efforts until now?

- The principles are right, but the practice often does not live up to expectations because:
 1. Expectations were raised without assessing whether they could be reached
 2. There was too much blind faith in others
 3. There was inadequate focus on what the market wanted
 4. Alliances had little vision, and sometimes little interest, beyond themselves

Summarising the pitfalls and traps learned from experience

THERE ARE THREE MAIN DRIVERS OF FAILURE

- **People:** who believe that the alliance serves them, not that they serve the alliance
- **People:** whose focus is on the farm and its ability to supply what it always has
- **People:** who lack commitment when it matters most, and who say yes when they mean no

And as a result, the following kinds of problems are typical

- Self interest rules every time there's a critical issue to resolve
- The alliance never gets a clear focus on its markets, customers and consumers, and misses their signals
- Real trust fails to develop
- The alliance is starved of essential resources such as capital and management expertise

And worst of all...

- The alliance becomes unable to create any kind of competitive advantage, there's no reason for its members to continue to belong to it, and so people revert to their old ways of doing business.
- EVIDENCE: AME, Fresh Double Red, 88 Red, Taste of the Tropics, AHEG, Valley Fresh

Time for a reality check

- There is absolutely no evidence that traditional ways of doing business are suitable for the kind of future that horticulture is facing?
- In the near future individual horticultural producers will be unable to deliver the quantity, quality, reliability, consistency, convenience, safety and value for money that will become the entry ticket to horticultural markets world-wide.

Supply chains, demand chains, or value chains ...what's in a name?

- This is a chain of activities and relationships that links consumers with producers and producers with consumers
- You cannot deliver benefits to consumers except through this chain
- So a chain will be created with or without your conscious involvement
- Let's call this chain a SUPPLY CHAIN

|

“Supply chain thinking” has overtaken “marketing alliance thinking”. Why?

There are three driving forces and they’re all beyond the farm gate

1. Globalisation of trade in fresh products (global sourcing)
2. Rapid advances in technologies such as IT and biotechnology (info systems, NIR sensing, DNA/PVR)
3. People wielding more power - as consumers and as guardians of the future (taste, safety, environment)

Everyone belongs to at least one supply chain. Does your supply chain influence consumers to pull your product through the chain?

Because this is far preferable to having to push your product from the other end of the chain - *which is often like trying to push a piece of string*

Another goal of your supply chain must be to deliver benefits to all the players in the chain equitably

Could you map your supply chain right now?

Do you know who’s in your supply chain?

Do you know what functions they carry out and what value they add?

Is the reward they take commensurate with the value they add?

Where does grower based marketing groups fit into the supply chain picture?

They only fit if:

- They can deliver improved benefits to customers and consumers
- Experience tells us that this is possible

Your primary objective should therefore be to make these benefits happen: because no one else will do it for you.

Does this mean building your own supply chain?

Yes it does, but you can’t do it on your own.

Is it possible to “hand build” your own supply chain in horticulture?

Evidence

- Zest, Panda Ranch, Blackboy Ridge
- Australian Persimmon Export Company
- Grandiflora Growers
- Australian Commercial Bamboo Corporation

Each of these has been hand built around a group of growers co-operating with each other, as well as with the other members of their chain.

There are two key elements you will need

- **The right people**
- The right processes**

Starting with the right people in your hand built supply chain – who are they?

- Don't have to be the biggest
- Don't have to be the most experienced
- Don't have to be the pushiest

- Do have to be committed
- Do have to be trustworthy
- Do have to want to succeed and make a difference
- Do have to represent all the major supply chain stages

Getting the right processes built into the supply chain – what are they?

They are the processes that ensure

- That the primary focus is on satisfied consumers.
- That product flows as efficiently as possible.
- That decisions are made honestly and transparently.
- That rewards flow in relation to the value added.
- That action is based on the best information possible.
- That trusting relationships are developed over time.

How to actually build these processes is beyond the scope of this short presentation

BUT REMEMBER

- Process- building takes time, money and commitment

- It is a big mistake to embark on such a journey without the right kind of support and assistance

- It is a big mistake to think that the process is just a matter of cutting people out of the existing chain because they “don't add value”

To summarise

In the absence of a supply chain strategy, you leave your fate in someone else's hands

Co-operative marketing alliances among growers are a waste of time unless they are configured as part of a supply chain – from the very beginning.

It is possible to build your own chain, so long as you start with the right people and focus on the right processes.

Never forget that group marketing is as much about the people as the product itself.

And Finally

You belong to supply chains, whether you like it or not.

Your future economic well being will be determined by the well-being of your supply chain – whether you like it or not.

You can let it happen; or you can make it happen.

Benjamin Franklin was probably talking about Australian horticulturists when he said,

“We must all hang together, or we'll all hang separately”

The Australian Tropical Marketing Story

Keith Noble, Director, Australian Tropical Marketing, Tully

One of my passions is reading history - not for reflection, but because the past contains valuable lessons for the future. And one thing I have come to realise from reading history is that all ideas and developments have their time at which they will succeed.

From our research, and particularly after listening to Ray Collins speak today; we believe the time for Australian Tropical Marketing is now.

What is Australian Tropical Marketing?

ATM is a new private company, comprised mainly but not exclusively of grower-shareholders, dedicated in the first instance to the marketing of rambutan and mangosteen.

ATM has not come out of nowhere – it draws on the expertise developed by the FNQ Rambutan Marketing Group, who developed grade standards, packaging, QA, and marketing processes for rambutan. However, the FNQRMG executive, like any voluntary organisation, was suffering a combination of burnout and dissatisfaction at a majority benefiting from the efforts of a minority. Additionally, being an Association, the group was constrained in its ability to operate commercially outside its state of Incorporation.

Why Australian Tropical Marketing?

The primary driver for ATM's establishment was not dissatisfaction with current marketing processes, it was the realisation that for our industry to grow it had to be promoted, and this was not going to occur unless we did it ourselves.

Most growers are planting more trees and production is expected to double within 5 years, but already supply gluts crash the market to a point where returns do not cover production costs. What will the situation be in 5 years? Most Australians still don't know what a rambutan is, let alone have eaten one.

ATM was not born out of any desire to bypass agents and existing market processes, it was to achieve supply chain transparencies and identification of the value each stage added to our product while growing the tropical fruit category into a mainstream commodity.

How Did Australian Tropical Marketing Happen?

Two years ago, Shane Comiskey from QFVG introduced me to John Murphy from Miandetta Fresh Foods – a successful SE Qld pork and asparagus production/marketing enterprise. John told me, how, through a structured marketing program, Miandetta had increased fresh asparagus sales in Australia over 900% in one year. Asparagus was a product familiar to all Australians (it came in a tin and you smeared it on your bread). John asked me what the potential of rambutan was – a fruit that no one knew, but everyone who tried it liked?

John also talked about supply chain transparency, and building a business based on:

- Trust,
- Relationship,
- Commitment.

John Murphy explained that growers often focus on one market segment (eg export) to the exclusion of others, whereas they should be developing a strategy that finds the best market for all our fruit.

What John said excited me, and gave a glimpse of what our industry's future could be. But the question remained – would growers accept it? Again, the Miandetta experience gave us heart. In the early days of Miandetta, only 5 out of 30 growers financially supported the concept, but this was sufficient for the company to achieve success.

So we have established Australian Tropical Marketing Pty Ltd as a private company. Capital has been raised through 21 shareholders. We have developed distinctive packaging and promotional material, attended Foodex in Tokyo this year, secured two new export markets, and been successful in introducing some product to chain stores.

Personally, I alternate between elation and terror at what we are doing, but I never vary from the certainty that this is the future for our industry.

Tropical fruit is an undiscovered category for most Australians and Europeans. The future is unlimited, and will be achieved. Australian Tropical Marketing's intention is that growers are a part of this success when it arrives.

Bamboo- An opportunity for north Queensland

Sonya Maley, Bamtek, Tully

The presenter spoke about a recently completed study looking at product and market opportunities for bamboo cultivation in FNQ.

The report was commissioned by the Bio Industries cluster (BioNQ) of the Cairns Regional Economic Development Corporation and undertaken by Sonya Maley, representing Bamtek and Kleinhardt's FGI.

Of all the plants on the planet bamboo certainly appears to have its fair share of 3 M's. They are the myths, the mysteries and the misconceptions.

Referred to as a plant of philosophical inspiration, a poor man's timber, visions of scaffolding and wretched weeds. Everyone it seems has an opinion on bamboo.

It is the running or monopodial bamboos that have been largely responsible for the reference to weed potential and those particular group of plants have no place in the report nor indeed do they have any place in the tropics. The report is specifically focused on sympodial or clumping bamboos, which have the following attributes-

- It is a giant grass
- Sympodial or clumping bamboo are ideally suited to the tropics and are non invasive.
- They are a vigorous producer of biomass and good quality fibre and food.
- They are excellent at absorbing or sequestering carbon.
- And there are many environmental benefits associated with growing bamboo in plantations.

Looking at the plant in this light the opportunities start to become clearer.

The report examined the markets for bamboo shoots, timber or whole culms, biomass fuel and fibre. Most importantly it looked for opportunities to blend in with current farming systems and capitalise on the infrastructure we already have in NQ. It was the fibre component of the study, which showed the greatest opportunities for NQ in applications of fibreboard like particleboard and medium density fibreboard.

Currently, most timber and fibre supplies come from the southern states and yet the Department of Primary Industries themselves predict that 80% of our future fibre sources will come from the tropics and subtropics. It makes sense, as forestry productivity is directly related to high rainfall and high humidity. Botanicals grow faster up here.....especially grasses.

The recent bushfires in prime timber producing areas, the increase of global warming which in turn will increase the risk of more fires, all suggest that it's a good time to look at what we're doing and where we're doing it.

Despite the predictions from DPI of being large fibre producers there are no major processing facilities or infrastructure in FNQ for this purpose. That is, until a closer look is taken at the sugar industry and in particular the sugar mills. An industry in crisis, a major employer of rural communities and an engineering plant that operates for less than ½ the year. This is a massive infrastructure sitting idle at a time when it can least be afforded.

There appears little doubt that the current crushing machinery cannot only process sugar cane into bagasse but bamboo into fibres as well. The crushing machinery effectively removes most of the moisture from the plant which would allow bamboo to be harvested counter seasonal to sugarcane extending the mills production to a year round operation. Additional facilities would be required to be

added to the mill and the type of alteration and costs associated would very much depend on whether the focus was particleboard or MDF. In either case the capital cost saving compared to building a new mill would be significant.

Harvesting requires mowing the bamboo plant every 3 years and the existing configuration of cane harvesters is believed to be capable of achieving this. There is a selection of species that are highly vigorous with a limited diameter of less than 75mm. The plant could be billeted in much the same way as sugarcane and delivered to the mill via the existing bulk handling infrastructure such as the bin haulers and railway network. We cannot underestimate the cost saving this infrastructure brings with it. Southern mills rely heavily on trucks and road haulage, the cost of which will continue to increase.

The system implemented would utilise highly productive plantations species, efficient plantation management, highly mechanised harvesting, cost effective haulage with the bulk of the material located as close to the mill as possible. Being located in the far north of Australia with shipping ports close at hand has an advantage for distribution to export markets. If you put all these together then the operation will be cost competitive.

The scale of operation required to support a 150,000m³ plant is in the vicinity of 2,500 hectares net. This land area doesn't allow for another added benefit the mills could gain if they were to co-generate electricity with bamboo. The chemical and fuel analysis of bamboo is very similar to bagasse and according to the US Department of Energy it actually burns cleaner so there should be no problems burning it through the current boilers. Extended operation of the mills would allow them to generate power during peak demands times and provide additional income for the plant operators and cash in on the green energy market. There are very successful models of clear felling bamboo for fibre production and cogeneration in other parts of the world that were previously farmed for sugarcane.

Investigation into the production of bagasse boards has been done by the Mulgrave Mill and proved positive. Due to the nature of the bagasse fibre being relatively weak, it was recommended that a composite mix be sought to improve the potential for applications. Trials in Europe have shown that the blending of bamboo fibres with spruce improved the structural performance of the board. Technologies for water resistant bamboo boards have also been developed. It presents as an interesting opportunity to step the process of production. Begin the process with bagasse boards, blend bamboo as it comes on line in the medium term, and design processes to eventually accommodate forest thinnings and waste in the longer term.

Once production is underway where will it be sold?

The Asia Pacific Rim is experiencing an explosion of population growth; a pillaging of forestry reserves in China alone is expected to see a 43 million m³ short fall in supplies by 2012.

Both MDF and particleboard have experienced solid growth in recent years, however to make the very most out of it, it's necessary to involve a forestry component. The highest growth market and profit margins to be made with fibreboards is overlaying with tropical timber veneers.

There's no doubting that the establishment of infrastructure in NQ will drive forestry investment in the region and when one is talking about large scale industry other opportunities start to present in the form of carbon credit investment, trading and funding. Overseas companies invest in Australian forestry to obtain carbon credits for future emission trading systems. Companies that are emitters can offset their green house penalties by investing in agroforestry industries or those activities that lock up carbon. Interestingly, carbon stored below ground is not released on harvesting bamboo as it is with trees. Other important physical aspects of bamboo to consider are its use in environmental management of wastewater and improvement of water quality.

The Federal Government has a target time of 2008-2012 for their Greenhouse Gas abatement program which fits in extremely well with the establishment of fast growing plants such as bamboo which plateau early combined with the longer term sequestration by trees. It's a good model and discussion is currently underway with FNQ Training and CSIRO Sustainable Ecosystems to see how their agroforestry model and this project can assimilate.

“New –age” crops for a bio-based economy: an opportunity for tropical north Queensland

**Peter Tonello, Peter Holden, Brett Weeden, QDPI Mareeba
Jo Visini, NQ Cooperative**

What is the biobased economy?

- The biobased economy uses renewable resources and environmentally friendly processes to develop bio-products in a sustainable way
- Existing global economy is very much dependent on energy, chemicals and materials derived from non-renewable fossil fuel resources
- This development has transformed modern society, but it has come at a cost...

Trend – transition to a biobased economy

- Changing attitudes and expectations – consumers are demanding better health and an improved quality of life.
- There is a pronounced swing back to products based on sustainable materials and environmentally sound biodegradable and recyclable residues.
- We know that petroleum based fuels are non-renewable and are predicted to run out by the year 2050.
- Before the 1920’s, many of our industrial products were derived from plants and animals
 - Henry Ford designed the first mass-produced car to run on ethanol derived from corn(bio-ethanol).
 - The first diesel engine ran on fuel made from peanut oil (bio-diesel)
- Many of the medical compounds prescribed in western medicine today have their origins in natural plant materials.
 - the anti – cancer drug Taxol from the pacific Yew tree
 - aspirin was originally isolated from willow bark
 - the heart drug, digitalis, from foxglove

Advances in technology and better understanding of systems processes are now making it possible:

- to increase biomass productivity in agricultural crops
- to utilise biomass and organic waste materials efficiently and sustainably
- and to begin replacing petroleum with renewable biomass derived mostly from plants

Trend “New Age” plants

Plants are poised to become the biofactories of a new age in agriculture, producing bioproducts for key sectors such as:

- Pharmaceutical-vaccines, antibodies, anti-cancer agents
- Nutraceutical-food related health-giving products
- Cosmeceutical-anti-aging and therapeutic applications
- Renewable energy cogeneration plants
- Renewable fuel-transport
- Biodegradable fibre and plastic-automobile, housing, textiles

Biofactory drivers

- Capacity crisis in pharmaceutical industry, 16 fold increase in production capacity required by 2010
- In the field of human medicine, plant derived bio-products are potentially:
 - Cheaper to produce and store
 - Easier to scale up for mass production
 - Safer than those derived from animal based systems
- Compared to current production techniques, plants can reduce cost of expensive drugs tenfold

What is plant molecular farming?

- Molecular farming is the production of pharmaceutically important and commercially valuable proteins in plants.
- Although some molecular farming systems use corn, soybeans or alfalfa as their plants of choice, rapid advances in the commercial use of tobacco plants as a 'plant factory' are already occurring in the US and Canada.

High-valued bioproducts

- Anti-cancer agents, biopharmaceuticals, human vaccines, antibodies and enzymes derived from genetically engineered plants are expected to generate billions of dollars.
- For example, the US biopharmaceutical industry has grown from just over \$US 1 billion in 1991 to \$US 7.8 billion in 2000. It is expected to reach \$47 billion by 2011.

And not just drugs

- Other researchers and biotechnology companies are using plants for industrial applications.
- For example, tobacco and potato plants that are capable of producing antibodies that can detect pathogens and contaminants in food and water such as *E. coli*, PC-B's and dioxins.
- Biodegradable polymers can be produced from a number of crops including maize, wheat and other cereals, potatoes, sugar beet, oilseeds and sugar cane.
- Plants are being used to develop a fibre that is claimed to be stronger than steel and more elastic than Kevlar.
 - called BioSteel, the fibre is derived from the silk protein produced by spiders.
 - biomedical glue derived from mussels

Renewable Biomass crops

- Biomass is organic matter that can be converted into energy, such as waste from agriculture, wood and paper, food processing, animal and human waste, grains and purpose grown energy crops.
- The energy obtained from biomass is a form of renewable energy.
- Fit in with bio-industrial farming system strategy.

HEMP/ KENAF/ SWEET SORGHUM/ SUGAR BEET/ CORN/ POTATO/ SUGARCANE

Hemp – industrial uses

Biocomposites – fibre reinforced plastics | non-woven geotextiles | insulation | paper | industrial oil

- The North American natural fibre/plastics composite market is projected to grow from US\$150 million in 2000 to US\$1.4 billion in 2005 – a growth of 54% per annum.
- EU – 95% of each car produced must be recyclable by 2015. EU auto-industry has increased the use of natural fibres in new cars (practical, technical, economic and environmental).
- EU estimates over 100 000 t of processed hemp fibre will be required by car manufacturers by 2005 (4000 t in 1996).
- At least 70% of this fibre will need to be sourced from outside Europe.

Hemp – nutra+cosmeceuticals

Hemp seed and oil contain unique blends of essential fatty and amino acids and anti-oxidants- and is now highly sought after for the cosmetic and processed food markets.

- Hemp oil's essential fatty acid profile is closer to fish oil than any other vegetable oil
 - Shelled hemp seed is 35% gluten free protein
 - Highest mono and polyunsaturated fat content of all oils
- Omega 6 concentration of 55%
- Omega 3 concentration of 17%
- Also unique source of gamma-linolenic acid (GLA) a rare and valuable nutraceutical agent, important for immune system functioning and healthy skin.
- Hemp seed flour is 40% fibre-highest of all grain-based flour.
- High in anti-oxidants+ wide variety of vitamins and minerals.
- High in phytosterols (reduce cholesterol in the body).

Benefits to NQ region & relevance to farming systems

The possible integration of ethanol and fibre production plus power generation and plant molecular farming into a bioindustrial system would enhance the commercial viability of the whole system.

This has the potential to:

- not only improve the economic viability of existing farms and current service industries
- but also introduce new industries that expand the economic base of the region.
- generate high value products, reduce reliance on fossil fuels and lead to net reduction in greenhouse gas emissions.

Just as the rainforest and coral reefs have been plentiful sources of compounds for developing new pharmaceuticals, the use of agricultural plants as biofactories is destined to be the next goldmine for the pharmaceutical, nutraceutical and renewable fibre and energy industries.

A Future for Tropical Fruits and other Ethnobotanicals?

Alan W. Carle, Collector, Botanical Ark, Mossman

I remember the first exotic fruits conference in Nambour, way back in September 1980. Our industry has come a long way since then.

Twenty-two years later I believe we need to address a fundamental question that concerns us all.

Is there a future in Tropical Fruits? Before we answer this we must consider addressing the all-important concept of just what is the future? For a child it is often his or her next excursion, for a teenage girl, possibly her first kiss, for a puppy it is the next meal, for a politician the next election, but for an industry that relies on trees, it must be considered in a very much longer time frame. For a sustainable industry to survive it needs a strong foundation, proper maintenance and a steady or increasing demand for its products.

In regards to tropical fruits I do believe we have a great product that will see increasing demands. After all fruit is the sweetest food of all. Maintenance is up to us as individuals, organisations and governments. The industry will be judged on its ability to produce high quality fruits and to provide enough exciting new ones from time to time.

Do we have a strong foundation? This matter to me is the most critical and needs serious attention now. Many of the resources upon which our industry depends are in a questionable state (and I don't mean Queensland). We are all well aware of the issues faced with transport, labour force and supplies of materials. Some of us are aware of the environmental issues facing us- such as water quality, salinity, soil erosion, soil vitality, fruit quality (after all fruit is supposed to be good for us and there are perceptions out there in consumer-land that so many chemicals are used in the production, that they may outweigh the benefits that healthy fruit does provide)- and the issue of climate change. Having just experienced the worst drought in (our recent) history and the wettest season not too many years ago, we tend to forget these extremes once 'normality' returns. Yet climate change will affect each and every producer's income and viability.

A great majority of the worlds top climate scientists agree that we are rapidly warming the earth- generally through increased usage of fossil fuels, land clearing, manufacturing processes and of course population growth. Their predictions of how this will affect us are also generally agreed upon, with greater risks of flood and drought, and sea level rises (which will increase salinity in the coastal zones and cause massive human migrations). What we seldom hear of, yet is critically important, is that as global weather warms, the average speed of winds increase. Some climatologists have even gone as far as saying that a 3-5 degree rise in ocean temperature could conceivably increase wind speeds in tropical storms (ie. cyclones) to 700 km/h. You can guess what that means to your orchards.

What, as an industry, and as individuals, are we doing about this increasing liability? Some changes have been enacted, ie. refrigerant and cooling gases have been replaced, methyl bromide is almost phased out, and some industries are making voluntary steps to reducing their greenhouse gas emissions. But will it be enough? Not if the Federal Government has it way. It actually argued for an increase in greenhouse gas emissions for Australia at the world climate conference in Kyoto.

While these issues are critically important to the survival of the horticultural and agricultural industries of tropical Queensland (not to mention the survival of the Great Barrier Reef), there is one other equally important issue we must address to ensure we have the best and strongest foundation possible. That is the issue of the loss of biodiversity.

Biodiversity is an indicator of the health of our planet. It is also the resource we rely upon for the selection of our crops, to look for breeding resources, or for the natural control of pests and diseases.

What is happening to biodiversity now? It is disappearing at an alarming rate. It was a lecture given by Dr. Peter Raven, Director of the Missouri Botanic Garden, while he was here in Australia in the 1980's that caused my wife and I to look at what was happening. Dr. Raven said that in the next 25 years, we might lose 20% of all life on earth if we do not change our ways. Twenty years of investigations and research has indicated that we probably haven't lost quite that amount of species- (the WWF estimates that we lose between 50 and 100 species a day from the planet) but have an exceptionally high number of species that have moved from the vulnerable to critical levels of concern. This is on top of the highest rate of extinction since the age of the dinosaurs. The single most common factor in this huge wave of extinction is Humankind and our impact on the earth.

When I first began this talk, I said we must ask ourselves what is the future of our industry? One thing is certain, that unless action is taken now, we will be poorer for it. If we were to hold this conference 25 years from now, we would certainly have many fewer options to choose from and we will probably be lamenting over what we had and lost or what might have been.

I began collecting tropical fruits in 1975. We would go to exotic tropical cities, villages and even remote jungle locations in the search of new fruits. By 1985 we were beginning to see that some of the places of early collections no longer existed. The forests had disappeared or were disappearing (currently at a rate of about 1 acre every second). We were also able to witness that friends we had made along the way were often unable to teach their children about fruits that we had 'discovered' the forest was either gone, or too far away.

We live in a rainforest area- the humid tropics, so basically all our explorations and collections have been done in these regions. It is important to note that rainforests currently occupy about 6% of our planet (and shrinking) yet contains more than 60% of the land based plant and animal species. Rainforests are truly the 'treasure chest' of our planet's biodiversity.

We became so concerned about the disappearing rainforests, their plants and animals and people (and knowledge), we decided to try and do something about it. In 1991 we were encouraged to join Botanic Gardens Conservation International, based at Kew gardens in UK and the Australian Association of Botanic Gardens. Unlike most public or government run botanic gardens we are not open to the general public, as we would get no work done.

The Botanical Ark is run by my wife Susan and myself. We seldom hire help. Overall it is just 12 hectares, but contains around 400 species of fruits & nuts, 500 species of Zingiberales and about 3,000 species of plants.

We cooperate with and consult for a number of overseas governments and research programmes in Singapore, Malaysia, Thailand, Ecuador, Costa Rica, Brazil, the Congo, CAR, India and French Polynesia and the USA. We have very little interaction or interests from governments within Australia with the exception of AQIS, whom we seem to deal with almost every day. I feel sad and a bit hollow about the previous lack of cooperation and hope that perhaps the future is brighter.

The key organisation concerned with new plant introductions into Australia is the Australian Quarantine Inspection Service. Some AQIS issues are making it increasingly difficult to increase our biodiversity resource base.

Firstly, I must say that the Botanical Ark is possibly the most ardent supporter of AQIS and the concept that they are chartered to uphold- i.e. to minimise the risk of bringing in pests, diseases and weeds. We have excellent relations with AQIS staff in the far north, but do not seem to have much

sympathy or understanding in Canberra with the exception of a few great staff members. Since Bio Security was taken from AQIS, things have been more difficult.

ICON, the AQIS germplasm database, prohibits *Paullinia (guarana)*, *Archidendron*, *Davidsonia*, *Hicksbeachia*, *Pleiogynium*, and restricts such genera as *Canarium*, *Baccaurea* and *Lecythis* to name just a few species.

The Botanical Ark would bring back many more fruit and ethnobotanicals, except for the costs associated with the government introductions. For example, coconuts, the 'machapinu' variety, solid inside, could have huge market potential.

Many more examples, such as *Baccaurea*, where grafted clones are available, are off limits to our AQIS registered quarantine station, because they pose a risk to an existing industry. I wonder what *Baccaurea* industry they are talking about. These minor genera should be allowable in private quarantine houses, as they pose no threat to an existing industry. Perhaps this meeting or a sub committee could look at the list of genera, which do pose a threat, and make a submission to AQIS to have the very minor ones removed from the commercial concerns list.

AQIS is making itself so expensive and bureaucratic that I believe the ordinary fruit collector just gives up and the dark-sided, determined or ill informed will look for another way to get the seeds or plants here. I addressed the AQIS Nairn inquiry on these issues. I believe their position should be to assist the safe and minimal risk introduction of seeds and plants into Australia.

Imagine a rambutan without a testa- and of good quality- we tasted this fruit recently. Imagine a *Canarium* that has a fruit 125mm long which tastes like a mango, and the nut is larger and just as nice as a pili nut. Imagine breadfruit that produces year round, or a red one- they all exist: just too expensive for ourselves to introduce. Some of these take years to locate, and there are rewards if we can just get them here.

Market and crop selection: at the moment the rainforests holds many options for us- but that is changing as we speak, (for the worse). When considering what we might grow we must look at return to growers. It is interesting to note that you can only ever sell an apple for \$1-2.00, perhaps \$3.00 if it is a new exceptional variety- but that higher price can't be sustained. Imagine getting \$100 for 100 grams of your product- it happens with many beauty products and can go higher for some perfumes and pharmaceuticals. My wife mentioned that a recent news item stated that saffron now sells for around \$31,000 per kilogram!

For every species we wish to bring into Australia not on ICON (the central data base for inquiries) we have to fill in a WRA form. Each form is an 8 page document detailing various issues such as fire tolerance, drought tolerance, method of flowering, fruit, dispersal methods, numbers of seeds per metre square, etc. All this is valuable information, but not easily available to people such as ourselves. One major pitfall in this WRA system is that it does not cater for species new to science or unidentifiable in the field, which will die before the assessment is made.

ICON is a great idea, but too cumbersome, the new evaluations or additions to it are too slow- they need more staff. What is a critical issue for us is recalcitrant seed that must be planted very quickly. A delay of just 1-2 days being held up at AQIS interception points can mean complete failure. Educating staff at these AQIS points of entry regarding tropical seed viability is no easy task. Since the foot & mouth disease outbreak in the UK staff numbers have increased tremendously, and although they receive training, nothing can replace experience and personal knowledge.

Recent political changes in our world also are making collecting itself much more difficult. The introduction of the international biodiversity treaty, while itself a great concept, is becoming too bureaucratic, and countries are closing their doors to exchanges and collections, and at the same time

are doing nothing to assist their rainforests to be inventoried or saved. I actually believe when large logging contracts are negotiated that some tropical countries secretly agree to the exclusion of scientists, conservationists and even sometimes their own forestry officials during the felling and extraction process.

Recent terrorist activities are making international travel and freight more difficult and expensive. The more the world becomes divided or polarised the greater the threats and the greater the loss of freedoms.

The time is now to decide what we want our future possibilities to be.

3. Discussion of Results Arising from Day One of the Workshop

The participants broke into small working groups to discuss key issues that will determine industry development. A summary is provided below;

Crops showing most potential

1. Rambutan: It was most evident that rambutan is the crop, which is sustaining viability of orchards on the Wet Tropics Coast. Hence, growers would like to see continued research priority on this crop, as it constitutes the majority of income for growers. The potential to value add to the product using a tautable pouch or MAP technology is worthy of future research.
2. Mangosteen: Demand for this fruit will grow as more consumers sample its amazing taste. The biennial bearing pattern of trees and intensiveness of labour at harvest are of major concern as to the economics of this crop. The current research projects will assist in determining basic phenology and nutrition requirements.
3. Taro: Since the 1997 review this vegetable has seen a marked increase in plantings. The quick return on investment, high yields per ha and resistance to cyclones have attributed to this rise in interest. It has been identified that there is a need for the crop processes of planting, harvesting and washing to become mechanised if the industry is to expand to any size. Commercial processing of taro into a crisp is being investigated and showing promise.
4. Jackfruit/Chempadek: This is a crop which has an established demand yet has received little research or promotion. For this fruit to grow in popularity grafted varieties with consumer favoured attributes would need to be selected.
5. Pitahaya: This crop has gained interest in the NT and Queensland in recent years. It is almost on a par with rambutan as an income earner in the NT. The eye appeal of the fruit both whole and when cut is a source of interest to consumers. The red variety is favoured by the catering sector for use in desserts and sauces.
6. Starapple: This was identified as a fruit that has the possibility of producing fruit in the winter months when little other fruit is in season hence bringing a good return to growers. Potential high yields are favourable however vertebrate pests are a major concern.
7. Pummelo: This crop was ranked number 6 in the 1997 review. The red/pink varieties appear more popular than white flesh ones. If crops coincide with Chinese New Year returns are favourable. The large unit size of the fruit can be disadvantageous to the consumer if price per kilo is high.

It was suggested that a watching brief be kept on mangosteen, durian, longan, carambola, guava, boob and bamboo shoots. For consideration, specifically in the Western Australian climate were pomegranate, loquats and dates. Mention was also made of hemp, cassava, coffee, green tea and heart of palm as crops worthy of future research.

It was suggested that a more detailed process similar to that used in the 1997 review would be required to accurately evaluate the priorities.

Issues raised

1. A common concern was the need to invest in the future by maintaining, evaluating and importing new germplasm. It was suggested that a stocktake of all germplasm presently in the country be conducted so as to add to the Australian Quarantine Inspection Service's ICON database.

2. The need to develop an *Exotic Fruit Category* appears paramount for the success of the industry. This will require market research to determine which fruits retailers and consumer perceive as being “exotic”.
3. Value adding through processing was identified as a potential use of good eating quality rambutan fruit that had superficial skin damage. This may overcome some quarantine restrictions for certain export destinations and may be more conducive for use in the service sector due to ease of preparation.
4. Building a business: the need for cool chain management and quality assurance monitoring to build buyer confidence and repeat sales are essential.
5. Building an industry: the need for increased communication at all levels so as all industry players are aware of developments at every level of the supply chain.
6. Environment Management Systems: auditable systems will be mandatory in the short to medium term. Growers need to consider how they are situated to meet these demands.
7. Market Access: Postharvest treatments that are effective and product friendly need to be identified to replace non-sustainable options such as methyl bromide.
8. Market Assessment: Using market information sourced to date, industry needs to formulate an approach on how to best promote, educate and increase the awareness of the variety of products grown.
9. Relationship of new industries to mainstream industries: Is there potential to utilise bamboo species for windbreak protection and edible shoots on banana farms?
10. Identification of crops that bear in wintertime: this would help spread labour throughout the year and offer longer-term employment.

Project proposals submitted to RIRDC for future research would need to seek to address these issues.

4. Related Issues Arising from Discussion Within Working Groups

Listed below are a number of issues which participants were asked to enter under the different category headings. This exercise was used as a means of capturing some of the more left field subjects that are generally not considered under the NPP program in the tropical arena. They are compiled here in dot point format as a means of recording the issues raised. No attempt will be made on the author's behalf to interpret them, as this would be inappropriate and inaccurate coming from a narrow viewpoint. It will be useful information for industry groups and research bodies as a reference for future actions to be based on.

Fruit Crops

Information requirements

- Information flow needs to be a multi-directional flow between all stakeholders
- A website providing information on cultural practices, varieties, postharvest issues, economics and marketing would provide a more accessible source of information
- Need for an RIRDC "Tropical Fruit Newsletter"
- Need for Agrilink on top 4 exotic fruits
- Better availability and accessibility of existing information, both technical and marketing
- Need to improve the circulation of recently acquired information in a usable form
- Information needed on successful commercialisation pathways
- Research Projects; need information on milestones and completed reports
- R&D information; need to compile all information on tropical fruits from RIRDC, HAL, State Departments, CSIRO and Universities
- Who and what process is used for deciding commercial potential of crops
- Industry updates / market reports following crop, annually in an industry newsletter

Cultural requirements

- Need to examine alternative netting systems
- Examine potential for mechanisation of orchard management
- How to manage longans throughout the year

Marketing

- What factors will determine the success of a new fruit product/what are the characteristics or attributes of market appeal
- Deficient marketing dollars
- Need to promote Regional Branding
- Increase consumer education
- Awareness of best practice or optimal retail practices/conditions
- Awareness of marketing chain needs, strengths, weaknesses and willingness or interest in these products
- Supply chain groups are elitist-what is the option for the independent majority?
- Linking different crops through a single grower association
- Deficit in consumer awareness of newer "cross over" fruits

Other

- Require a list of reputable seed merchants from as many countries as possible including AQIS information
- Domestication of native species/adaptation of exotic species
- Lack of information on germplasm/collection

- Data on genetic variations on existing /new species

Fruit Stakeholders

Produce/retail managers

- Chefs / celebrity chefs
- Food media
- Wholesale agents/merchants
- Transporters
- Industry alliances
- Supermarkets
- Bureaucracy/administrators ie. AQIS
- Research bodies
- Consumers
- Growers and labour force

Vegetable Crops

Information

- Require information on what vegetables consumers want and how they want it packaged
- Require information on Asian vegetable research conducted by RIRDC
- What is the season availability of Asian vegetables
- How does one access prices, markets / clients and export opportunities
- Deficient information on marketing, supply chain and transport costs

Cultural requirements

- Require information on
 1. Mechanisation
 2. Weed control
 3. Pest control
 4. Nutrition
 5. Processing
 6. Packaging
 7. Plant populations

Marketing

- Require more consumer awareness of range of products
- Need to educate consumers as to uses of the product

Vegetable Stakeholders

- Chefs/celebrity chefs
- Food writers and media
- Wholesalers
- Retailers
- Growers
- Industry organisations
- Government bodies ie DPI ,RIRDC, CSIRO
- Water providers
- Environmentalists
- Packaging manufacturers
- Transporters

Pharmaceutical

Information

- Who do I go seek out to evaluate pharmaceutical potential of products ie kava, noni
- How does one identify potential bio active species
- What is the competition from alternative sources
- Where do dollars required to develop a product come from
- Require information on crops suitable for regional areas ie NT, northern WA that can feed into a pharmaceutical market

Pharmaceutical Stakeholders

- Landholders with native forests
- Drug companies
- State / Federal governments

Flowers

Information

- Require information on domestication of native species
- Adaptation of exotic species
- Lack of grower knowledge of market size and potential
- Lack of information on tropical flowers and export markets
- What is required to move it away from a hobby farm scenario
- Need information on post harvest requirements
- Shelf life and capacity to travel to domestic and export markets
- Many RIRDC reports on native flowers and foliage which include market studies

Flower Stakeholders

- Local workforce
- Marketers
- Flower exporters
- Flower market in capital cities
- Native flower and foliage growers
- Flower Export Committee of Australia

Timber

Information

- Lack of knowledge of dollar and farm system /plan potential
- Lack of consumer/building industry awareness of tropical native species
- Carbon credits: when, who, how much?
- New germplasm for timber
- Stop logging native forests

Timber Stakeholders

- Australian Forest Growers
- Afforestation
- Greening Australia
- Local environment
- Local economy via value adding

Fibre Industries

Information

- Lack of grower knowledge of market and farm plan/management potential
- Economic feasibility of bamboo
- Crops to use in conjunction with broad acre crops (sugar)
- More production and economic data needed
- Linking to sugar industry with alternative crops
- Parchments for speciality uses from purpose grown plants
- Complete lack of support within Government for nurturing of new crops and ideas
- Lack of awareness within relative organisations like RIRDC, DPI,
- Always hard to get the information to the right people
- Lack of collaboration between fibre projects DESPITE government organisations being fully informed
- Information on prospects for hemp; several RIRDC reports

Fibre Stakeholders

- Paper makers
- Sugar mills
- Raw produce growers
- Building board makers

Beverage Industry

Information

- More production information required
- Information on coffee R&D available from RIRDC, DPI
- Information on future of NSW coffee; RIRDC Study by S de Jong
- Report on Australian tea industry; RIRDC reports
- Spices- what are the market opportunities
- What other beverages are there other than tea and coffee? Native plant/hemp beverages?
- Deficiency in regional marketing and branding
- Education of growers/roasters for perceived quality

Beverage stakeholders

- Major companies
- Retailers and distributors
- Producer Association in Qld and NSW

5. References

- Ross, P. 1997, Market opportunities and Research Priorities for Commercially Under-exploited Tropical Fruits, Vegetables and Nuts.
- Zappala, A. 2003, Queensland Tropical Horticulture Overview