Challenges to Enhance Exports of Tropical Fruit: a Role for Research.

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Introduction

- International food trends
- Know your markets; drivers for consumer purchases
- Superfruits
- Food miles
- R&D drives innovation

Why be involved in the fruit business?

- Why do farmers grow tropical and subtropical fruit ?
- Why do postharvest operators sort, pack, store fruit ?
- Why do exporters dispatch fruit ?
- Why do importers handle fruit
- Why do wholesalers and retailers sell fruit ?

Why be involved in the fruit business?

- Not out of the goodness of their heart
- Not simply to provide food for their family
- Not to feed the hungry of the world
- **They do so to make money**
- Therefore they must understand the business of the supply chain
- They must understand what drives consumer choices.

Food trends in the USA 2008

- Eco-friendly foods
- Local, Natural, and Fresh Foods
- Food Safety
- Higher Prices
- Prebiotics and probiotics
- Whole grains
- Simple Ingredients and Clearer Labels
- Lowered salt content
- Alternative Sweeteners
- Bottled Water Backlash

Source: http://www.medicinenet.com/script/main/art/asp?articlekey=86520

More food trends in the USA 2008

- Going local - locavore
- Vegetarian – more fruit and options
- Green – greenitude to save the planet
- Eating for health - diet concerns
- Kids are hot – healthy food in lunches
- Superfruit –high antioxidants, nutrient dense
- Hot and spicy – for aging baby boomers
- Hispanic – Central and South American tastes and flavours
- Rise of Asian foods –Beijing Olympics

Source :http://www.post-gazette.com/pg/07361/844565-34.stm

Key food trends in 2008

Source: www.new-nutrition.com ex Julian Mellenthin

- 1: Digestive Health – a wellness issue and the biggest opportunity
- 2: Fruit and superfruit – the future of food and health
- 3: The marketing power of “naturally healthy”
- 4: Beauty foods – the newest niche
- 5: Weight management more about maintaining than losing
- 6: Mood food feels its way; indulgence is allowed
- 7: A tipping point for the premiumisation of health
- 8: Healthy snacking for the “me” generation
- 9: Kid’s nutrition – connecting to multiple trends is crucial
- 10: Are antioxidants the new probiotics?

What will the food buzz words in 2009 and beyond?

- Sustainable, healthful, seasonal, local, organic, antioxidant, artisanal, kids, yumberry, probiotics, carbon footprint, locavore, sustainability, cage-free, pasture-raised, micro-greens, gluten-free and (all things) Latino.

Psychographics – the study of shopper identification in relation to attitude to food - UK

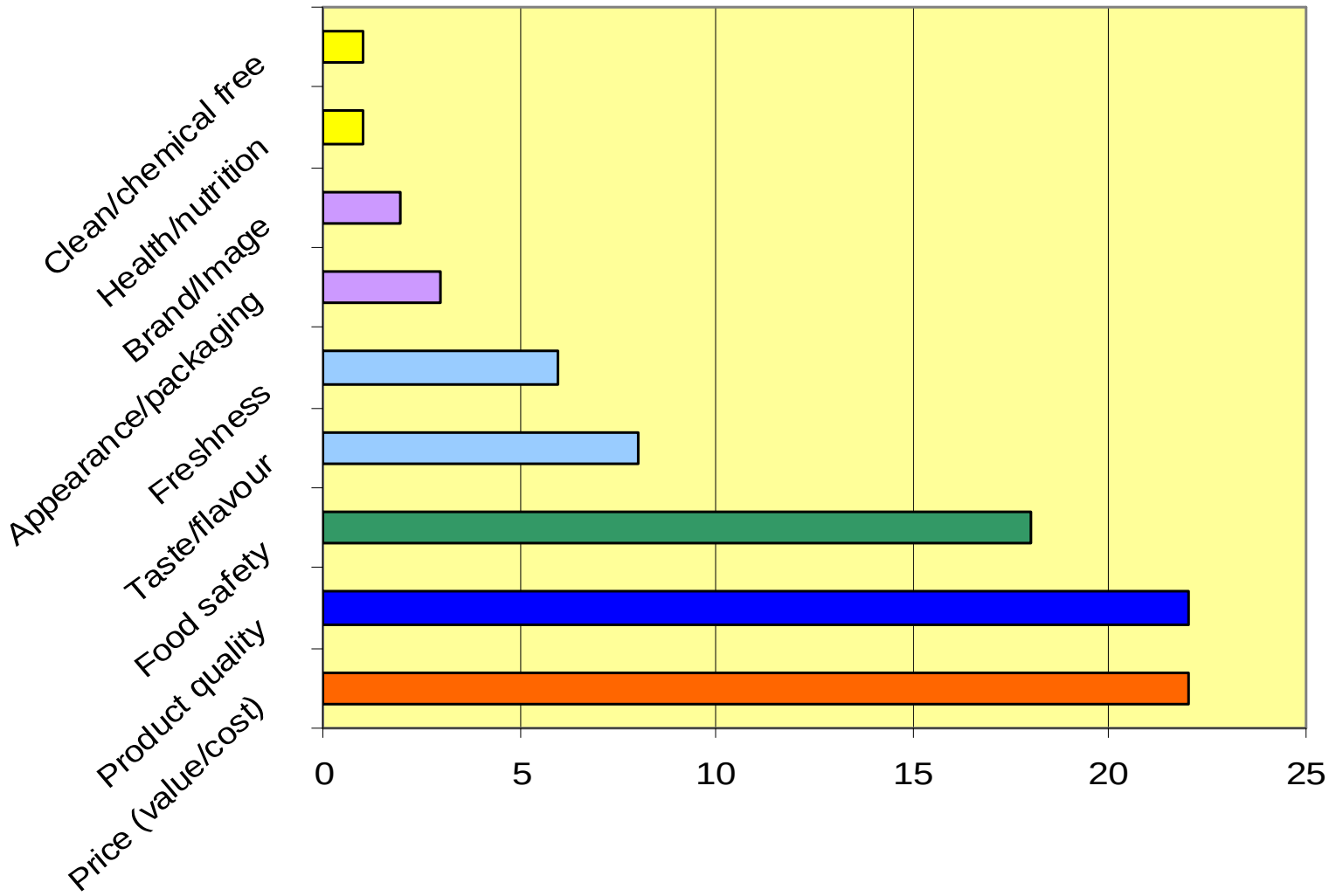
- **Foodies** - those who enjoy cooking, trying new things and cook meals from scratch 40%).
- **Traditionalists** – always eat the same thing, not adventurous with food choices (29%)
- **Economists** – shop to budget, interested in value for money (18%)
- **Fuelies** – not interested in food, eat because they have to (13%)

IGD, Shopper Trends in Product and Store Choice, 2007.

Who are these shoppers?

- **Foodies** – young people, women and higher socioeconomic group. More likely to shop at Tescos and Sainsburys
- **Traditionalists** – older shoppers, lower socioeconomic group. More likely to shop at Asda
- **Economists** – shop at all major retailers, tend to be >65, not working and from lower to medium socioeconomic groups
- **Fuelies** – generally males, lower socioeconomic group

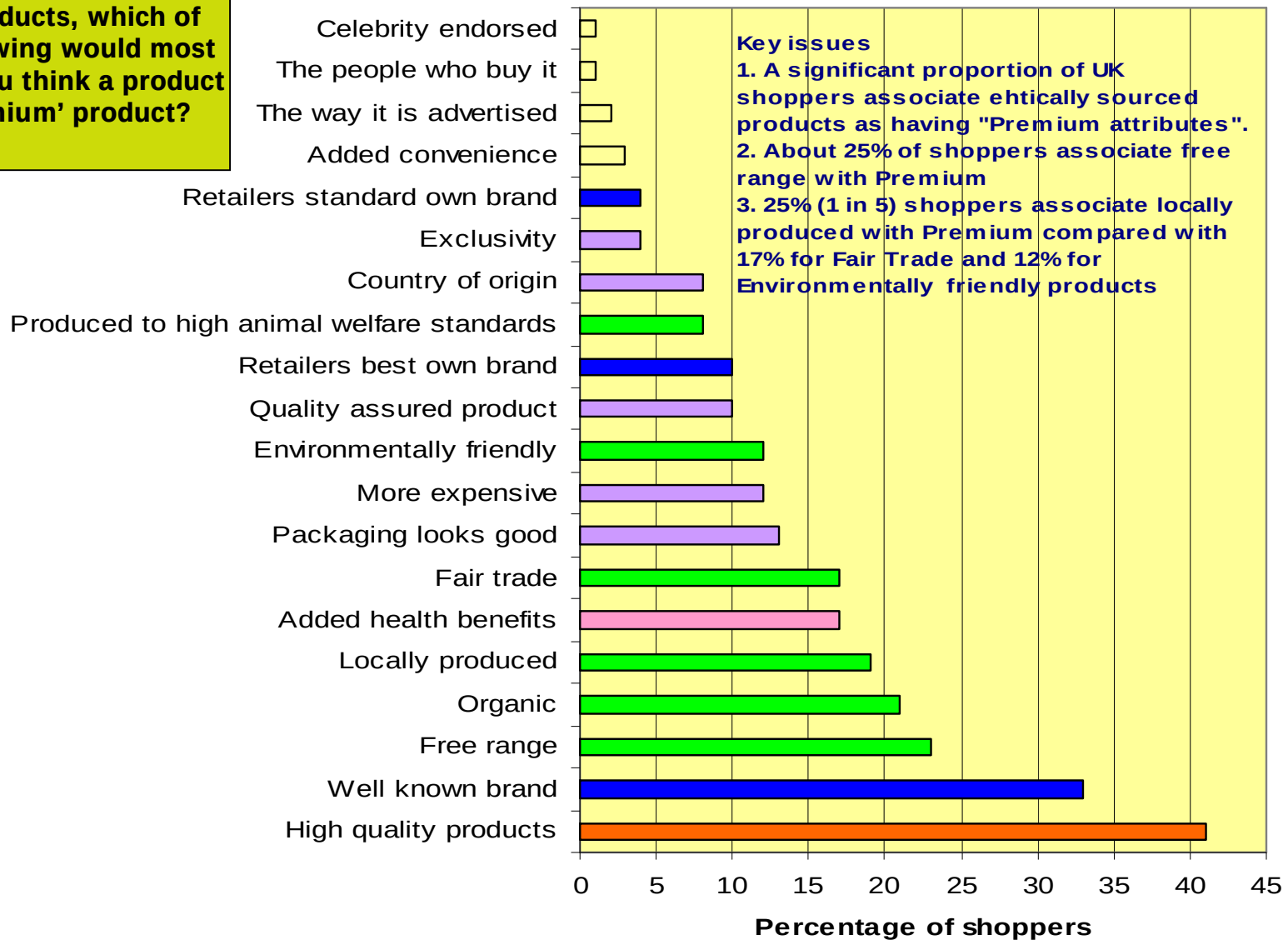
Food attributes influencing consumer purchase decisions (nominated by market)



Beyond Price and Quality. Dept Rural Affairs, Victoria, 2004

Premium attributes influencing UK consumer purchasing (as decided by consumers)

Thinking about food and drink products, which of the following would most make you think a product is a premium' product?



**IGD Grocery Shopper Survey 2007 What next for Premium? n=1017 UK Shoppers*

R&D in marketing

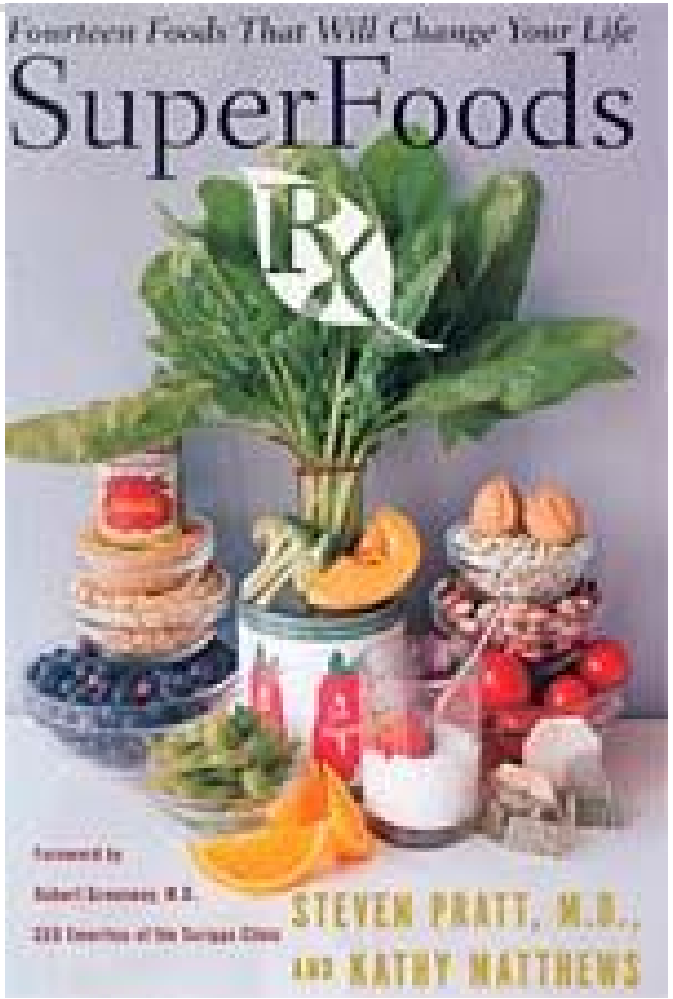
- Determine current food trends; they will be different next year
- Commission market research and taste evaluations for different markets
- Determine consumer reactions by using in store promotions with new products
- R&D to develop market driven new products utilising health and nutrition benefits of tropical fruit

Summary

- Know your market, know and capitalise on current and future trends
- Understand motivations behind shoppers decisions where to purchase their food
- Understand drivers influencing consumers purchase behaviour
- Detailed market research is an essential component of business plan for any producer and marketer of tropical fruit.
- Knowledge costs money

Superfoods – 14 flagship foods for health and wellbeing

- **Blueberries**
- **Oranges**
- Beans
- Broccoli
- Oats
- Pumpkin
- Salmon
- Soy
- Spinach
- Tea (black and green)
- Tomatoes
- Turkey
- Walnuts



Superfoods

- No official definition of superfoods is available
- They are foods that offer health benefits beyond basic nutrition, improving overall health or offering disease prevention.
- Spans a vast array of foods, usually encompassing those with high antioxidant contents, from fruits such as pomegranate, yumberry, açai and goji berries, to green tea, soy and even red wine and dark chocolate.

Superfruit – a current boom

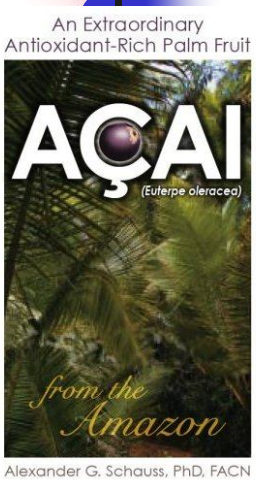
- A superfruit has appealing taste and appearance
- 1) high nutrient density,
- 2) superior antioxidant quality,
- 3) health benefits.

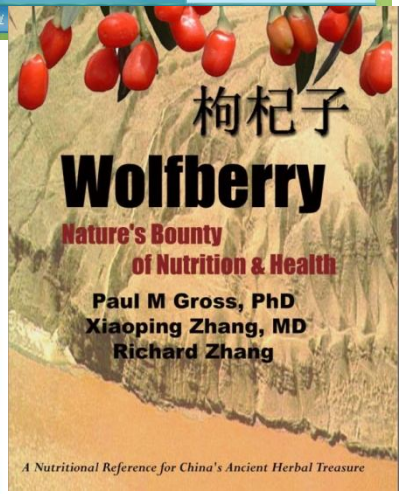
- *The popularization of superfoods means that many food and drinks now have a 'healthy-halo' which significantly influences consumer preferences.*"
- Is this simply a marketing ploy?

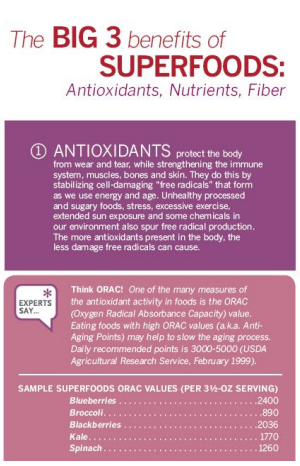
Major superfruit

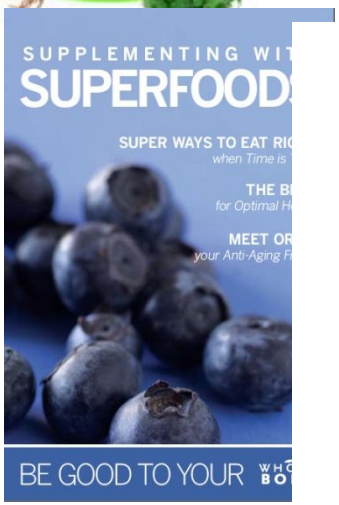
- NB. EU has banned use of name ‘superfruit’ on labels unless specific nutritive and health attributes have been scientifically demonstrated; too many spurious claims
- Red, purple, black fleshed fruits have greatest antioxidant activity plus increasing number of health conferring attributes
- Increased number of products now available using combinations of fruit in juices, yoghurts etc.

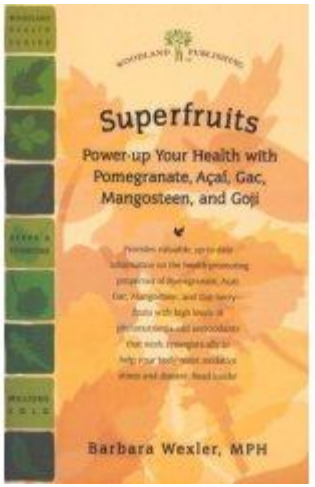
Supermarketing











Plumegranate – a new plum from Israel

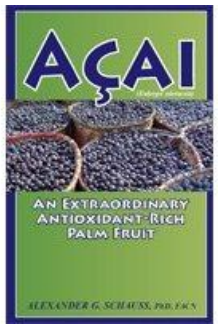
Superfruit

Cranberry

Elderberry

Concord grape

Blueberry



Pomegranate

Raspberry

Bilberry

Chokeberry

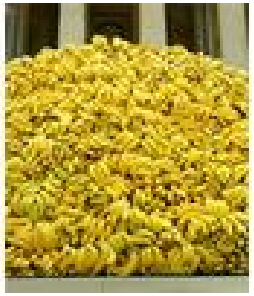
Black currants

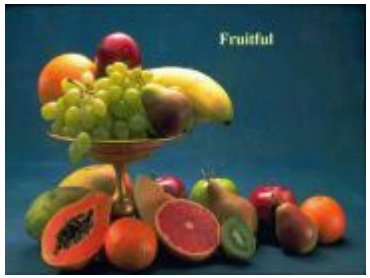
Boysenberry

Blackberry

Goji berry

Tropical and subtropical superfruit





What is a superfruit?

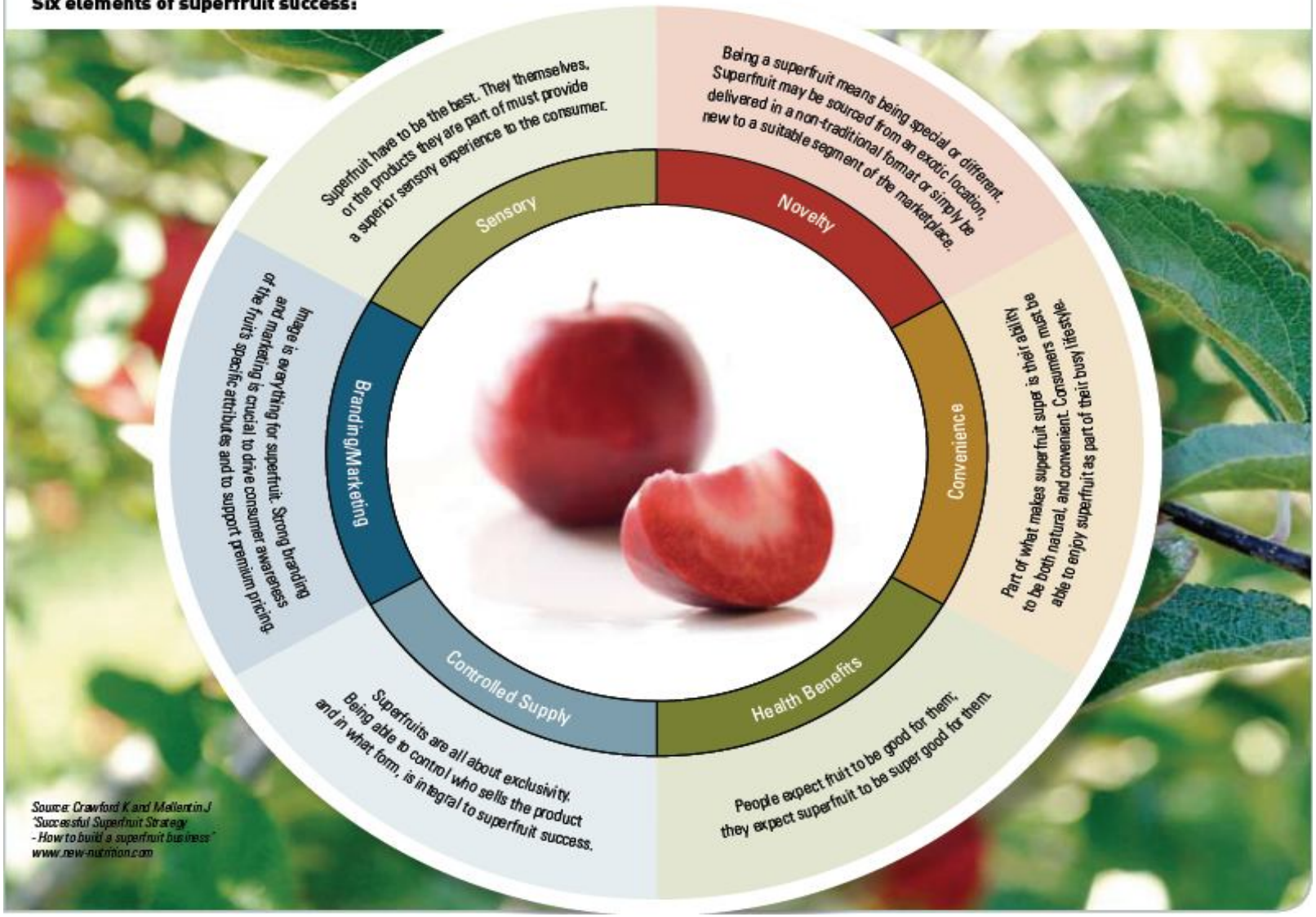
Superfruits are fruits which combine a defined set of consumer and commercial attributes that enable them to achieve popularity and price premiums above those experienced by fruit in general.

They are fruits that stand out from the crowd, that excite us, give us pleasure and offer enhanced health or nutrition benefits.

New Zealand is well placed to play a major role in creating superfruit. Recognised worldwide as a source of high quality fruit products, and for innovation in new fruit development and marketing, New Zealand's horticulture industry has established credentials in the field of high value, niche products.

Add to that a 'clean and green' image with global consumers, the ability to stand out as a unique fruit producing location, and strong capability in food and health research and you have a winning combination capable of meeting all the criteria for superfruit success.

Six elements of superfruit success:



Source: Crawford K and Mellentin J "Successful Superfruit Strategy - How to build a superfruit business" www.new-nutrition.com

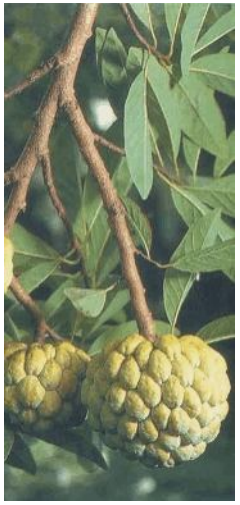
R&D and superfruit

- Plant hunting – seek out and utilise botanical biodiversity in tropical flora
- Plant selection and plant breeding to develop unique cultivars
- Know your fruits –biochemical and metabolomic studies to identify nutritive and health conferring properties
- Identify unique characteristics for use as key attributes for eventual marketing emphasis
- Develop efficient, productive, sustainable production and postharvest systems

Food miles

- Potential problem for export of fruit from Asia to Europe , Japan/Korea and Nth America
- Miles travelled is claimed to indicate energy cost - not appropriate
- “Woolly” uncritical thinking has driven some decisions in UK such as protesting food from Africa imported by air, and labelling such food with evocative labels

Defra report on Food Miles



- A single indicator based on total food kilometres is an inadequate indicator of sustainability.
- Data is available to provide a meaningful set of indicators annually.
- Food transport has significant and growing impacts.
  * Food transport accounts for 25% of all HGV vehicle kilometres in the UK.
  * Food transport produced 19 million tonnes of carbon dioxide in 2002, 10 m CO_2 tonnes in UK, 1.8% of total UK carbon emissions and 8% of total UK road sector emissions
- Direct environmental, social and economic costs of food transport were over £9 billion each year, and dominated by congestion.

Source: DEFRA Report :The Validity of Food Miles as an Indicator of Sustainable Development, 2005. http://www.risc.org.uk/pdf/Food%20miles%20full.pdf

Energy use in the US food sector

Table 2. Energy use in the U.S. food system *

Sector	Average (percent)
Production	17.5
Processing	28.1
Transportation	11
Restaurants	15.8
Home preparation	25
Food system**	**15.6**

* (Excerpted from Table 2, "Energy Use in the Food System: A Summary of Existing Research and Analysis." Center for Integrated Agricultural Systems, University of Wisconsin-Madison.)

** percentage of total U.S. energy consumption used in the food system

Source: Pirog et al. 2001. http://www.leopold.iastate.edu/pubs/staff/ppp/food_mil.pdf

R&D required

- Serious economic analysis must determine total energy (carbon footprint) for production, postharvest and processing systems of tropical and subtropical fruit in producing countries
- The full carbon footprint must be determined and articulated through supply chain from farm to fork including buyer behaviour
- Social consequences must be taken into account in relation to poor farmers in developing countries
  *is it better to grow tomatoes in Kenya and fly them to Europe, or produce them in energy intensive greenhouses in The Netherlands?

R & D required

- Need to establish total carbon footprints or Life Cycle Assessments (LCA) for each tropical and subtropical fruit
- LCA = assessment of the environmental effects of product or service during its lifetime, from cradle to grave. Energy for all important processes during products lifecycle are included, from raw materials brought in and used on farm (cradle) until product is disposed of and waste dealt with (grave).

A Carbon Calculator 1

- **Lincoln University Agricultural Economics Research Unit**
- **Free web based Industry Specific Carbon Calculator** for New Zealand Agriculture and Horticulture
- **Enter the area of farm in hectares and select the type of farm**
- Effective area (in ha)
- Farm Type
- Agriculture (with stock)
  Horticulture (no stock)
- This Farm Carbon Calculator is a farmers management tool to estimate the amount greenhouse gasses produced by farming activities (in units of C02eq) using Life Cycle Assessment.

www.lincoln.ac.nz/carboncalculator

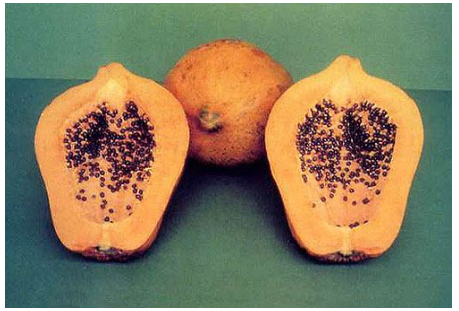
A carbon calculator 2

- **Fuel Amount**
- **Default values**
- Diesel litres Cost per litre
- Petrol litres Cost per litre
- Electricity kW hrs Unit cost per kW hr
- Daily charge per day
- **Reset Back Next**

A carbon calculator 3

Fertiliser	**Amount**
Nitrogen kg N/ha	120
Phosphorous kg P/ha	100
Potassium kg K/ha	60
Sulphur kg S/ha	30
Magnesium kg Mg/ha	40
Lime kg/ha	100

A carbon calculator 4



- **My Farm Carbon Footprint in kg of C02 equivalent (Life Cycle Assessment)**

Type	Per farm	Per Ha
Energy	4,952	990
Fert/Feed	3,041	608
Methane	0	0
Nitrous Oxide	3,524	705
TOTAL	**11,517**	**2,303**

R & D environment

- Scientists will always say they do not have enough money
- Funders will always say they are providing as much as they can afford
- Industry always want more definitive answers
- Strong desire by many students to undertake graduate studies – Masters or PhD research degrees
- R & D stimulates innovation
- How best can these themes be reconciled?

R & D environment

- Leverage existing funding by combining grants from public and private sectors
- Industry liaise more closely with public research organisations and universities
- Identify generic industry problems requiring research solutions
- Provide opportunities for a combination of basic (understanding) and applied (outcome oriented) research

Research outputs

- Increasing research publications on tropical fruit is most gratifying
- Fundamental information forthcoming on mango, papaya, mangosteen, durian and pitaya provides underpinning information for industry
- Provide vacation employment and scholarships to graduate students
- Using students to do research provides capabilities a successful industry future

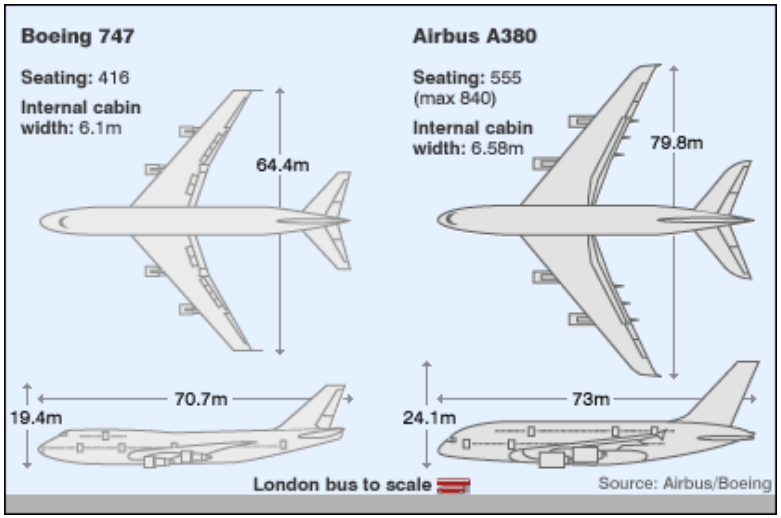
Transport modalities

- Must improve transport efficiencies as oil prices escalate towards $200/barrel,
- Bigger planes – Airbus 380
- Air ships – dirigibles SkyHook
- Faster ships – New York to Paris, door to door in 7 days
- Faster trains - >400 kph;
- New networks – Trans Asian Rail network
- New cheaper routes from major new production regions to affluent markets.

Air transport – the Airbus

- The new Airbus 380
- In low density configuration can take 555 people; in high density up to 853
- Freight version will carry 150 tonnes of cargo 10,400 km at 1050 km/h
- Minimise transhipment problems at transport hubs?
- Specialised packaging and handling; in transit dynamic CA?
- Real time control of container conditions

- A huge plane with large capacity



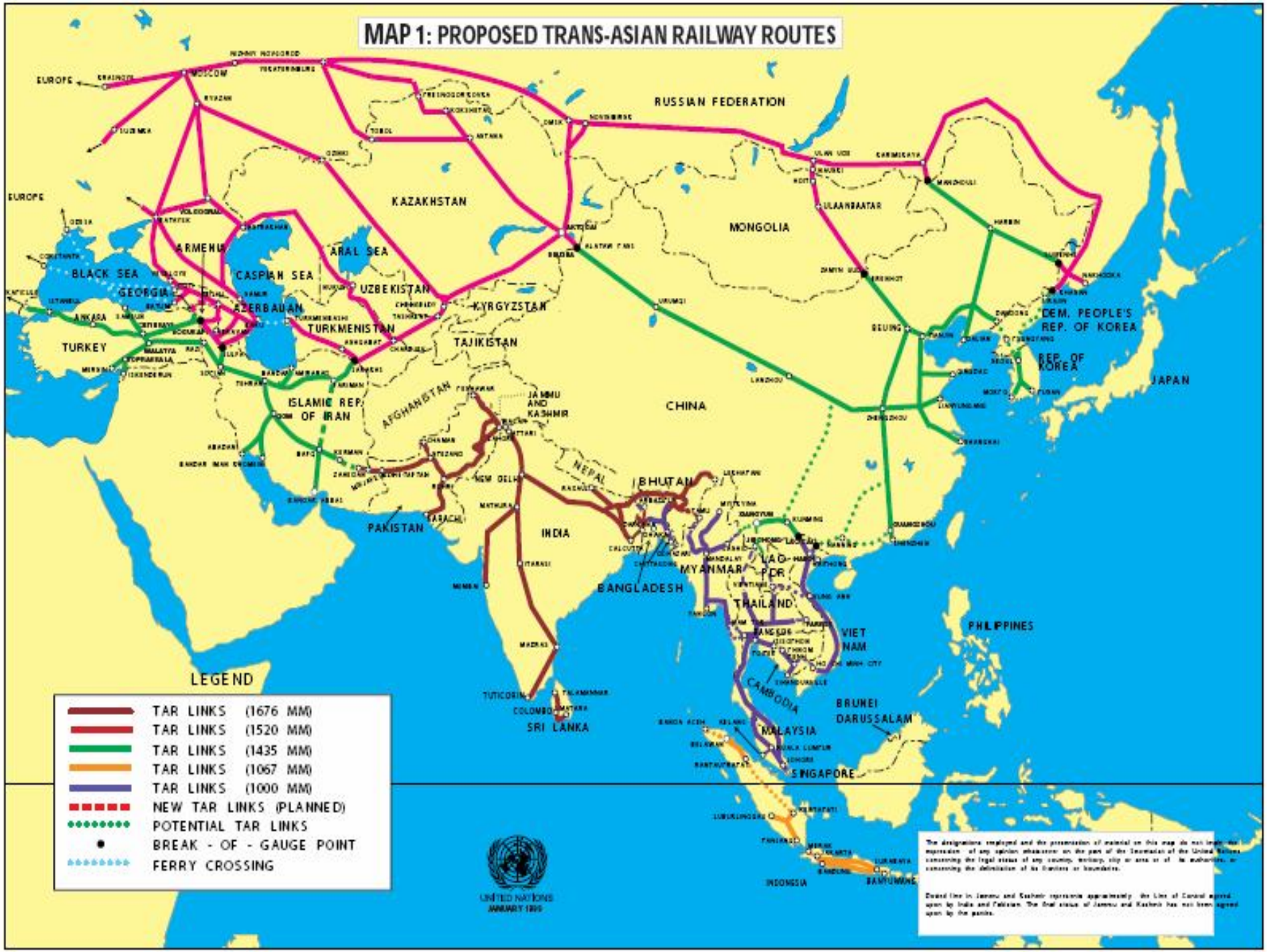
Airships

- Airships have potential to provide ‘medium’ speed transport
- Planned payload volume capability of 50m x 8m x 8m or 160 tonnes; ship planned to be 270m long.
- Speed wind dependent but 50-200 km/h
- Significant fuel savings and reduced energy costs

- Number of companies building airships
- Boeing building SkyHook

Trans Asian railway

- First mooted in 1960 to facilitate freight flows across Asia
- Gained impetus in 1990s following strong economic growth of Asian countries
- Northern, Southern and intra-Asian routes promoted
- Reduce point to point transit times by 7-10 days from China to Amsterdam compared with sea freight
- Cheaper than air freight


MAP 1: PROPOSED TRANS-ASIAN RAILWAY ROUTES
RUSSIAN FEDERATION
KAZAKHSTAN
MONGOLIA
CHINA
EUROPE
MOSCOW
ULAANBAATAR
BEIJING
ARMENIA
BLACK SEA
CASPIAN SEA
ARAL SEA
GEORGIA
AZERBAIJAN
UZBEKISTAN
KYRGYZSTAN
TURKMENISTAN
TAJIKISTAN
ANKARA
TURKEY
ISLAMIC REP. OF IRAN
AFGHANISTAN
PAKISTAN
JAMMU AND KASHMIR
NEPAL
BHUTAN
NEW DELHI
INDIA
BANGLADESH
MYANMAR
LAO PDR
THAILAND
VIET NAM
CAMBODIA
PHILIPPINES
BRUNEI DARUSSALAM
MALAYSIA
SINGAPORE
INDONESIA
SRI LANKA
DEM. PEOPLE'S REP. OF KOREA
REP. OF KOREA
JAPAN
LEGEND
TAR LINKS (1676 MM)
TAR LINKS (1520 MM)
TAR LINKS (1435 MM)
TAR LINKS (1067 MM)
TAR LINKS (1000 MM)
NEW TAR LINKS (PLANNED)
POTENTIAL TAR LINKS
BREAK - OF - GAUGE POINT
FERRY CROSSING
UNITED NATIONS
JANUARY 1999
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Dotted line in Jammu and Kashmir represents approximately the Line of Control agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not been agreed upon by the parties.

Fast ships

- Hydro-Lance ships designed for a cruising speed of 60 - 150 Knots. Max. speed up to 200 knots on calm seas?
- Payload up to 2,000 tonnes
- FastShip's seven-day service from Chicago to Frankfurt. New York to Paris would be six days, carrying 10,000 tonnes at 38 knots (100 hour port-to-port).
- Dedicated terminal facilities , very rapid (6 h) turnaround adds to competitiveness.
- Logistical challenges to be overcome

Tamarillo
Fruit for life from New Zealand

R&D Requirements

- Supply chain studies to identify constraints and provide answers to problems
- Enhanced postharvest research to extend storage life so sea freight is possible
- Research to understand the physiological nature of the product
- New packaging technologies that responds to environment and to product
- Add value through processing for product that does not meet export quality criteria

Conclusions

- Real potential for increased consumption of new and exotic tropical and subtropical fruits
- Consumer trends indicate health, convenience, nutrition, indulgence, exotic Asian flavours are key purchase drivers that should be exploited
- Research essential to establish needs of consumers in different markets
- R&D needed to get improved varieties, new selections, and even new fruit (e.g. yumberry) along with environmentally friendly production and postharvest supply chain systems

Conclusions

- Market safety and quality standards with GlobalGap acceptance are must be adopted with sustainable production systems developed and implemented for all crops
- New products must be created through packaging or processing to capitalise on future consumer trends
- Tropical and subtropical fruit must be analysed thoroughly and Metabolomics will identify specific chemical attributes that have health conferring and well being benefits

Conclusions

- LCAs must be calculated for each fruit and for total supply chain from farm to fork and used in marketing
- Essential for increased cooperation between private and public sectors, including universities, to undertake R&D to develop new fruit, new fruit based products, new postharvest technologies and for calculating LCAs.