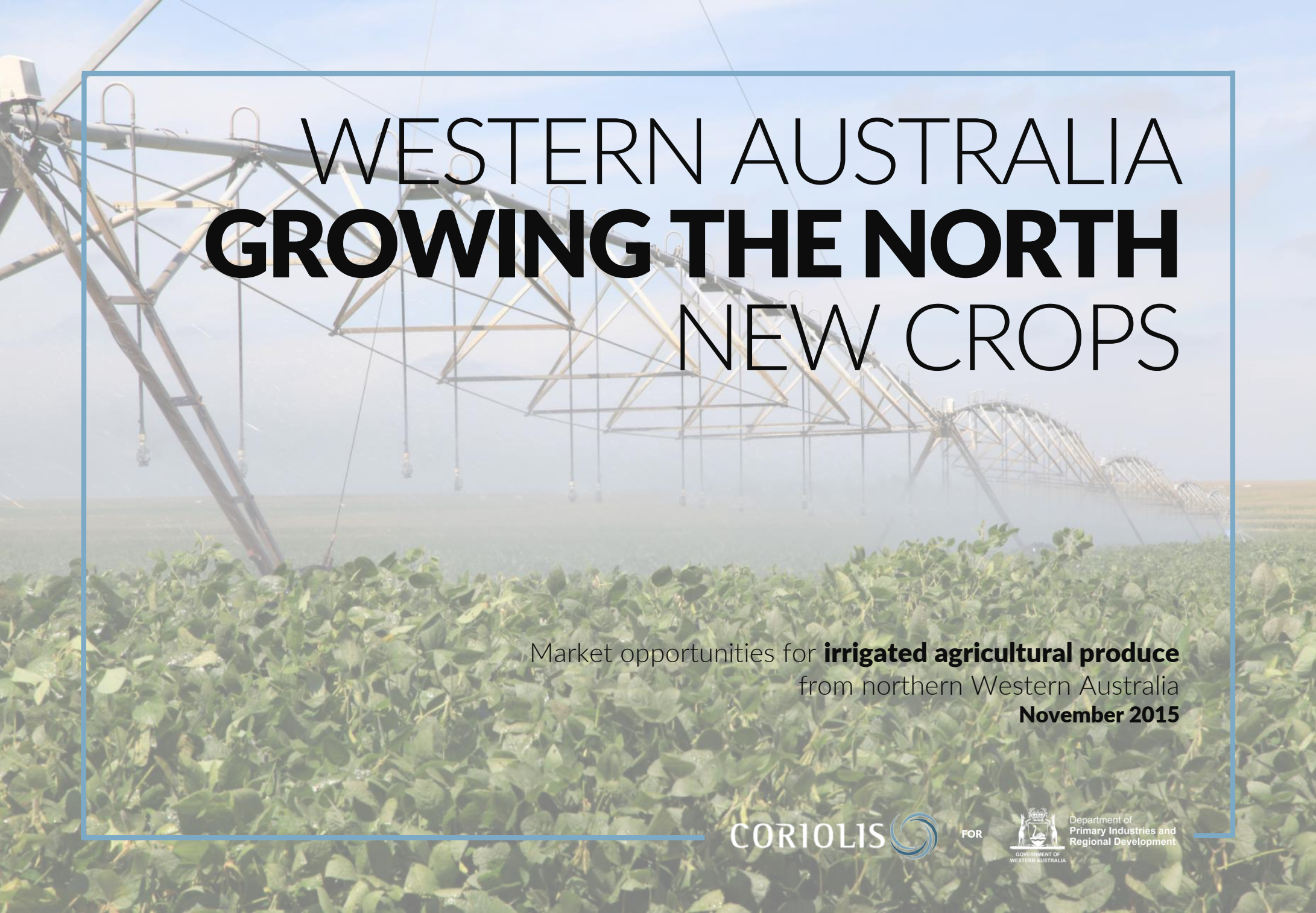

WESTERN AUSTRALIA
GROWING THE NORTH
NEW CROPS

Market opportunities for **irrigated agricultural produce**
from northern Western Australia
November 2015

CORIOLIS FOR Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

GROWING THE NORTH

Market opportunities for irrigated agricultural produce from northern Western Australia

FINAL DISCUSSION DOCUMENT; under contract DAFWA244; November 2015

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CONTENTS

Why did DAFWA undertake this project?

DAFWA aims to create a progressive, innovative and profitable agriculture and food sector that benefits Western Australia - in this role, they are leading a number of irrigated agriculture development projects including those in the Gascoyne, Pilbara and Kimberley

DAFWA recognises that there are many products that could be grown successfully in the North – identifying those with strong demand that are experiencing growth in the markets of the future will ensure greater potential for success

In order to make the best decisions for the regions, DAFWA and stakeholders need to gain an understanding of the different agricultural options - the scale requirements and capacity needed to meet demand, what is WA's competitive advantage and the potential for adding value

Core questions that Coriolis were engaged to address:

What products do our key target markets want...

... that can be competitively produced in the North of Western Australia?

EXECUTIVE SUMMARY

The North of Western Australia can realise the potential of new irrigation precincts coming on stream. However, success will require new thinking about the products being demanded today in the markets of the future, rather than the products of European immigrants of the past.

Northern Western Australia currently produces limited food or agricultural products. Irrigation projects provide an opportunity to expand production and increase exports. A number of irrigation projects are underway with the potential new agrifoods exports to come online. How should Western Australia best utilise this water?

Too often the agricultural sector is "production driven" rather than "market led." Instead, this discussion document identifies high potential products at the intersection of what markets are demanding and what the North can produce.

CONCLUSION 1: Markets want what the North can produce.

High growth target markets in Asia and the Middle East are demanding products that the North can produce. Asia and the Middle East are attractive markets to Western Australia. These countries are high growth markets and importing significant volumes from our climatic peers. Western Australia can compete in these markets.

CONCLUSION 2: The North can increase agricultural production.

Climatic peers demonstrate there are major opportunities to increase agriculture in the North. A screen of these climatic peers concludes many products can be grown in the North. Countries in a similar climatic zone, from Mozambique to Israel, are producing and exporting high value products and products to the world. If climatic peers can produce theses products, so can Western Australia.

However, due to conditions in the North, success will depend on growing products that are robust, mechanically harvested, and which thrive in the heat. Achieving scale and utilising modern farm practices is critical for Western Australia to compete globally.

CONCLUSION 3: There are a wide range of high potential options.

Eighteen high potential products have been identified as opportunities for irrigated agriculture in Northern Western Australia. An extensive quantitative screen and category evaluation highlighted eighteen products with significant potential for Northern Western Australia. A wide range of agricultural products were identified, with products ranging from walnuts to cotton. These products all have a growing market with a wide spread of buyers and sellers.

The Western Australia Government has a wide range of projects underway to facilitate the growth of irrigation in the North

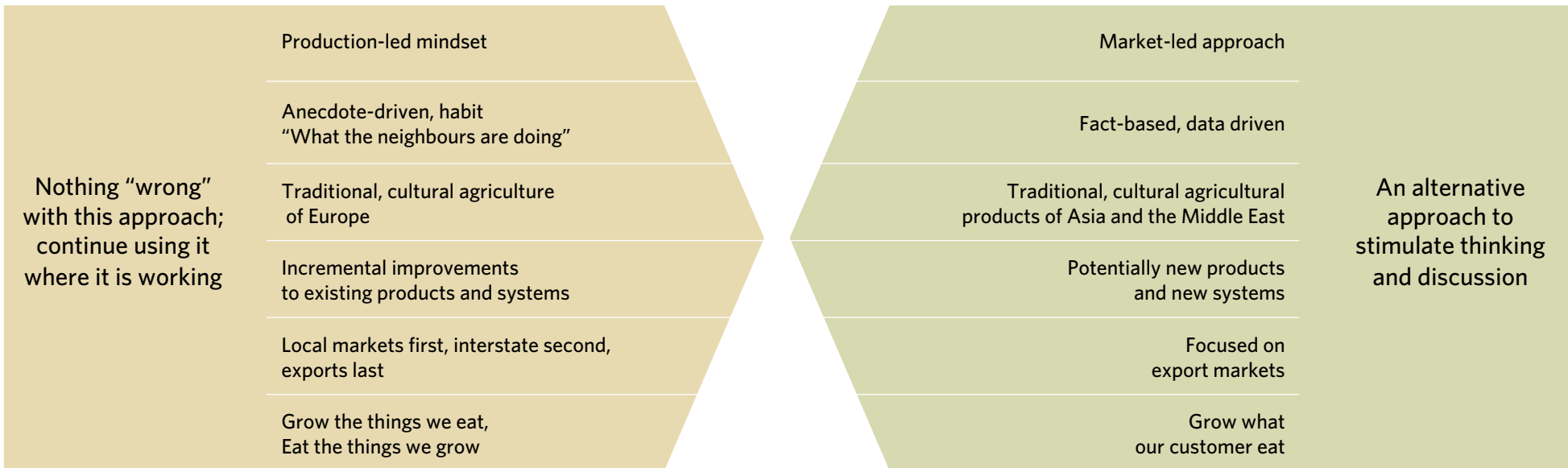
ROYALTIES FOR REGIONS PROJECTS INVOLVING IRRIGATION IN THE NORTH OF WESTERN AUSTRALIA

As of mid/late 2015

Region	Project	Key stakeholders	Project type	Summary
Pilbara	Pilbara Hinterland Agricultural Development Initiative (PHADI)	Local stakeholders Leaseholders	Demonstration	- Assess the potential of irrigated agriculture in the Pilbara utilising surplus mine dewater and other in-situ water resources - Strong focus on practical research through pilot site trials and a comprehensive assessment of Pilbara soil and water resources
Gascoyne	Middle Gascoyne water investigations	Local stakeholders	Prospecting	- Define & scale water in alluvial aquifers upstream - Agreed strategic direction for Gascoyne horticulture industry
Kimberley	Mowanjum Irrigation Trail	Mowanjum Aboriginal Corporation	Demonstration	- Dry season feeding of large cow; "stand-and-graze" - Develop a pivot irrigation area - Use for grazing and silage
	Knowsley Agricultural Area water investigation	Local stakeholders	Prospecting	- Find water for area on outskirts of Derby - Land is currently unallocated Crown Land
	Fitzroy Valley	Local stakeholders Leaseholders	Prospecting	- Confirm groundwater potential to support irrigation around Willare, Liveringa and Gogo areas, and potential irrigation start-ups on Aboriginal pastoral stations
	La Grange – West Canning groundwater project	Local stakeholders Leaseholders	Prospecting	- Presence, reliability & availability of water from Canning Basin - Development pathways in existing landscape
	Bonaparte Plains – Kimberly expansion	Local stakeholders Potential investors	Demonstration	- Developing irrigated agriculture in loamy sands of East Kimberly; groundwater investigation, soil assessment, water & land availability; develop tenure options for potential investors

Source: various Royalties For Regions publications; DAFWA website; Coriolis analysis

This project seeks to "think different" and take a new approach to assist in solving the challenge of what to do with this new irrigation area and the new output it could produce



What is the objective of this project?

What do Western Australia's markets of the future want...

- China, Japan, Korea and other East Asian markets
- South-East Asia
- India & South Asia
- The Middle East

...from new irrigated agriculture in the North of the State...

- Pilbara
- Kimberley
- Carnarvon/Gascoyne

... that will create the most value?

Suited to Western Australia's...

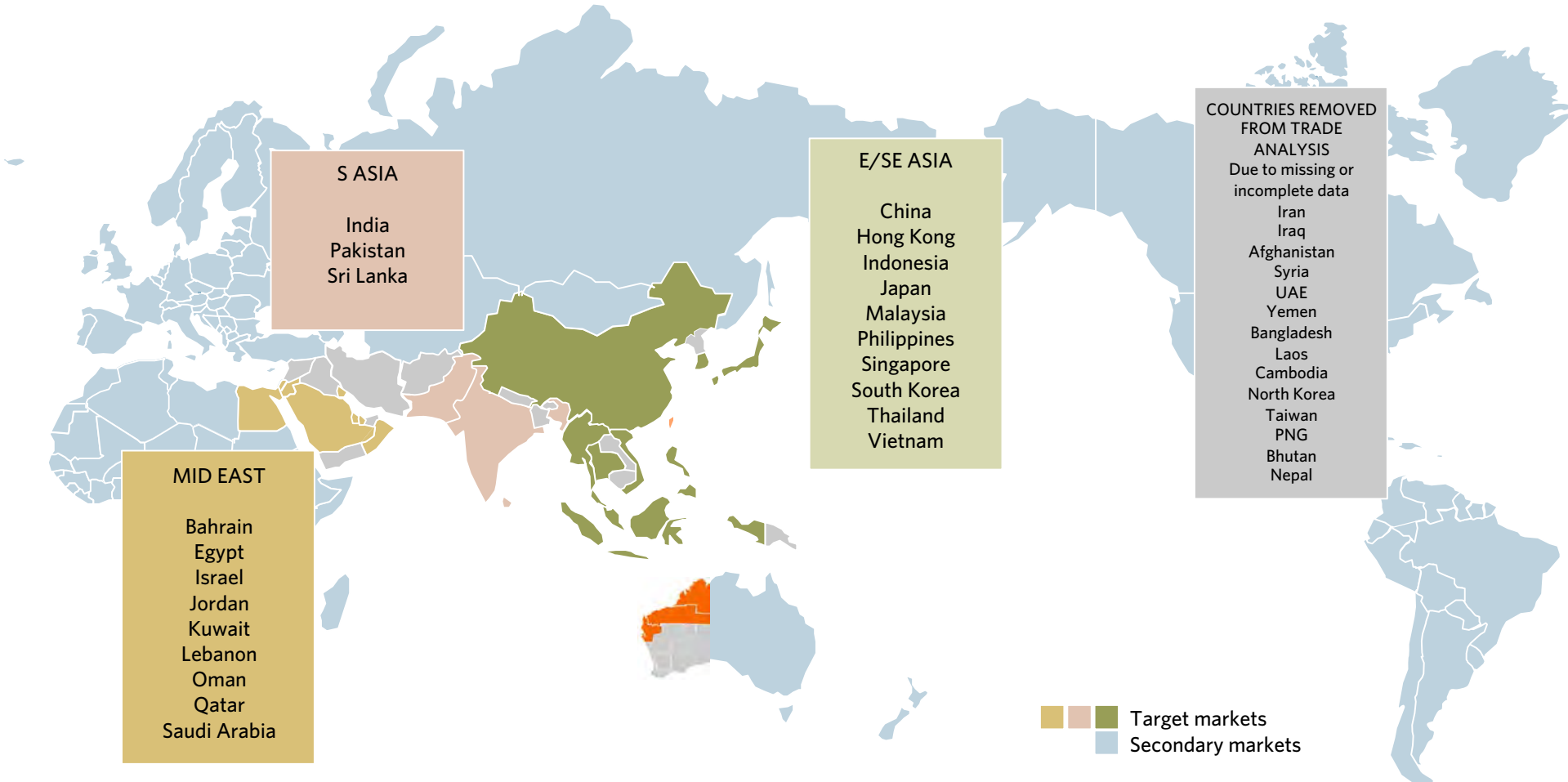
- Climate
- Conditions
- Skills

CONTENTS

The following twenty-two countries were defined as high potential target markets for new agricultural products produced in the North of Western Australia

COUNTRIES/REGIONS DEFINED AS HIGH POTENTIAL TARGET MARKETS FOR NORTHERN WESTERN AUSTRALIA

Target markets; 2015

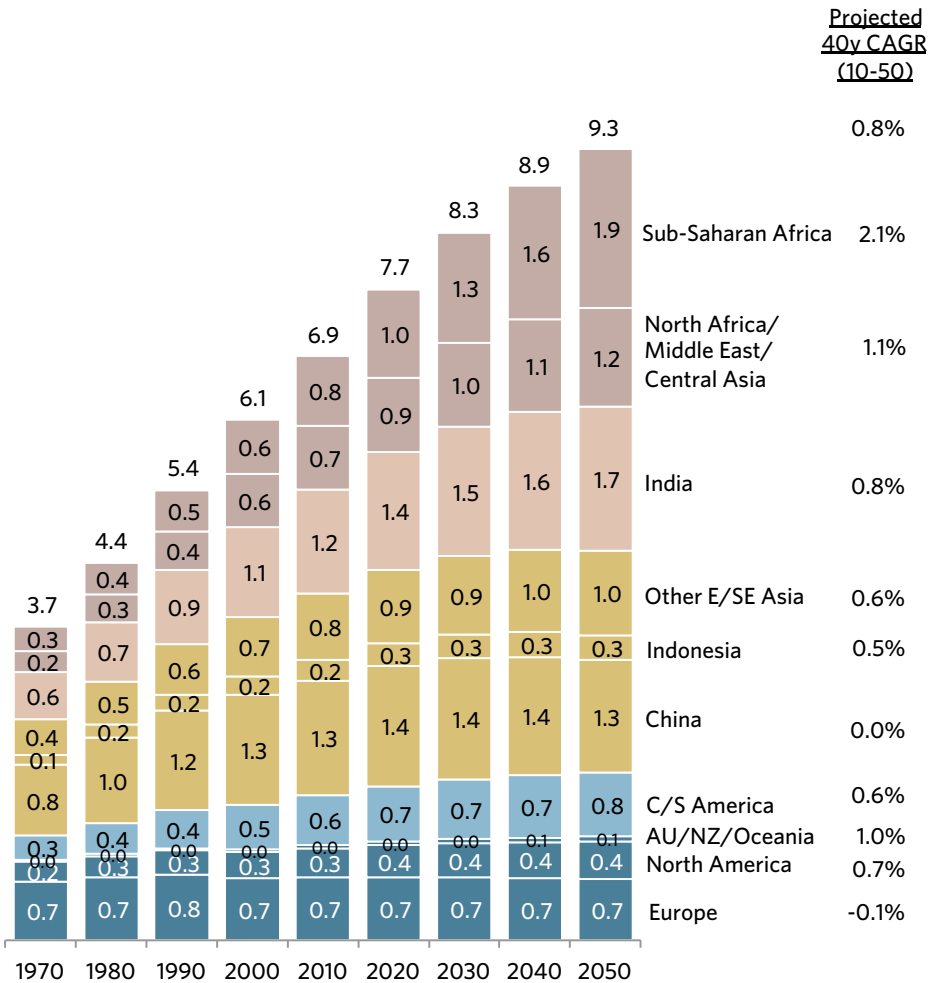


NOTE: The removed countries will appear in some of the data as suppliers (as reported by the receiving country); their own import data is not available

These markets are large and have growing populations and growing incomes

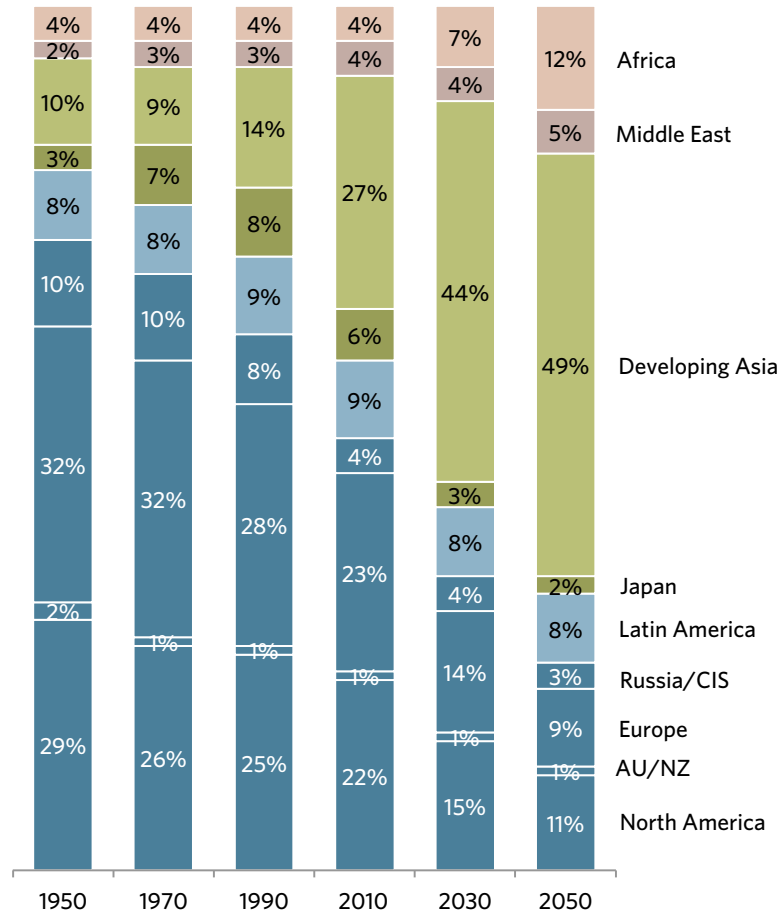
PAST & PROJECTED WORLD POPULATION BY SUPER-REGION

People; billions; 1970-2050



WORLD GDP AT PURCHASING POWER PARITY (PPP) BY REGION

% of dollars; PPP (not nominal);1950-2050

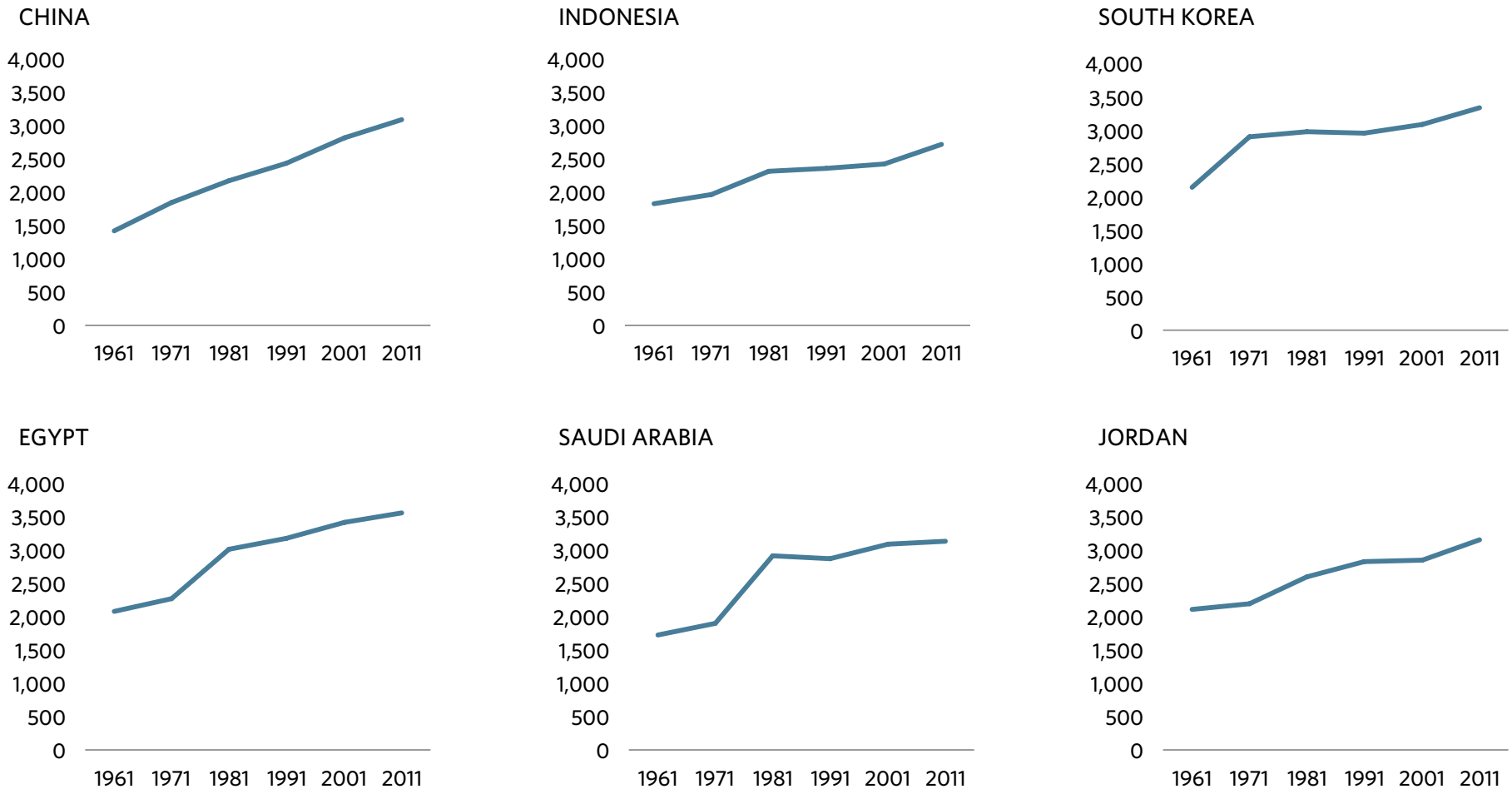


Source: Citigroup "Global Growth Generators" 21 Feb 2011; United Nations World Population Prospects 2010 revision; Coriolis analysis

Consumers in these markets are spending some of their growing incomes on more food

FOOD SUPPLY OF SELECTED ASIAN AND MIDDLE EASTERN COUNTRIES

kcal/capita/day; 1961-2011

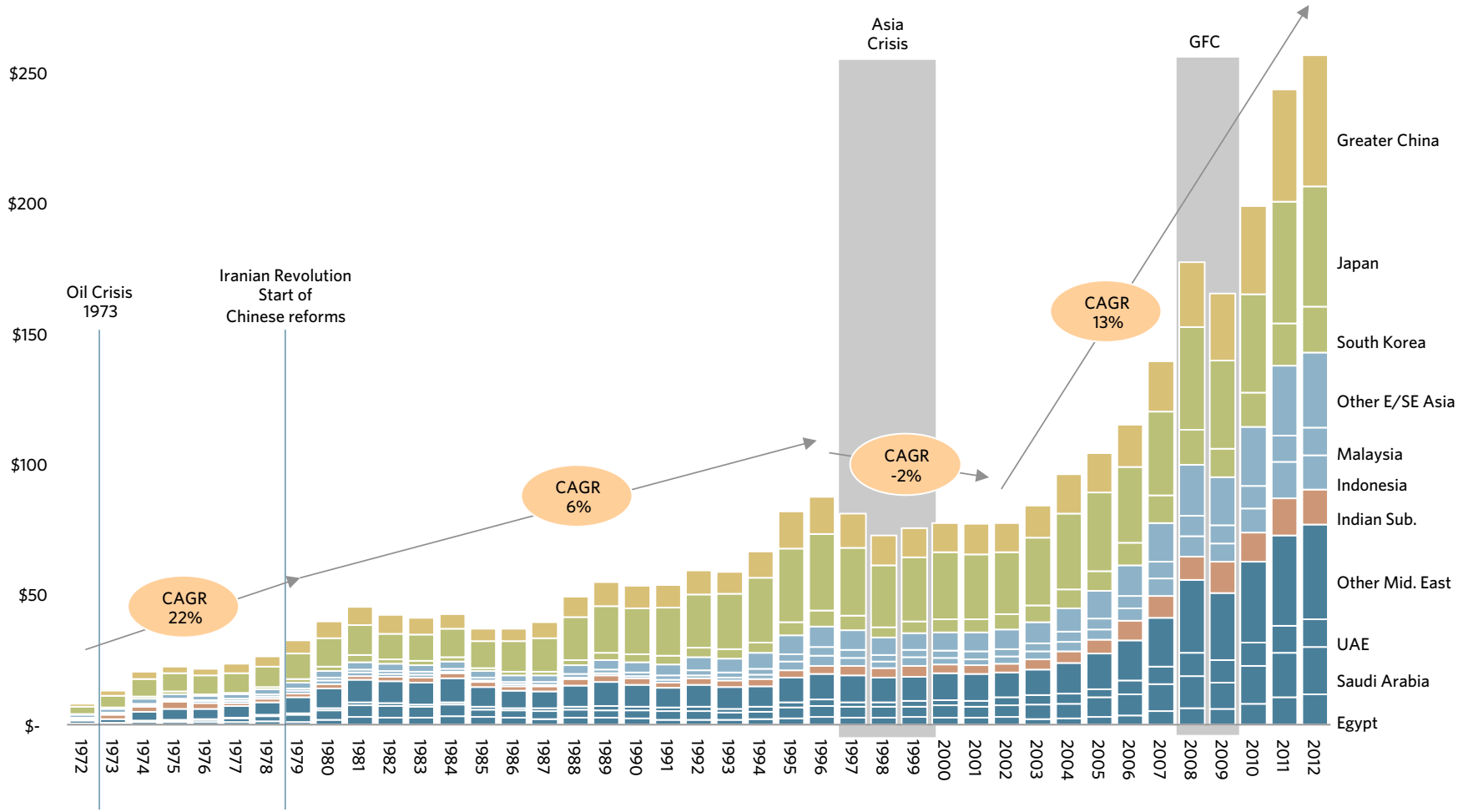


Note: kcal = kilocalorie (used interchangeably nutritionally with calories); Source: UN FAO FAOStat database; Coriolis analysis

The target markets of Asia and the Middle East have large and growing agrifood imports

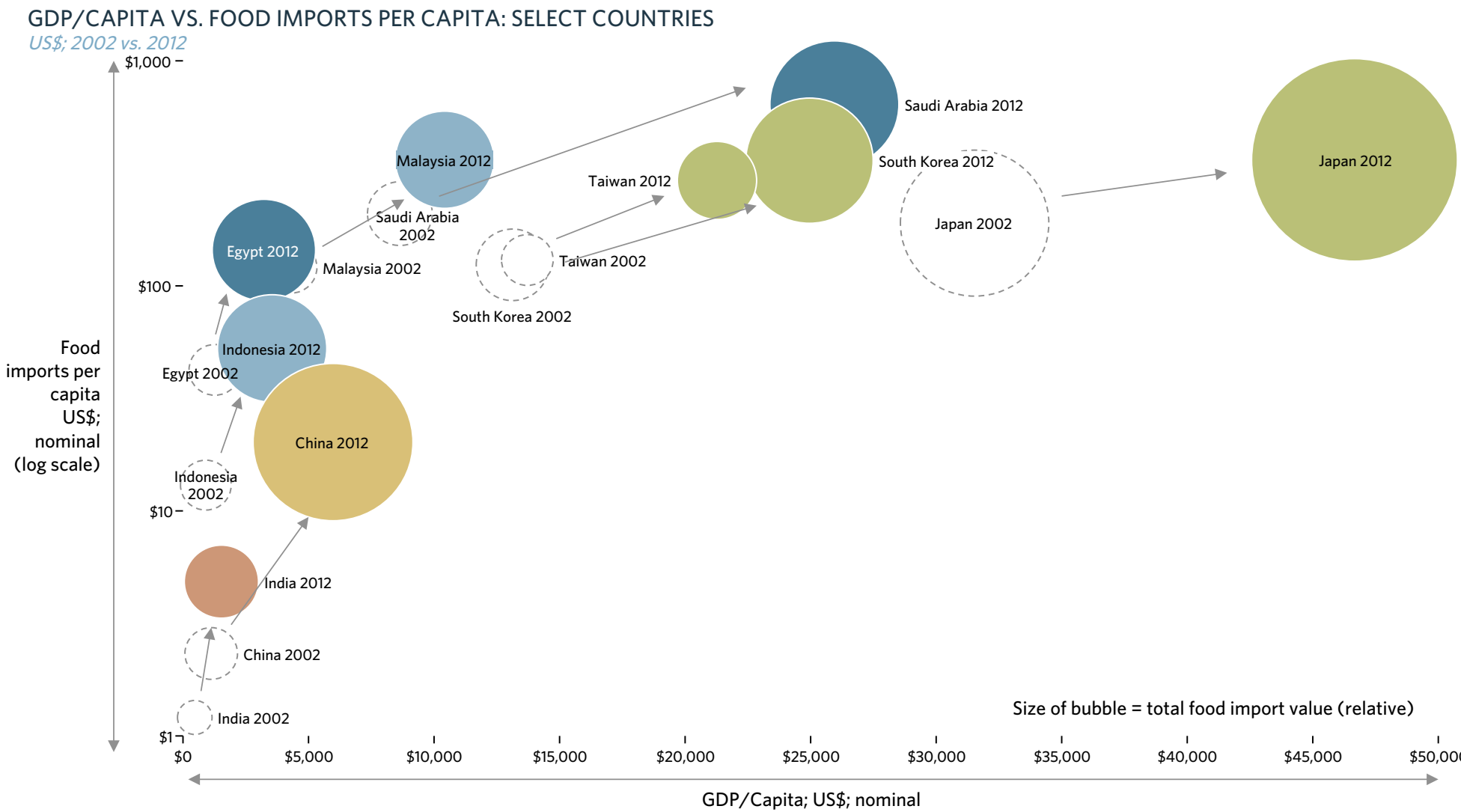
TOTAL VALUE OF AGRIFOOD IMPORTS BY E/SE/S ASIAN AND MIDDLE EASTERN MARKETS

US$b; 1972-2012



CAGR - Compound Annual Growth Rate; Source: UN FAOStat database; Coriolis classification and analysis

Per capita GDP growth drives per capita food imports; large developing countries have further upside

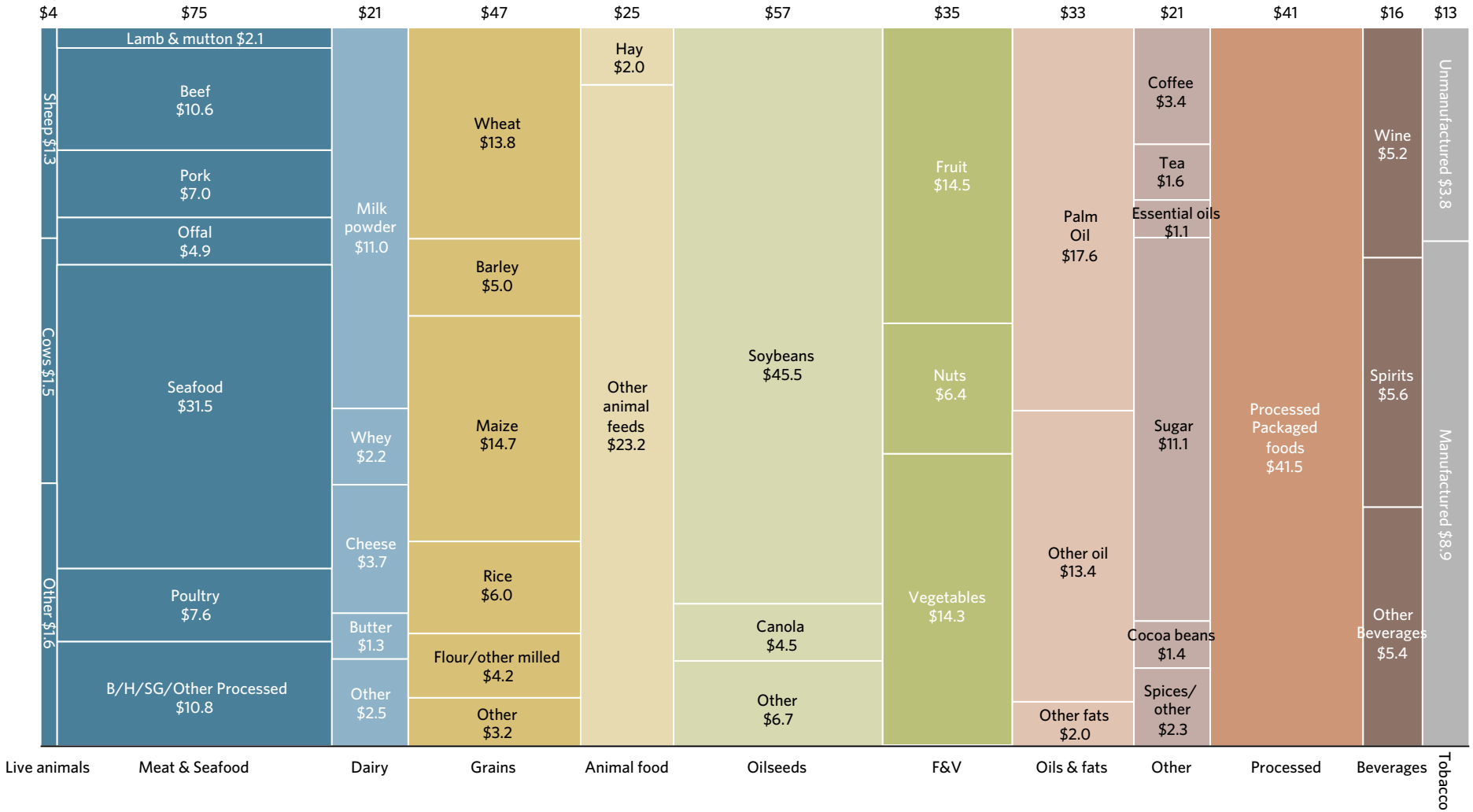


Source: UN FAO; World Bank; Coriolis analysis

In aggregate, Asia and the Middle East import a wide variety of products

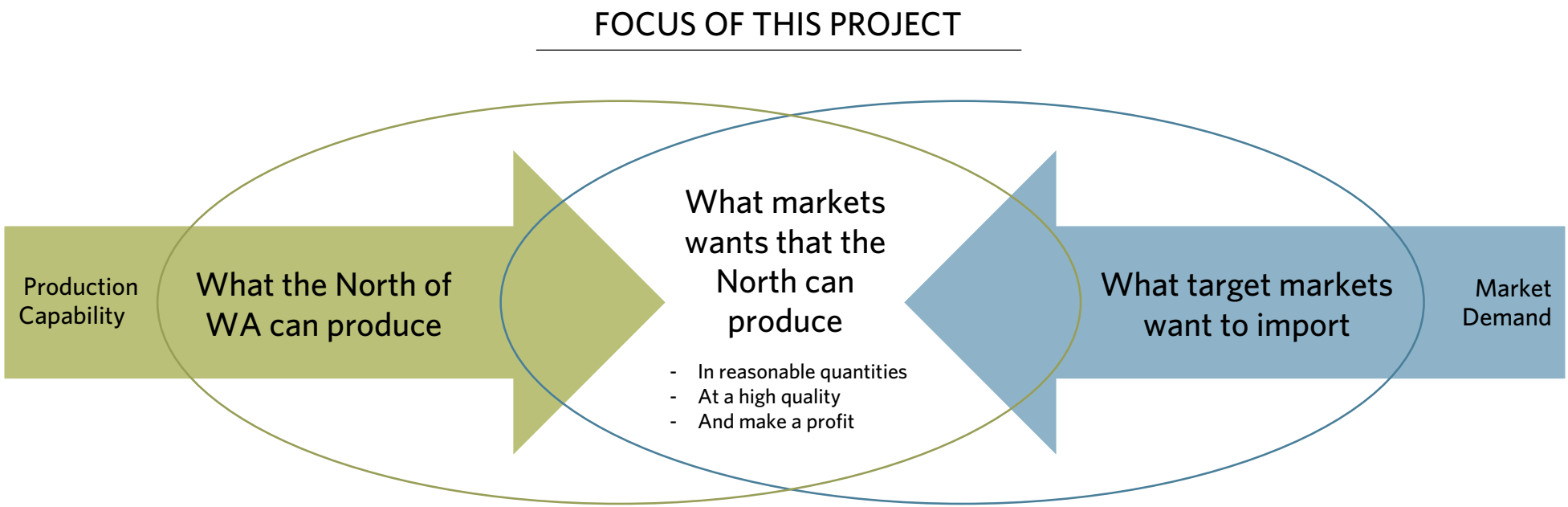
TOTAL AGRIFOOD IMPORTS BY DEFINED E/SE/S ASIAN & MIDDLE EAST MARKETS BY DEFINED PRODUCT SUPER-CATEGORY

US$b; 2013



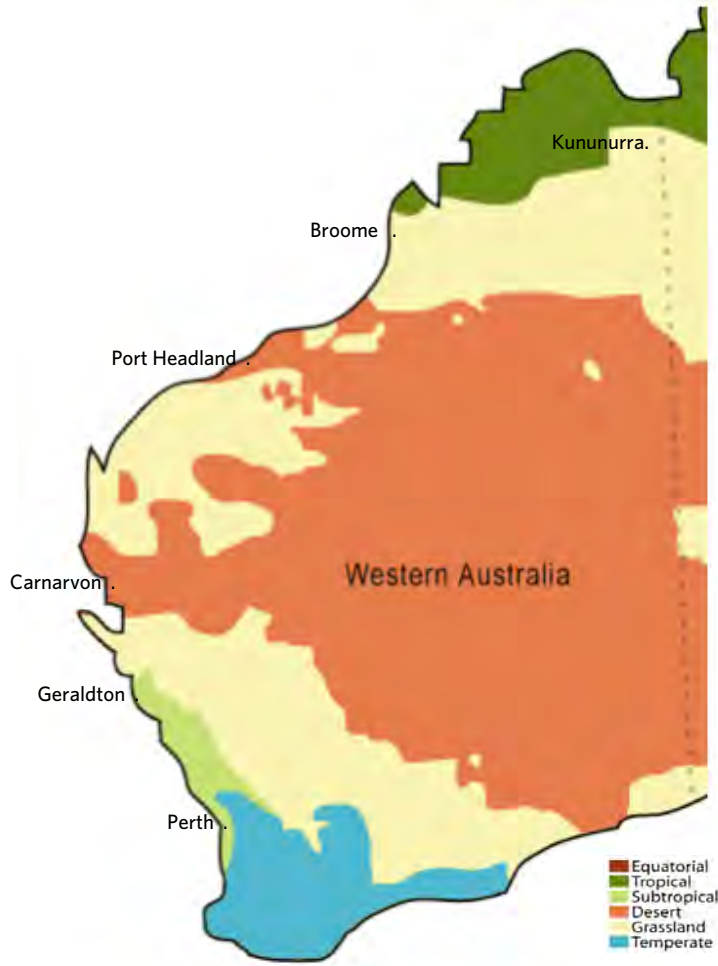
Note: these are aggregates; categories analysed later are sub-classifications of these; Source: UN Comtrade data; Coriolis definitions and analysis

This project identifies opportunities at the intersection of “What key target markets want” and “What the North can produce”



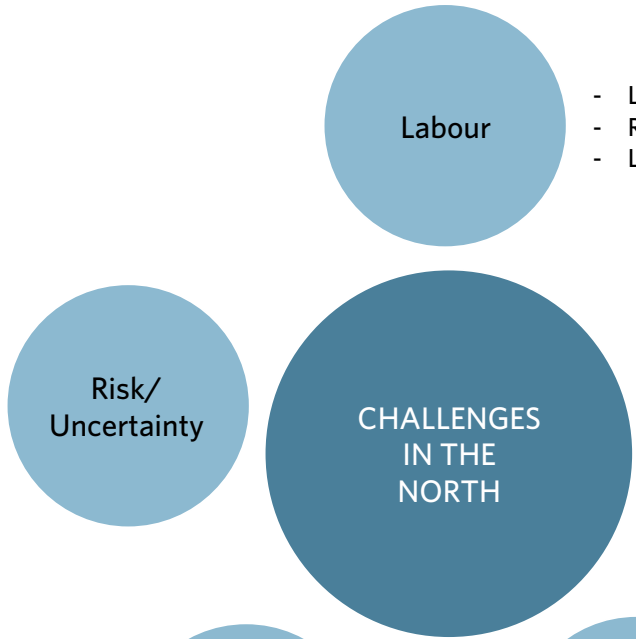
CONTENTS

This project looks at opportunities for the three regions in the North of Western Australia



Images on this page are courtesy DAFWA

Developing agriculture in the North of Western Australia faces a range of challenges



- Low regional population
- Relatively high wages (in competition with mining)
- Low/no supply of low wage "guest workers"

- Limited track record; region has effectively only been farmed for ~50 years
- Limited number of proven models; still evolving and "learning" what works
- Climate, climate change and weather events
- Land development for is complex and time consuming; multiple coexisting interests (i.e. Native Title, Mining, Pastoral Leases and government approvals required

- Large scale irrigation is capital intensive
- Many products require significant post harvest investment (e.g. sugar mill)
- Catch 22 (need scale to get to profit; profit to get to scale)
- Navigating wide range of government processes timely and expensive (doesn't make sense for 5ha)

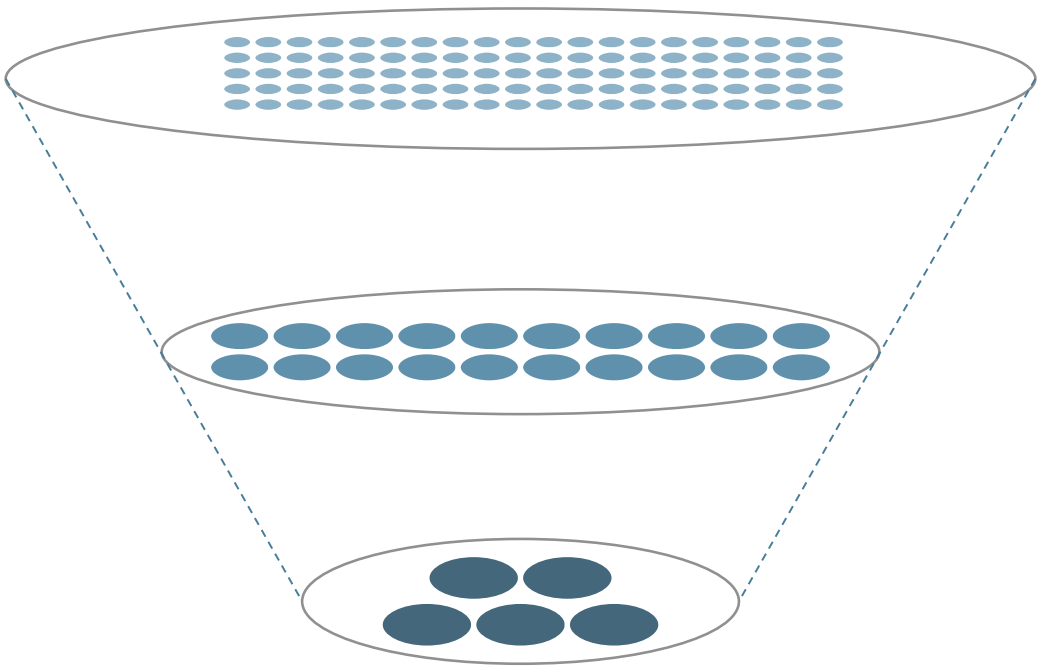
- Incomplete or partial value and supply chains in place
- Need to "import" skills from South of WA or even overseas; may need to bring in best practice
- New products will be starting from scratch without some needed supporting services

- Many potential locations are very remote (freight costs in (fertiliser, chemicals) and out (products)
- Highly perishable products may spoil in transit
- Low value/high volume products will struggle with high transport/logistics costs

CONTENTS

In order to stimulate new thinking about irrigated agriculture in the North, a three stage screening process was implemented

SIMPLIFIED DIAGRAM OF SCREENING PROCESS USED IN THIS PROJECT
Model; 2015

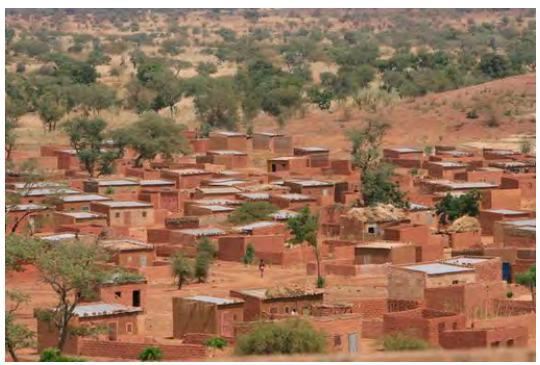


Stage I – What do peer group produce?
Assemble a pool of actual products produced in a similar climate
- *Using country/region level production data*
- *Purely quantitative*

Stage II – What do our target markets want?
Screen to a short list based on import growth metrics
- *Using country/region level import data*
- *Purely quantitative*

Stage III – Which make sense for the North?
Screen to a short list based on potential/payoff
- *Common criteria*
- *Mixture of relevant variables*
- *Quantitative/qualitative*
- *Fitting the market demand to the regions*

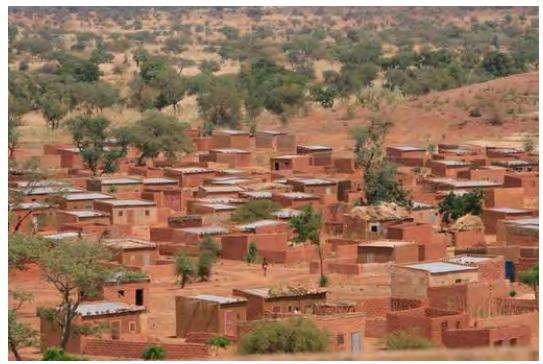
Potential opportunities were identified through a multi-stage screening process

QUESTION 1 WHAT CAN BE PRODUCED IN THE NORTH?	QUESTION 2 WHAT DO TARGET MARKETS WANT?	QUESTION3 WHAT SUITS THE NORTH?
 MAJOR PRODUCTS IN US SOUTHWEST	 EAST & SOUTH EAST ASIA	 IN ATTRACTIVE CATEGORIES
 MAJOR PRODUCTS IN CLIMATIC PEER GROUP	 MIDDLE EAST MARKETS	 THAT SUITS THE NORTH

The first stage evaluated climatic peer group countries and regions for potential agrifood products suited to the North

QUESTION 1
WHAT CAN BE PRODUCED IN THE NORTH?

US SOUTHWEST
7 states evaluated
108 products



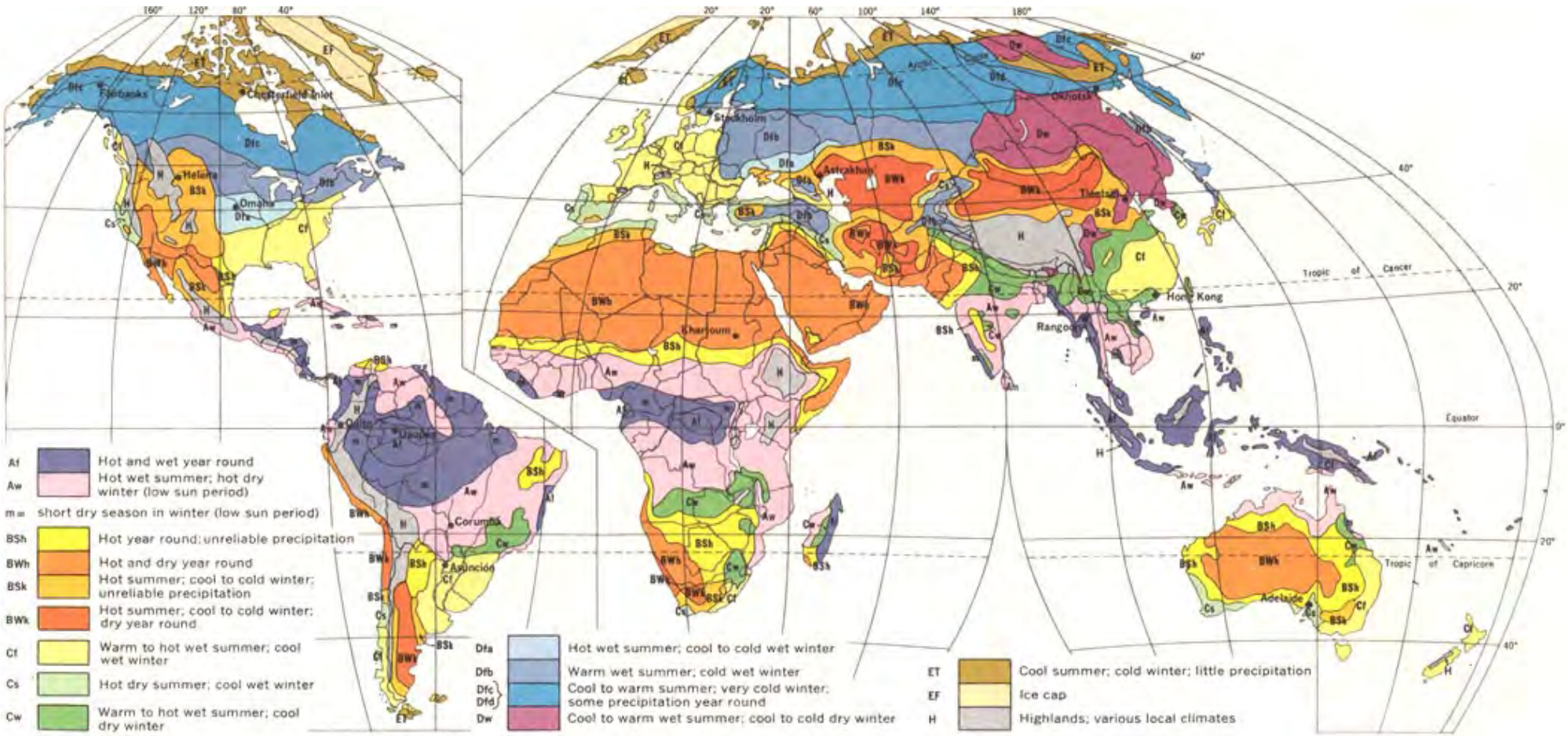
CLIMATIC PEER GROUP
43 countries evaluated
150 products

TO QUESTION 2

The North of Western Australia exists in the three broad climatic zones: BSh (hot year round; unreliable precipitation), BWh (hot and dry year round), and Aw (hot wet summer, hot dry winter)

DISTRIBUTION OF WORLD CLIMATIC ZONES

Koppen scale; 2015

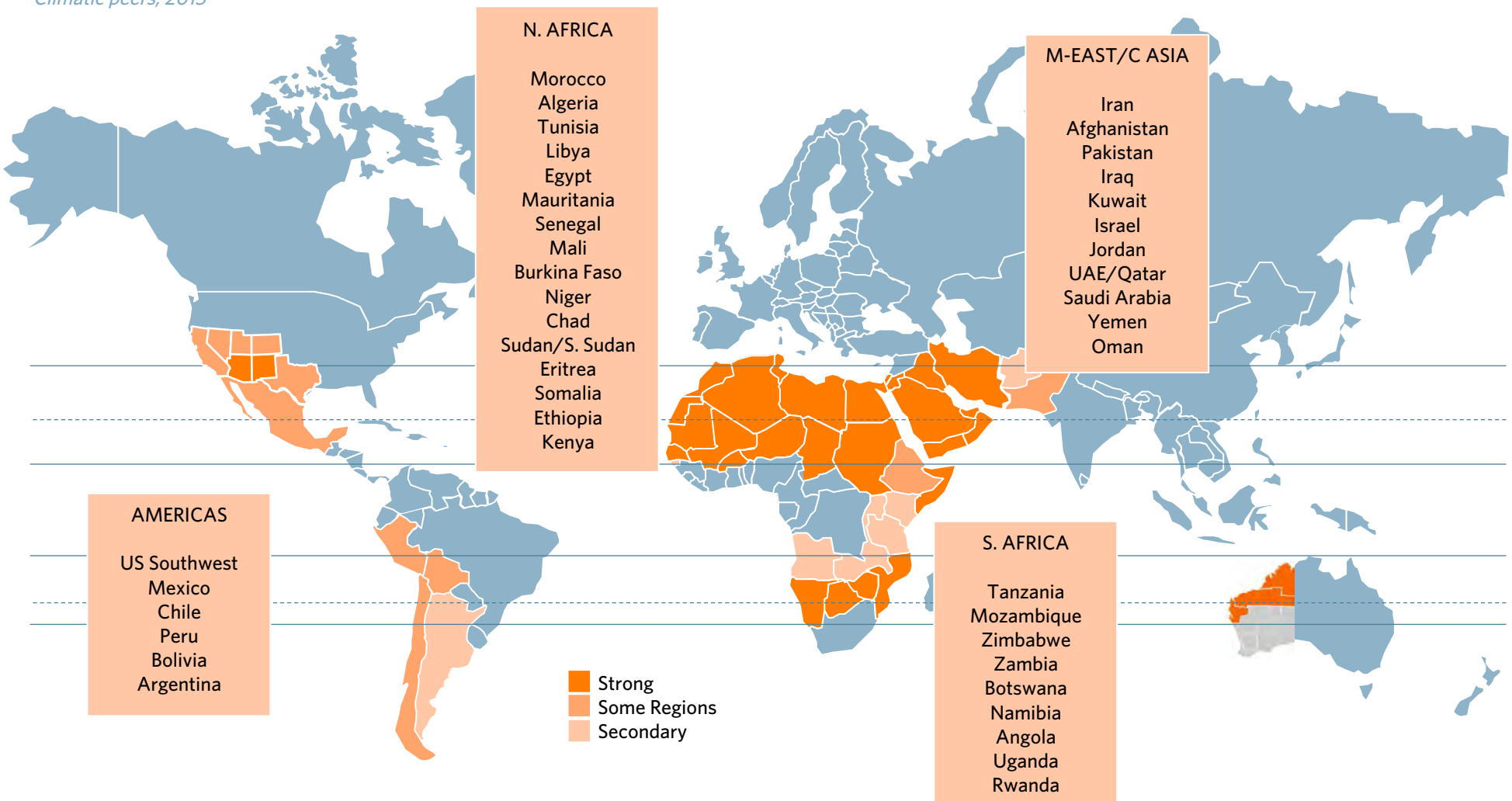


Source: Map (government publication in the public domain)

The following countries cover similar climatic zones thus defined as climatic peers for the North of Western Australia

COUNTRIES/REGIONS DEFINED AS CLIMATIC PEER GROUP FOR NORTHERN WESTERN AUSTRALIA

Climatic peers; 2015



Over two hundred products emerged from this screen as being produced in climatic peer group countries; products were spread across three mega-categories

EXAMPLES
SEE APPENDIX FOR
COMPLETE LIST

Intensive Horticulture

Cassava
Sweet potatoes
Beans
Yautia/Cocoyam
Yam
Eggplant
Lettuce
Tomatoes
Artichokes
Strawberries
Broccoli
Carrots
Green onions
Onions
Cauliflower
Spinach
Celery
Capsicum
Cucumbers
Asparagus
Okra
Bambara beans
Chick peas
Onions
Garlic
Chillies
Eggplant
Chicory
Kale
Radishes
Escarole/endive
Watercress
Rhubarb
Mint for oil
Herbs
Parsley
Others

Perennial Tree/Vine products

Dates
Figs
Carob
Pistachio
Coconuts
Plantains
Avocados
Pineapples
Black pepper
Vanilla
Tea
Mate
Coffee
Black pepper
Vanilla
Tea
Mate
Coffee
Black pepper
Cloves
Karite Nuts
Cocoa beans
Mangoes
Papaya
Plantains
Tung nuts
Citrus
Olives
Castor Oil Seeds
Palm kernel
Jojoba
Other

Field Products

Maize
Rice
Sorghum
Fonio
Barley
Millet
Wheat
Triticale
Pyrethrum
Soybeans
Palm kernel
Sunflower seeds
Sesame seeds
Safflower seeds
Canary seed
Mustard seeds
Cottonseeds
Hay/Haylage
Silage/Greenchop
Rye
Oats
Beans/Peas
Lentils
Quinoa
Sugarcane
Sugar beet
Field/grass seeds
Pyrethrum
Tobacco
Flax
Cotton
Sisal
Jute
Groundnuts
Canola
Melonseed
Linseed
Pumpkins (fodder)
Other

Products that emerged from the process were dry climate products, not traditional European temperate products

TRADITIONAL AGRIFOODS OF ENGLAND GROWN IN WA





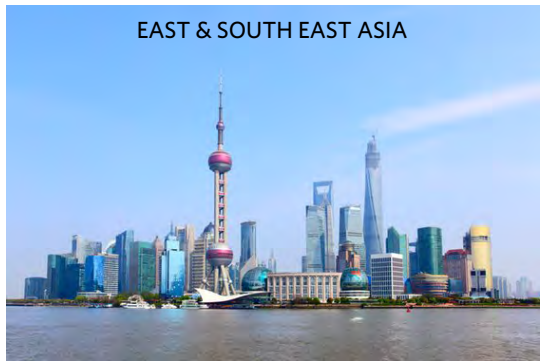

SAMPLE AGRIFOODS THAT EMERGED FROM THE SCREEN






The second stage asks – of what can be produced – what do Western Australia's target markets want?

QUESTION 2
WHAT DO TARGET MARKETS WANT?



QUANTITATIVE SCREEN

Develop (product x market) attractiveness screen

256 HS codes

Imports by 22 countries

Exports from 287 countries

10 years

Calculation of six growth metrics

29 PRODUCTS TO QUESTION 3

This screen uses a range of quantitative criteria on aggregate import value growth by target markets over various periods (5 or 10 years)

STRUCTURE OF MEASURES USED FOR QUANTITATIVE SCREENING

2015

Variable	Time periods measured	Colour coding	Measure or test for scoring	Discussion/justification for this measure/test
Import value growth rate (Compound Annual Growth Rate (CAGR))	10 year 5 year		15% or more	- Strong rates of growth in imports over the mid-term suggest underlying market growth driven ultimately by consumer demand - Products growing at high percent rates will potentially be supply constrained, indicating a need for new production area - Growth categories are easier for new entrants to enter - Caution is required using CAGR values over a very low base; cannot be looked at in isolation
			10 to 15%	
			Negative	
Absolute value growth	10 year 5 year		US$500m or more	- Categories that have growing absolute import value are attractive as this is a welcoming environment for new entrants
			US$100-499m	
			Negative	
$/unit (kg or l)	2010		US$5 or more	- Across agricultural products (but not across all products),all other things being equal, those with the higher value per kilogram are more attractive
			US$1-5	
CAGR $/unit	10 year		8% or more	- Is the average import price for the product growing? - Products with strongly growing prices signal supply constraint - Products with strongly growing prices signal a potential to pass through cost increases - Products will falling prices indicate, all other things being equal, increasing scale economics or falling demand
			Negative	
Overall quantitative attractiveness score	5/10y		High	- Above variables are converted into a purely quantitative score - Trade codes are then force ranked against each other with a target of 20-30 to pass through the screen
			Medium	
			Under 2	

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0")

High ● Medium ◑ Low ○

MARKET DEMAND LEADERS – FIELD PRODUCTS

	HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
				10y	5y	10y	5y			
Products showing very strong demand growth in target markets and so passed into next stage	151211	Crude sunflower-seed and safflower oil	$2,652	29%	41%	$2,439	$2,171	$1.23	7%	●
	170111	Raw cane sugar, in solid form	$6,666	20%	20%	$5,555	$3,943	$0.46	9%	●
	71410	Manioc, fresh or dried	$2,221	26%	29%	$1,998	$1,597	$0.26	12%	●
	100700	Grain sorghum	$932	15%	18%	$703	$521	$0.31	8%	●
	110814	Manioc (cassava) starch	$1,030	18%	21%	$829	$627	$0.48	10%	●
	120740	Sesamum seeds	$1,731	18%	11%	$1,400	$720	$1.79	9%	●
	120100	Soya beans	$45,485	18%	10%	$36,860	$17,720	$0.61	9%	●
	240120	Tobacco, partly or wholly stemmed/stripped	$3,189	10%	8%	$2,002	$1,028	$7.10	4%	●
	520100	Cotton, not carded or combed	$14,195	14%	11%	$10,221	$5,835	$2.04	5%	●
	230400	Oil-cake/solid residues, of soya-bean	$10,332	15%	10%	$7,829	$3,878	$0.54	9%	●
	71331	Dried beans, shelled	$774	20%	14%	$651	$364	$0.81	9%	●
	71340	Dried lentils, shelled	$754	20%	19%	$636	$436	$0.44	0%	●
	120210	Ground-nuts in shell, not roasted	$171	25%	28%	$153	$121	$1.02	8%	●
	120600	Sunflower seeds	$249	12%	35%	$172	$194	$1.41	15%	●
	150810	Crude ground-nut oil	$122	23%	39%	$107	$99	$1.80	5%	●
Great products also showing good growth that "just missed the cut"	151521	Crude maize (corn) oil	$191	15%	19%	$142	$111	$1.30	6%	◑
	170199	Cane or beet sugar, in solid form, nes	$2,107	11%	6%	$1,374	$566	$0.62	9%	◑
	230210	Brans, sharps and other residues of maize	$172	21%	35%	$146	$134	$0.26	2%	◑
	120220	Shelled ground-nuts, not roasted	$447	12%	14%	$309	$212	$1.24	10%	◑
	120921	Lucerne (alfalfa) seed, for sowing	$91	13%	30%	$64	$67	$7.13	12%	◑
	170112	Raw beet sugar, in solid form	$481	14%	133%	$348	$474	$0.49	8%	◑
	230240	Brans, sharps/other residues of other cereals	$61	23%	17%	$53	$33	$0.38	9%	◑
	71080	Vegetables, frozen, nes	$605	10%	11%	$376	$247	$1.17	2%	◑
	71310	Dried peas, shelled	$1,206	17%	5%	$965	$283	$0.47	7%	◑
	71320	Dried chickpeas, shelled	$534	14%	16%	$386	$279	$0.41	1%	◑
	71390	Dried leguminous vegetables, shelled, nes	$609	12%	12%	$421	$269	$0.98	13%	◑
	71420	Sweet potatoes, fresh or dried	$52	19%	20%	$42	$31	$0.79	10%	◑
	100190	Spelt, common wheat and meslin	$11,544	12%	3%	$7,892	$1,427	$0.35	7%	◑
	100300	Barley	$5,043	14%	2%	$3,671	$503	$0.32	7%	◑
	100590	Maize (excl. seed)	$14,006	11%	5%	$9,283	$2,873	$0.25	7%	◑

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0"

High ● Medium ◑ Low ○

MARKET DEMAND LEADERS – INTENSIVE HORTICULTURE

	HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
				10y	5y	10y	5y			
Products showing very strong demand growth in target markets and so passed into next stage	330125	Essential oils of mints (incl. concretes and ab	$210	20%	38%	$177	$168	$21.94	8%	●
	70390	Leeks and other alliaceous vegetables, nes	$159	11%	24%	$102	$106	$1.50	9%	●
Great products also showing good growth that "just missed the cut"	70320	Garlic, fresh or chilled	$646	16%	18%	$497	$360	$0.27	0%	◑
	81010	Strawberries, fresh	$154	11%	16%	$102	$81	$5.00	3%	◑
	90910	Seeds of anise or badian	$36	17%	29%	$29	$26	$1.97	4%	◑
	70200	Tomatoes, fresh or chilled	$337	12%	19%	$231	$196	$0.54	7%	◑
	70310	Onions and shallots, fresh or chilled	$932	13%	12%	$645	$394	$0.44	6%	◑
	70960	Fruits of genus Capiscum or Pimenta, fresh	$276	9%	15%	$162	$140	$1.46	2%	◑
	70970	Spinach, fresh or chilled	$20	19%	20%	$17	$12	$1.01	3%	◑
	70511	Cabbage lettuce, fresh or chilled	$107	17%	18%	$86	$61	$0.75	4%	◑
	70610	Carrots and turnips, fresh or chilled	$308	13%	11%	$216	$124	$0.59	4%	◑

Target markets are more self sufficient in intensive horticulture; therefore they have a much lower demand for imported products (relative to tree or field products).

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0"

High ● Medium ◑ Low ○

MARKET DEMAND LEADERS – PERENNIAL TREE/VINE PRODUCTS

	HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value 10y	CAGR import value 5y	Absolute import growth 10y	Absolute import growth 5y	US$/kg or l 2013	10y CAGR $/kg or l	Overall
Products showing very strong demand growth in target markets and so passed into next stage	80250	Pistachio, fresh or dried	$1,123	16%	19%	$859	$656	$7.82	12%	●
	80211	Almonds in shell, fresh or dried	$834	26%	28%	$749	$587	$3.37	6%	●
	80610	Fresh grapes	$1,654	18%	23%	$1,330	$1,060	$2.00	6%	●
	80920	Cherries, fresh	$696	17%	27%	$554	$487	$7.29	7%	●
	90411	Dried pepper (excl. crushed or ground)	$533	16%	20%	$411	$315	$6.02	13%	●
	80231	Walnuts in shell, fresh or dried	$272	50%	62%	$267	$248	$3.99	10%	●
	80290	Other nuts, fresh or dried, nes	$756	20%	21%	$637	$463	$2.26	6%	●
	81090	Other fruit, fresh, nes	$1,412	21%	23%	$1,210	$903	$0.71	2%	●
	80131	Cashew nuts, in shell dried	$1,424	16%	10%	$1,101	$558	$0.93	3%	●
	80212	Almonds without shells, fresh or dried	$868	15%	17%	$658	$472	$1.50	-9%	●
	80232	Walnuts without shells, fresh or dried	$355	16%	16%	$278	$188	$4.76	2%	●
	80810	Apples, fresh	$1,633	15%	16%	$1,232	$860	$0.15	-12%	●
	90111	Coffee, not roasted or decaffeinated	$2,867	14%	7%	$2,108	$809	$2.84	9%	●
	230660	Oil-cake/other solid residues of palm nuts	$353	31%	17%	$328	$194	$0.18	10%	●
	150910	Virgin olive oil and fractions	$558	18%	16%	$449	$292	$4.63	3%	●
	151329	Palm kernel or babassu oil (excl. crude)	$725	19%	24%	$601	$474	$0.90	7%	●
	151530	Castor oil and its fractions	$392	22%	15%	$340	$198	$1.38	4%	●
Great products also showing good growth that "just missed the cut"	80410	Dates, fresh or dried	$357	16%	14%	$279	$171	$0.69	10%	◑
	80440	Avocados, fresh or dried	$209	14%	20%	$154	$124	$2.45	2%	◑
	80450	Guavas, mangoes and mangosteens, fresh	$622	15%	17%	$465	$334	$1.34	5%	◑
	90210	Green tea in immediate packings	$50	13%	17%	$36	$27	$8.39	8%	◑
	90300	Mate	$10	16%	36%	$8	$8	$3.44	11%	◑
	90412	Pepper, crushed or ground	$89	20%	16%	$74	$47	$5.51	8%	◑
	121210	Locust beans (incl. locust bean seeds), fresh	$9	22%	78%	$8	$8	$1.08	9%	◑
	80122	Brazil nuts, shelled dried	$4	15%	6%	$3	$1	$5.28	16%	◑
	80420	Figs, fresh or dried	$111	18%	15%	$89	$55	$4.80	13%	◑
	80520	Mandarins, clementines, etc., fresh	$471	15%	12%	$358	$200	$0.87	6%	◑
	80620	Dried grapes	$268	12%	13%	$180	$124	$1.99	6%	◑
	81020	Raspberries, blackberries, & mulberries	$33	12%	16%	$23	$17	$12.17	6%	◑
	81040	Cranberries, bilberries, etc., fresh	$85	15%	27%	$64	$59	$8.01	1%	◑

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0"

Twenty-five product categories ultimately passed through the second screen (quantitative) into the third screen (qual/quant)

SEE APPENDIX FOR DETAILED ANALYSIS

RANKING OF PRODUCTS ANALYSED

Stage I Score	Category	Total imports US$m by target markets	HS6 Codes
●	Pistachio, fresh or dried	$1,123	080250
●	Essential oils of mints (incl. concretes)	$210	330125
●	Dried pepper (excl. crushed or ground)	$533	090411
●	Almonds in shell, fresh or dried Almonds without shells, fresh or dried	$834 $868	080211 080212
●	Grain sorghum	$932	100700
●	Manioc (cassava) starch Manioc, fresh or dried	$1,030 $2,221	110814 071410
●	Fresh grapes	$1,654	080610
●	Sesamum seeds	$1,731	120740
●	Crude sunflower-seed and safflower oil and fraction Sunflower seeds	$2,652 $249	151211 120600
●	Raw cane sugar, in solid form	$6,666	170111
●	Walnuts in shell, fresh or dried	$272	080231
●	Soya beans	$45,485	120100
●	Leeks and other alliaceous vegetables, nes	$159	070390
●	Ground-nuts in shell, not roasted or otherwise	$171	120210
●	Oil-cake and other solid residues of palm nuts Palm kernel or babassu oil (excl. crude) and fractions	$353 $725	230660 151329
●	Walnuts without shells, fresh or dried	$355	080232
●	Castor oil and its fractions	$392	151530
●	Virgin olive oil and fractions	$558	150910
●	Dried lentils, shelled	$754	071340
●	Dried beans, shelled	$774	071331
●	Cashew nuts, in shell dried	$1,424	080131
●	Coffee, not roasted or decaffeinated	$2,867	090111
●	Tobacco, partly or wholly stemmed/stripped	$3,189	240120
●	Cotton, not carded or combed	$14,195	520100

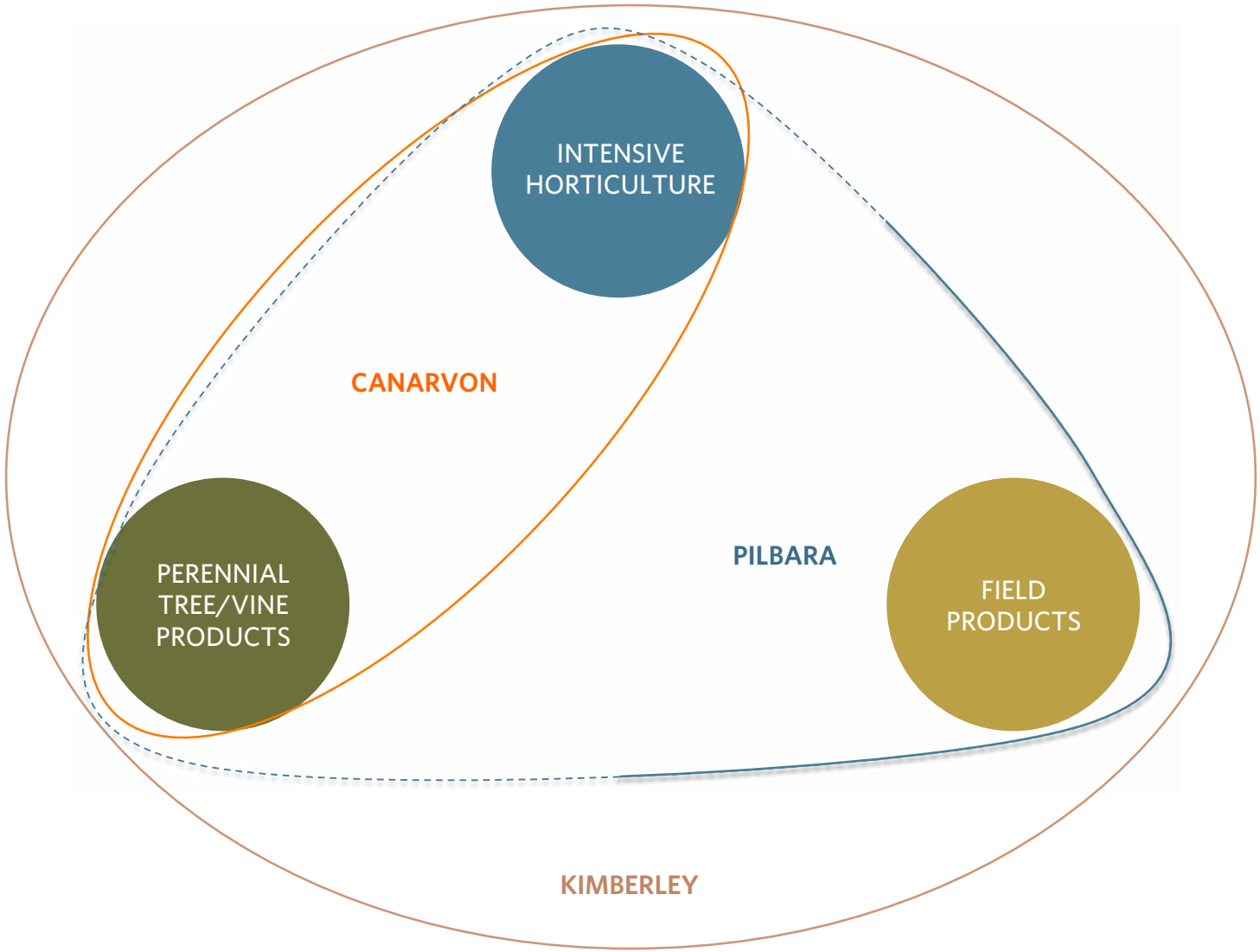
PRODUCTS ADDED BY CLIENT

Stage I Score	Category	Total imports US$m by target markets	HS6 Codes
◑	Compressed hay; other forage products	$1,727	121490
◑	Guavas, mangoes and mangosteens, fresh	$622	080450

PRODUCTS REMOVED

HS CODE	Category	Reason for removal
080290	Other nuts, fresh or dried, nes	Catch-all "not elsewhere specified" (NES) category unable to be analysed further
081090	Other fruit, fresh, nes	
080810	Apples, fresh	Brought in by "non-climatic peer" parts of some peers, particularly Southern Chile and Argentina
080920	Cherries, fresh	
230400	Oil-cake and other solid residues, of soya-bean	Parent/producing product (soya oil) is not attractive (HS150710/150790 scored poorly)

Discussions with industry experts suggest each of the three Northern region has different strengths, leading to different potential areas of focus for new irrigation coming online



A wide range of products came through the screen; different products suit different regions

PRELIMINARY REGIONAL DISTRIBUTION OF IDENTIFIED PRODUCTS IN HIGH MARKET DEMAND

Model; 2015

Regional strength	KIMBERLEY		
	PILBARA		
		CANARVON	
Product type	**FIELD PRODUCTS**	**INTENSIVE HORTICULTURE**	**PERENNIAL TREE/VINE PRODUCTS**
Products showing very strong demand growth in target markets and so passed into next stage	Crude sunflower-seed and safflower oil Raw cane sugar, in solid form Manioc, fresh or dried Grain sorghum Manioc (cassava) starch Sesamum seeds Soya beans Tobacco, partly or wholly stemmed/stripped Cotton, not carded or combed Oil-cake/solid residues, of soya-bean Dried beans, shelled Dried lentils, shelled Ground-nuts in shell, not roasted Sunflower seeds Crude ground-nut oil	Essential oils of mints (incl. conc. and absol.) Leeks and other alliaceous vegetables, nes	Pistachio, fresh or dried Almonds in shell, fresh or dried Almonds without shells, fresh or dried Fresh grapes Cherries, fresh Dried pepper (excl. crushed or ground) Walnuts in shell, fresh or dried Cashew nuts, in shell dried Walnuts without shells, fresh or dried Apples, fresh Coffee, not roasted or decaffeinated Oil-cake/other solid residues of palm nuts Virgin olive oil and fractions Palm kernel or babassu oil (excl. crude) Castor oil and its fractions
Great products also showing good growth that "just missed the cut"	Crude maize (corn) oil Cane or beet sugar, in solid form, nes Brans, sharps and other residues of maize Shelled ground-nuts, not roasted Lucerne (alfalfa) seed, for sowing Raw beet sugar, in solid form Brans, sharps/other residues of other cereals Dried peas, shelled Dried chickpeas, shelled Dried leguminous vegetables, shelled, nes Sweet potatoes, fresh or dried Spelt, common wheat and meslin Barley Maize (excl. seed)	Garlic, fresh or chilled Strawberries, fresh Seeds of anise or badian Tomatoes, fresh or chilled Onions and shallots, fresh or chilled Fruits of genus Capiscum or Pimenta, fresh Spinach, fresh or chilled Cabbage lettuce, fresh or chilled Carrots and turnips, fresh or chilled	Dates, fresh or dried Avocados, fresh or dried Guavas, mangoes and mangosteens, fresh Green tea in immediate packings Mate Pepper, crushed or ground Locust beans (incl. locust bean seeds), fresh Brazil nuts, shelled dried Figs, fresh or dried Mandarins, clementines, etc., fresh Dried grapes Raspberries, blackberries, & mulberries Cranberries, bilberries, etc., fresh

The results for all 256 trade codes are shown in the supplementary appendix to this document

SEE APPENDIX FOR DETAILED ANALYSIS

The third stage asks – of what the markets want – what suits new irrigation precincts in the North?

QUESTION 2
WHAT DO TARGET MARKETS WANT?

EAST & SOUTH EAST ASIA

MIDDLE EAST MARKETS

25
HIGH
GROWTH
PRODUCTS
WITH HIGH
DEMAND

QUESTION3
WHAT SUITS THE NORTH?

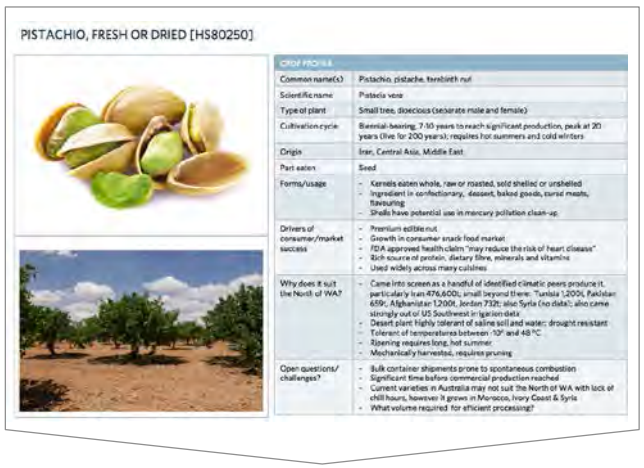
ATTRACTIVE
CATEGORIES

THAT SUITS
THE NORTH

Each of the 25 products was evaluated across a standardised three page Qualitative/Quantitative screen

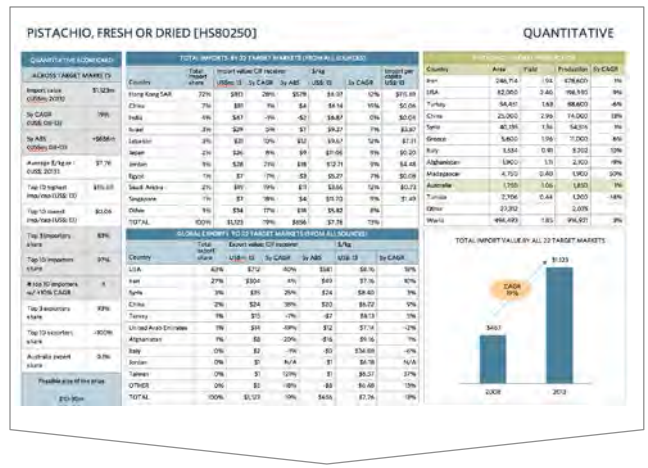
SEE APPENDIX FOR DETAILED ANALYSIS

OVERVIEW


PISTACHIO, FRESH OR DRIED [HS80250]

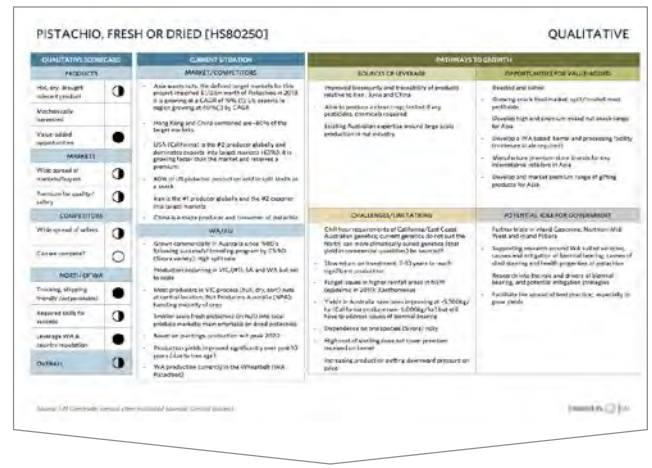
Common name(s)	Pistachio, pistache, fereshteh nut
Scientific name	Pistacia vera
Type of plant	Small tree, dioecious (separate male and female)
Cultivation cycle	Biennial-bearing. 7-10 years to reach significant production, peak at 20 years (live for 200 years); requires hot summers and cold winters
Origin	Iran, Central Asia, Middle East
Part eaten	Seed
Forms/usage	- Kernels eaten whole, raw or roasted, sold shelled or unshelled - Ingredient in confectionary, dessert, baked goods, cursal meats, flavouring - Shells have potential use in mercury pollution clean-up.
Drivers of consumer/market success	- Premium edible nut - Growth in consumer snack food market - FDA approved health claim "may reduce the risk of heart disease" - Rich source of protein, dietary fibre, minerals and vitamins - Used widely across many cuisines
Why does it suit the North of WA?	- Came into screen as a handful of identified climatic peers produce it, particularly Iran 476,600t, small beyond there. Tunisia 1,200t, Pakistan 659t, Afghanistan 1,200t, Jordan 732t; also Syria (no data); also came strongly out of US Southwest in Igalon data - Desert plant highly tolerant of saline soil and water; drought resistant - Tolerant of temperatures between -10° and 48 °C - Ripening requires long, hot summer - Mechanically harvested, requires pruning
Open questions/ challenges?	- Bulk container shipments prone to spontaneous combustion - Significant time before commercial production reached - Current varieties in Australia may not suit the North of WA with lack of chill hours, however it grown in Morocco, Ivory Coast & Syria - What volume required for efficient processing?

QUANTITATIVE


PISTACHIO, FRESH OR DRIED [HS80250]

QUANTITATIVE

QUALITATIVE


PISTACHIO, FRESH OR DRIED [HS80250]

QUALITATIVE

WHAT IS IT?	WHAT ARE THE KEY MARKETS?	WHAT'S THE STORY?
WHAT DO YOU DO WITH IT?	WHO IS THE COMPEITION?	CAN WE COMPETE?
WILL IT GROW IN THE NORTH?	WHAT IS THE SIZE OF THE PRIZE?	DOES IT FIT THE NORTH?

KEY

HIGH ● MEDIUM ◑ LOW ○

A qualitative scorecard was developed to subjectively rank the opportunities against the ideal product for the North

Identified characteristics that act as markers for potential success	Qualitative criteria to scorecard
- Does the product thrive in a hot, dry climate? - If the irrigation broke for, say, a week, would the product die?	- Hot, dry environment product
- Can the product be harvested by "one man and a big machine"? - Robust, well-developed mechanical harvesting systems exist	- Mechanically harvested
- Do straightforward opportunities exist to add value to the product? - Is there a multi-stage value chain with clear steps and opportunities?	- Value added opportunities
- Is the product is imported by a wide range of countries? - No single country dominates the market (not overexposed to one market)	- Wide spread of markets/ buyers
- Does the product possesses intrinsic qualities that differentiate suppliers? - Is a wide variation in product forms or varieties demanded? - Is the product a high involvement/high awareness premium item?	- Premium for quality/safety
- Is it exported in large quantities by a wide range of countries? - No single country dominates exports or the market	- Wide spread of sellers
- Do "weak competitors" exist in the market? - Are there obvious, low risk product or market level gains? - Are key competitors/producers high income countries (e.g. US)? - Growing imports from high income producers	- Can we compete?
- Is the product robust and non-perishable? - Does the product require refrigeration or immediate processing	- Trucking, shipping friendly (not perishable)
- Are the production systems and technologies available in WA/Australia? - Alternatively can new entrants leverage similar production systems where WA has strength (e.g. arable)?	- Required skills for success
- Is the country of origin an integral part of product marketing? - Would major buyers (e.g. multinationals) have supply concerns? - Is there an acceptance of new brands/new products in key markets?	- Leverage WA and Australian reputation

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	●
COMPETITORS	
Wide spread of sellers	●
Can we compete?	●
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	●
Leverage WA & country reputation	●
OVERALL	●

HIGH ● MEDIUM ◑ LOW ○

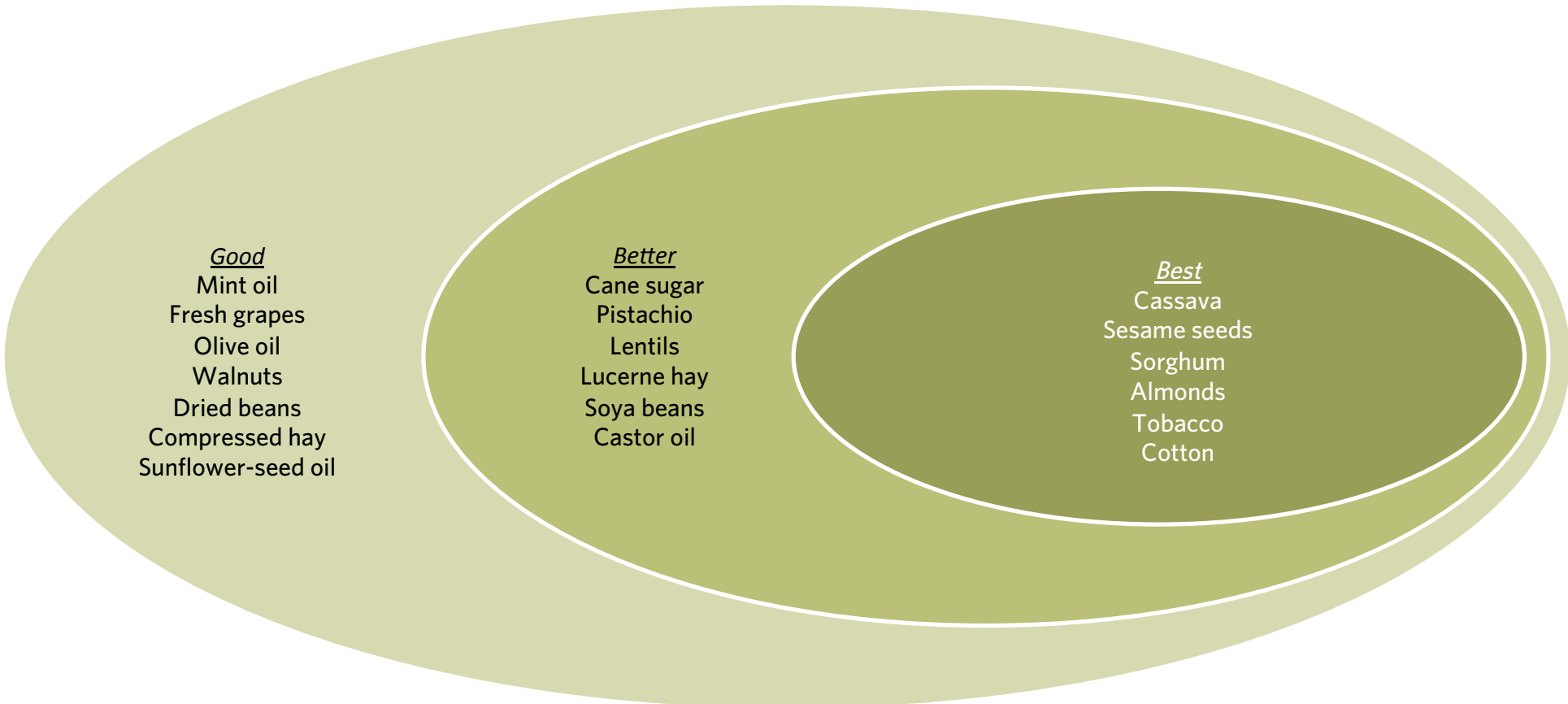
The results of the quantitative "size of the prize" and qualitative "attractiveness" assessments were crossed, delivering a range of attractive categories for new irrigation precincts in the North of WA

SEE APPENDIX FOR DETAILED ANALYSIS

Results from qualitative attractiveness scorecard *Against ten defined criteria*	Quantitative "size of the prize" estimate *Potential new, incremental exports in medium term timeframe*		
	Under US$20m	US$20-99m	US$100m+
High ●	-	Sorghum	Cassava Sesame seeds
Medium ◑	Sunflower seeds Essential oils of mint Fresh grapes Olive oil Beans, dried shelled Walnuts	Raw cane sugar Pistachio Lentils Lucerne hay Castor oil	Almonds Tobacco Cotton
Low ○	Dried black pepper Leeks, etc. Peanuts Palm oil/cake Cashew nuts Coffee, unroasted Mangoes, etc.	Sunflower-seed oil	Soya beans

Eighteen market opportunities in Asia and the Middle East were identified with high growth potential and a good fit with the North of Western Australia

SEE APPENDIX FOR DETAILED ANALYSIS



Some of the products emerging from the screen can be executed on by local capability, others may require new skills and systems

EXISTING STATUS-QUO PRODUCTS/PROVEN IN WA




WA can execute on these opportunity with existing skills and capabilities

NEW/TRIAL/UNPROVEN PRODUCTS IN THE NORTH

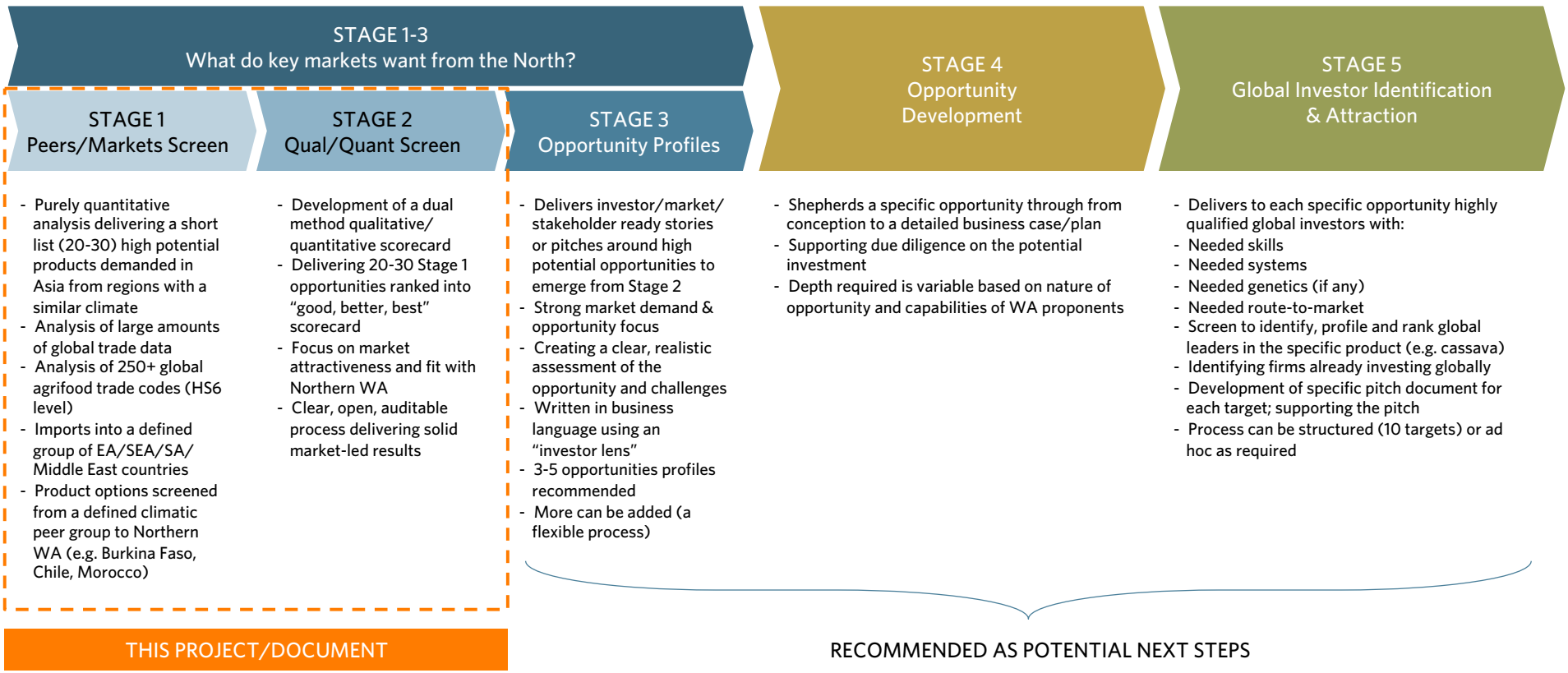



May suit new investors with required skills, systems, genetics and capital

This project represents the completion of Stage Two of what is proposed as a multiple stage process

HOW DO WE PUT IN PLACE A PROCESS TO CAPTURE THE MOST VALUE FROM IRRIGATED LAND IN THE NORTH?

Process outline; 2015



CONTENTS

A range of field products emerged from the second screen and are profiled across qualitative/quantitative measures

PRELIMINARY REGIONAL DISTRIBUTION OF IDENTIFIED PRODUCTS IN HIGH MARKET DEMAND

Model; 2015

Regional strength	PILBARA	KIMBERLEY CANARVON	
Product type	FIELD PRODUCTS	INTENSIVE HORTICULTURE	PERENNIAL TREE/VINE PRODUCTS
Products showing very strong demand growth in target markets and profiled in this stage	Crude sunflower-seed and safflower oil Raw cane sugar, in solid form Manioc, fresh or dried Grain sorghum Manioc (cassava) starch Sesamum seeds Soya beans Tobacco, partly or wholly stemmed/stripped Cotton, not carded or combed Oil-cake/solid residues, of soya-bean Dried beans, shelled Dried lentils, shelled Ground-nuts in shell, not roasted Sunflower seeds Crude ground-nut oil	Essential oils of mints (incl. concretes) Leeks and other alliaceous vegetables, nes	Pistachio, fresh or dried Almonds in shell, fresh or dried Almonds without shells, fresh or dried Fresh grapes Cherries, fresh Dried pepper (excl. crushed or ground) Walnuts in shell, fresh or dried Walnuts without shells, fresh or dried Cashew nuts, in shell dried Apples, fresh Coffee, not roasted or decaffeinated Oil-cake/other solid residues of palm nuts Virgin olive oil and fractions Palm kernel or babassu oil (excl. crude) Castor oil and its fractions

SUNFLOWER, SEEDS & CRUDE OIL [HS120600]/ [HS151211]*

PRODUCT PROFILE	
Common name(s)	Sunflower seeds
Scientific name	Helianthus annuus
Type of plant	Annual flowering plant
Cultivation cycle	Monounsaturated sunflowers are sown in spring, polyunsaturated sunflowers are sown in summer. Harvest for seeds 30-45 days after bloom
Origin	North America
Part eaten	Seed kernel
Forms/usage	- Eaten raw or roasted on own - Ingredient in salads, bread, baked goods - Sprouted - Processed into oil, salad dressing, margarine, meals - Bird seed, Cosmetic uses, biodiesel, paints, lubricants
Drivers of consumer/market success	- Polyunsaturated or monounsaturated (depending on variety) fat with low levels of trans fat - High in vitamin E - High smoke point for oil
Why does it suit the North of WA?	- Grows all across the climatic peer group regions in significant quantities (e.g. Tanzania 1.1m t); also came out of US Southwest irrigation data - Existing production in Ord river catchment; grown 2015 at Liveringa; NT data indicates that oil quality and content lower in hotter areas - Sunflowers are highly suited to no tillage - Best suited to mild temperatures but can be grown in relatively hot areas so long as moisture is not limiting - Can be double cropped in the right conditions (soybeans in the wet; maize, sorghum or sunflowers in dry)
Open questions/ challenges?	- Monounsaturated, polyunsaturated or confectionery varieties have to be determined at planting - Bee pollination required for successful yields - Historically grown in the Ord; not clearly a success

** Includes minor amounts of Safflower oil Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis*

SUNFLOWER SEEDS [HS120600]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$249m
5y CAGR (US$; 08-13)	35%
5y ABS (US$m; 08-13)	+$194m
Average $/kg or l (US$; 2013)	$1.41
Top 10 highest imp/cap (US$; 13)	$1.31
Top 10 lowest imp/cap (US$; 13)	$0.01
Top 3 importers share	79%
Top 10 importers share	94%
# top 10 importers w/ +10% CAGR	7
Top 3 exporters share	87%
Top 10 exporters share	96%
Australia export share	0.5%
Possible size of the prize	
$5-10m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Egypt	41%	$103	70%	$96	$1.62	7%	$1.31
Pakistan	29%	$73	58%	$65	$1.04	17%	$0.43
China	8%	$20	9%	$7	$10.81	9%	$0.01
Thailand	3%	$8	21%	$5	$1.49	28%	$0.12
Indonesia	2%	$6	9%	$2	$0.88	12%	$0.03
South Korea	2%	$6	16%	$3	$1.87	5%	$0.12
Japan	2%	$6	12%	$2	$2.41	8%	$0.04
Israel	2%	$5	-1%	-$0	$1.48	14%	$0.62
Jordan	2%	$4	39%	$3	$1.28	9%	$0.62
Lebanon	1%	$4	17%	$2	$1.27	-1%	$0.84
Other	6%	$16	18%	$9	$1.06	-3%	
TOTAL	100%	$249	35%	$194	$1.41	8%	

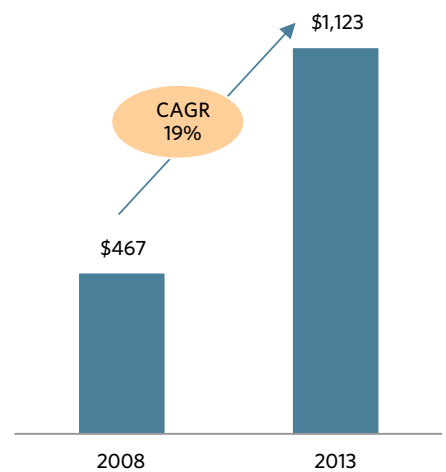
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
China	47%	$117	59%	$105	$1.51	19%
Romania	22%	$56	1245%	$56	$1.08	-56%
USA	17%	$43	23%	$28	$2.27	-1%
Argentina	3%	$7	35%	$6	$1.26	4%
India	1%	$4	10%	$1	$0.98	3%
Canada	1%	$4	4%	$1	$1.22	0%
Ukraine	1%	$3	103%	$3	$1.02	-25%
Other Europe, nes	1%	$2	86%	$2	$0.91	-7%
Bulgaria	1%	$2	48%	$2	$1.18	6%
United Arab Emirates	1%	$2	141%	$2	$0.94	2%
OTHER	4%	$9	-14%	-$11	$1.30	10%
TOTAL	100%	$249	35%	$194	$1.41	8%

SUNFLOWER SEEDS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Ukraine	5,092,000	2.17	11,050,480	11%
Russia	6,796,100	1.55	10,534,000	7%
Argentina	1,620,081	1.92	3,104,420	-8%
China	923,390	2.62	2,423,241	6%
Romania	1,095,202	2.01	2,196,450	13%
Bulgaria	859,800	2.25	1,937,000	8%
France	770,732	2.05	1,582,449	0%
Turkey	609,784	2.50	1,523,000	9%
Hungary	593,600	2.48	1,469,600	0%
Tanzania	810,000	1.34	1,083,000	29%
Spain	849,100	1.21	1,029,400	3%
Other	5,433,786		6,618,055	
World	25,453,575	1.75	44,551,095	4%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

SUNFLOWER SEEDS [HS120600]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	○
Mechanically harvested	●
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	◑
Can we compete?	◑
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	○
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Asia and the Middle East want oil; target markets imported $2.7b worth of sunflower oil; to put this in perspective, WA exported $2.7b worth of grains in 2012/13
- Domestic demand outstrips production
- Oil seed and confectionery seed demand expected to increase by between 10 to 15 % per year
- Egypt is the largest single market taking 41%
- Pakistan is second largest market in group, taking 29%
- Primarily developing countries importing
- China is almost half the market (47%); 5y CAGR of 59%
- Romania #2 with 22% showing huge growth
- US #3 with 17% and solid growth at a reasonable premium

WA/AU

- Majority of domestic production is now monounsaturated varieties (94%)
- Polyunsaturated and confectionery varieties grown for niche markets in Australia and Asia
- Northern NSW, Southern and Central QLD key locations, some grown in VIC
- Gross value of production $21 mil off 26,000 ha
- Currently being grown in WA for birdseed and in Kimberley in 2015; used for oil, diesel generation, cattle supplement

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Growth in Asian niche markets for birdseed, confectionery and horsefeed
- Health benefits of monounsaturated and polyunsaturated fats
- WA has long history of farming; systems and skills to ensure high quality production
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems
- New GM safflower produces excellent oil quality & yields at Kununurra

OPPORTUNITIES FOR VALUE-ADDED

- Premium health food products
- Oil and spreads, marketed for health benefits
- Develop and market premium range of gifting products for Asian market
- Manufacture premium store brands for key international retailers in Asia
- Roast and flavour with unique WA/AU flavours
- Innovative packaging to ensure freshness
- Crushing plant would be needed to export higher value commodities (oil & meal)

CHALLENGES/LIMITATIONS

- Scale is the key challenge
- Current production systems and scale marginal; may need right genetics and new systems
- Suggest targeting global agribusiness operators at scale for new investment at scale
- Lack of quarantine glasshouse facilities iimits importation of genetic material
- Difficult to compete with China and Romania
- Targeted species required to achieve high oil quality in hotter temperatures

POTENTIAL ROLE FOR GOVERNMENT

- Extension of east coast R&D and expertise to WA farmers
- Streamlining quarantine procedures
- Support management of disease risks

Source: UN Comtrade; various other published sources; Coriolis analysis

CRUDE SUNFLOWER-SEED OIL AND FRACT. [HS151211]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$2,652m
5y CAGR (US$; 08-13)	41%
5y ABS (US$m; 08-13)	+$2,171m
Average $/kg or l (US$; 2013)	$1.23
Top 10 highest imp/cap (US$; 13)	$8.09
Top 10 lowest imp/cap (US$; 13)	$0.39
Top 3 importers share	91%
Top 10 importers share	~100%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	98%
Top 10 exporters share	~100%
Australia export share	0.03%
Possible size of the prize	
$25-75m	

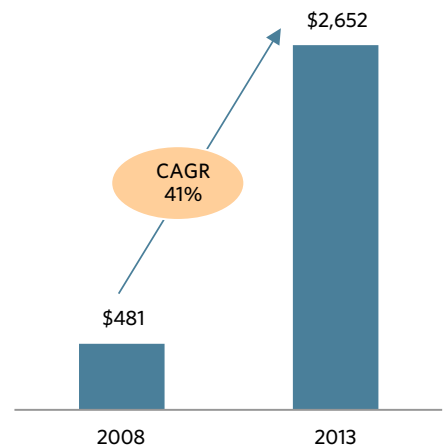
TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
India	47%	$1,248	72%	$1,166	$1.15	-2%	$1.05
Egypt	24%	$637	21%	$391	$1.43	-4%	$8.09
China	20%	$519	159%	$515	$1.20	6%	$0.39
Saudi Arabia	4%	$111	27%	$77	$1.21	-5%	$4.21
Japan	2%	$42	-3%	-$7	$1.82	3%	$0.33
Malaysia	1%	$32	9%	$12	$1.16	-3%	$1.13
Lebanon	1%	$30	151%	$29	$1.10	-15%	$7.05
Oman	1%	$19	-14%	-$21	$1.12	-12%	$6.70
Jordan	0%	$10	71%	$10	$1.68	-3%	$1.66
Singapore	0%	$2	-11%	-$2	$1.64	-4%	$0.46
Other	0%	$3	20%	$2	$1.68	-4%	
TOTAL	100%	$2,652	41%	$2,171	$1.23	-5%	

GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Ukraine	80%	$2,120	56%	$1,893	$1.18	-9%
Russian Federation	10%	$266	106%	$258	$1.44	-1%
Argentina	8%	$203	1%	$11	$1.43	1%
USA	1%	$30	-1%	-$1	$1.89	3%
Saudi Arabia	0%	$8	65%	$7	$1.79	-4%
France	0%	$4	74%	$4	$1.64	-7%
Kazakhstan	0%	$4	210%	$4	$1.88	30%
Spain	0%	$3	118%	$3	$1.62	-9%
Rep. of Moldova	0%	$3	N/C	$3	$0.91	N/C
Egypt	0%	$2	179%	$2	$1.54	17%
OTHER	0%	$10	-20%	-$20	$1.63	-4%
TOTAL	100%	$2,652	40%	$2,164	$1.23	-5%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

CRUDE SUNFLOWER-SEED OIL AND FRACT. [HS151211]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	○
Mechanically harvested	●
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	○
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET

- India (47%) is the largest market taking almost half of target markets total
- Egypt (#2 at 24%) and China (#3 at 20%) follow
- Other markets much smaller
- Domestic demand outstrips production
- Oil seed and confectionery seed demand expected to increase by between 10 to 15 % per year
- Three countries dominate the market: Ukraine (80%), Russia (10%) and Argentina (8%)
- USA is #4 with 1%/$30m
- Wide range of smaller supplier beyond these four

WA/AU

- Majority of Australia's production is now monounsaturated varieties (94%)
- Polyunsaturated and confectionery varieties grown for niche markets in Australia and Asia
- Northern NSW, Southern and Central QLD key locations

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Opportunity for import replacement – up to 50% of domestic sunflower oil consumption is from imports
- Health benefits of monounsaturated and polyunsaturated fats
- Possible to guarantee GM free oil; alternatively new GM safflower produces excellent oil quality & yields at Kununurra
- WA has long history of farming; systems and skills to ensure high quality production
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems

OPPORTUNITIES FOR VALUE-ADDED

- GM free premium vegetable oil for Asia markets, particularly Japan
- Develop nutraceutical sector market
- Improved processing technology to ensure premium product with optimised nutrient profile
- Crushing plant would be needed to export higher value commodities (oil & meal)

CHALLENGES/LIMITATIONS

- Scale is the key challenge
- Current production systems and scale marginal; may need right genetics and new systems
- Suggest targeting global agribusiness operators at scale for new investment at scale
- Dominance and availability of palm oil limits price premiums
- Lack of quarantine glasshouse facilities limits importation of genetic material
- Oil processing capacity is in NSW and VIC
- Difficult to compete with natural rainfall producers (Ukraine, Russia)

POTENTIAL ROLE FOR GOVERNMENT

- Support R&D into new varieties for increased oil yield and desired fatty acid composition
- Extension of R&D and expertise to WA farmers from east coast
- Streamlining quarantine procedures
- Support management of disease risks

Source: UN Comtrade; various other published sources; Coriolis analysis

RAW CANE SUGAR, IN SOLID FORM [HS170111]

PRODUCT PROFILE	
Common name(s)	Sugarcane
Scientific name	Saccharum officinarum
Type of plant	Perennial true grass
Cultivation cycle	Replanting after 2-3 harvests for large production, continuous water supply for 6-7 months
Origin	South Asia
Part eaten	Stalks processed to extract sucrose, young flowers can be eaten
Forms/usage	- Raw cane sugar, which can be refined to white and brown sugar - Other products of processing are molasses (supplement, animal feed, ethanol, rum, citric acid), bagasse (boiler fuel, paper, mulch) and filter cake (animal feed, fertiliser, sugarcane wax)
Drivers of consumer/market success	- One of world's most efficient photo synthesisers - Range of options for co-product use
Why does it suit the North of WA?	- Grown in massive amounts across all across climatic peer group regions (e.g. Sudan 6.8m t, Kenya 5.9m t, Zambia 4m t, Zimbabwe 3.9m t, Mozambique 3.8m t, Tanzania 3.0m t, etc.) etc.) - Requires tropical or temperate climate - Requires minimum of 60 cm annual moisture - Most of worlds products grown between latitudes 22 ° north and south of the equator - Can be gown on many soils - Plentiful sunshine wand water increase cane production - Mechanical harvesting
Open questions/ challenges?	- Industry needs immediate scale to supply required local processing plant - Historically grown in the Ord; not clearly a success; getting to minimum mill scale appears to be the challenge

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

RAW CANE SUGAR, IN SOLID FORM [HS170111]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$6,666m
5y CAGR (US$; 08-13)	20%
5y ABS (US$m; 08-13)	+ $3,943m
Average $/kg or l (US$; 2013)	$0.46
Top 10 highest imp/cap (US$; 13)	$30.72
Top 10 lowest imp/cap (US$; 13)	$0.31
Top 3 importers share	66%
Top 10 importers share	99%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	86%
Top 10 exporters share	99%
Australia export share	17%
Possible size of the prize	
$50-100m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	28%	$1,870	53%	$1,646	$0.44	1%	$1.40
Indonesia	25%	$1,678	68%	$1,554	$0.52	10%	$7.16
Malaysia	13%	$869	16%	$457	$0.50	12%	$30.72
South Korea	12%	$807	9%	$278	$0.47	7%	$16.22
Japan	10%	$663	7%	$194	$0.47	7%	$5.21
India	5%	$362	66%	$333	$0.44	2%	$0.31
Egypt	2%	$145	-21%	-$330	$0.19	-14%	$1.84
Israel	2%	$119	30%	$87	$0.48	7%	$15.69
Saudi Arabia	1%	$63	-30%	-$324	$0.58	13%	$2.41
Vietnam	0%	$33	21%	$20	$0.96	16%	$0.39
Other	1%	$55	15%	$28	$0.68	11%	
TOTAL	100%	$6,666	20%	$3,943	$0.46	7%	

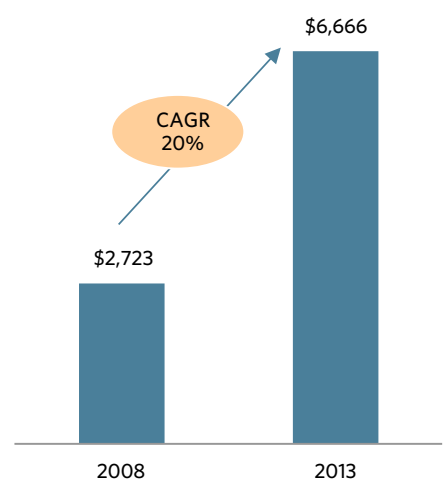
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Brazil	49%	$3,243	26%	$2,219	$0.44	5%
Thailand	20%	$1,340	21%	$826	$0.50	8%
Australia	17%	$1,118	11%	$466	$0.48	8%
Guatemala	5%	$306	54%	$271	$0.47	10%
Cuba	3%	$226	4%	$37	$0.52	2%
United Kingdom	2%	$110	141%	$109	$0.47	-6%
South Africa	1%	$90	-2%	-$12	$0.54	10%
Philippines	1%	$79	96%	$76	$0.47	2%
El Salvador	1%	$55	N/C	$55	$0.57	N/C
France	0%	$26	53%	$23	$0.70	11%
OTHER	1%	$73	-37%	-$641	$0.67	15%
TOTAL	100%	$6,666	16%	$3,429	$0.46	7%

SUGAR CANE - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Brazil	10,195,166	75.34	768,090,444	4%
India	5,060,000	67.43	341,200,000	0%
China	1,816,490	70.58	128,200,908	1%
Thailand	1,321,600	75.74	100,096,000	6%
Pakistan	1,128,800	56.48	63,749,900	0%
Mexico	782,801	78.16	61,182,077	4%
Colombia	405,737	85.96	34,876,332	2%
Indonesia	450,000	74.89	33,700,000	6%
Philippines	435,405	73.21	31,874,000	-1%
USA	368,588	75.71	27,905,943	2%
Australia	329,303	82.40	27,136,082	-4%
Other	4,648,796		293,168,089	
World	26,942,686	70.94	1,911,179,775	2%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

RAW CANE SUGAR, IN SOLID FORM [HS170111]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	○
Mechanically harvested	●
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	◑
Can we compete?	●
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	○
Required skills for success	●
Leverage WA & country reputation	○
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Brazil dominates production and exports to target markets (49%)
- Australia is the 3rd largest exporter of sugar (17%) after Brazil and Thailand (20%)
- China is the largest market taking $1.87b and accounting for 28% of target market; relatively low per cap currently
- Indonesia second largest (25%) taking $1.68b
- Current sugar prices are low, below cost for many milling companies
- Stockpiles of sugar are growing worldwide, an oversupply due to increases in production. Estimated to reach 82.7 million tonnes in 2014-2015
- Brazil economic situation of stagflation, devaluation of currency and political unrest affecting global sugar market

WA/AU

- Grown experimentally in Ord from 1947; commercial production starts 1995 when CSR built mill; sold to CJ Corp in 2000; closed 2007; no longer cropped
- Shanghai Zhongfu won rights to lease and develop Ord River Stage 2 in 2012. Waiting on NT to release land so necessary scale is achieved to support new sugar mill. Interim products of sorghum and chia planned for 2015
- Around 4,000 cane farm businesses in Australia; QLD accounts for around 95% of Australian raw sugar production, NSW 5%
- 80% exported, 2nd largest export agrifood after wheat
- 24 sugar mills owned by 8 companies, some closures over last decade
- Ownerships of mills is about 75% foreign ownership

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Internationally competitive industry as no subsidies or price support
- Mechanised harvesting
- Extensive body of research and innovation into best farming practice, research institutions streamlined into Sugar Research Australia in 2013
- Safe and secure production location versus major producers
- Existing major players in Australia
- QLD industry growth constrained by land availability
- "Sugar in Ord has one of the best outputs in Australia"

OPPORTUNITIES FOR VALUE-ADDED

- Further refined into white, brown and golden syrup products before exporting
- Co-products can provide additional revenue stream – molasses, bagasse, mill mud and mulch
- Molasses can be processed into ethanol and alcohol (rum)

CHALLENGES/LIMITATIONS

- Sugarcane needs to be processed as soon as possible after harvesting, transport, milling and storage infrastructure must be in place
- Current nutritional studies portray sugar in poor light, food processors trying to reduce sugar content and replace with other sweeteners
- Scale necessary before essential sugar mill infrastructure built

POTENTIAL ROLE FOR GOVERNMENT

- Facilitate investment in necessary infrastructure for sugarcane industry

Source: UN Comtrade; various other published sources; Coriolis analysis

MANIOC/CASSAVA, FRESH & STARCH [HS110814/071410]

PRODUCT PROFILE	
Common name(s)	Cassava, Brazilian arrowroot, manioc, tapioca
Scientific name	Manihot esculenta
Type of plant	Woody shrub
Cultivation cycle	Perennial but cultivated as an annual
Origin	Western Brazil
Part eaten	Root
Forms/usage	- Has to be cooked before eating - Boiled as a root food - Made into starch - Made into a wide range of alcoholic spirits - Made into bio-ethanol
Drivers of consumer/ market success	- Seventh largest human agrifood product by volume - Plant gives third highest yield of carbohydrates per cultivated area (after sugarcane and sugar beets) - 25-30% protein on a dry basis - Third largest source of food carbohydrates in the tropics, after rice and maize; fourth largest globally - Easily processed into a wide range of foods and food ingredients
Why does it suit the North of WA?	- Grown across massive amounts across all across African climatic peer group regions (e.g. Angola 16.4m t, Mozambique 10m t, Uganda 5.2m t, Tanzania 4.8m t, Rwanda 2,9m t, Kenya 1.1m t, Zambia 1.1m t, Chad 0.3m t, Zimbabwe 0.2m t, Senegal 154,071t, Niger 150,000t, Somalia 90,000t, Mali 38,000t, etc.) - One of the most dry climate friendly major products - Can be successfully grown on marginal to poor soils with a pH ranging from acidic to alkaline - Well adapted within latitudes 30° north and south of the equator - Suits elevations between sea level and 2,000 m above sea level, in equatorial temperatures, - Suits rainfalls of 50 millimetres to 5 m annually
Open questions/ challenges?	- How will the North of WA compete with Thailand? - What is the current state of mechanical harvesting technology? - Can WA replicate Queensland's world class yields?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

MANIOC/CASSAVA, FRESH & STARCH [HS110814/071410]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$3,251m
5y CAGR (US$; 08-13)	6%
5y ABS (US$m; 08-13)	+$2,224
Average $/kg or l (US$; 2013)	$0.30
Top 10 highest imp/cap (US$; 13)	$6.12
Top 10 lowest imp/cap (US$; 13)	$0.30
Top 3 importers share	88%
Top 10 importers share	~100%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	97%
Top 10 exporters share	~100%
Australia export share	0.0001 %
Possible size of the prize	
$100-200m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	77%	$2,498	35%	$1,935	$0.28	4%	$1.87
Vietnam	6%	$202	58%	$182	$0.95	8%	$2.35
South Korea	4%	$146	-7%	-$63	$0.24	1%	$2.93
Indonesia	3%	$107	13%	$49	$0.49	6%	$0.46
Malaysia	2%	$81	13%	$37	$0.48	7%	$2.85
Japan	2%	$71	0%	$0	$0.44	3%	$0.56
Thailand	2%	$64	78%	$61	$0.14	26%	$1.01
Singapore	1%	$31	10%	$11	$0.50	4%	$6.12
Philippines	1%	$29	4%	$6	$0.43	6%	$0.30
Hong Kong SAR	0%	$11	-2%	-$1	$0.49	7%	$1.50
Other	0%	$11	22%	$7	$0.52	4%	
TOTAL	100%	$3,251	26%	$2,224	$0.30	4%	

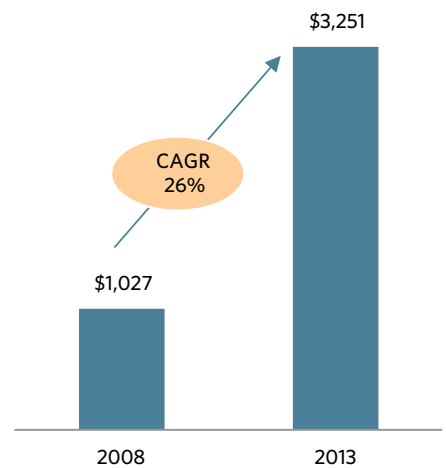
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Thailand	73%	$2,365	26%	$1,627	$0.30	3%
Vietnam	17%	$554	20%	$332	$0.27	4%
Cambodia	8%	$250	62%	$228	$0.37	13%
Indonesia	2%	$51	6%	$14	$0.33	8%
Laos	1%	$24	71%	$22	$0.40	15%
Myanmar	0%	$4	54%	$3	$0.16	-5%
India	0%	$1	67%	$1	$0.78	1%
Taiwan	0%	$1	-18%	-$1	$1.12	29%
China	0%	$0	-5%	-$0	$0.68	9%
Malaysia	0%	$0	0%	$0	$0.26	10%
OTHER	0%	$1	-1%	-$0	$0.61	2%
TOTAL	100%	$3,251	26%	$2,224	$0.30	4%

CASSAVA - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Nigeria	3,800,000	13.95	53,000,000	4%
Thailand	1,385,120	21.82	30,228,000	4%
Indonesia	1,065,752	22.46	23,936,921	2%
Brazil	1,525,918	14.08	21,484,218	-4%
DR Congo	2,050,000	8.05	16,500,000	2%
Angola	1,167,948	14.05	16,411,674	10%
Ghana	875,185	18.27	15,989,940	7%
Mozambique	780,000	12.82	10,000,000	20%
Vietnam	544,107	17.93	9,757,681	1%
Cambodia	350,000	22.86	8,000,000	17%
India	207,000	34.96	7,236,600	-4%
Other	6,641,785		64,217,025	
World	20,392,815	13.57	276,762,059	3%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

MANIOC/CASSAVA, FRESH & STARCH [HS110814/071410]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	◑
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	○
OVERALL	●

CURRENT SITUATION

MARKET/COMPETITORS

- Mozambique (similar in size to the Pilbara and Kimberley combined – and at a similar latitude) alone produces 10m tonnes
- Cheap carbohydrate easily produced in small scale/ home plots across Africa and South America
- Thailand dominates Mid-East/Asian trade (73%), followed by Vietnam (17%) and Cambodia (8%)
- Thai production goes 55% to starch; 40% to pellets; 5% to ethanol; Thailand has ~61 factories, of which 6 are 200t/day+
- Major cash agrifood product in Thailand; Vietnam and Cambodia increasing production
- Thai tapioca flour/starch production concentrated in Thailand; 3-4 big firms dominate (e.g. STC Group)
- China is the key market, taking 77% of Mid-East/ Asian trade
- Wide range of E/SE Asian countries follow; low Middle Eastern imports
- China has growing production and imports; expected to double consumption in 5+ years

WA/AU

- Trials in Northern Queensland in 70's (earlier?)
- First commercial cassava enterprise was Australian Cassava Products (QLD; 1979-1986)
- CassTech is unlisted Australian public company farming 75ha of cassava in Queensland since 2008 (www.casstech.com.au); plans to farm 6,000ha
- CassTech is achieving yields of 80-100t/ha (vs. global average of 14) in Queensland; has developed proprietary farming machinery

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- African peer group strongly suggest this could be grown without irrigation; perhaps mechanised large area, low yield production systems (not intensive irrigation as envisaged by some reviewers and used in Queensland)
- Potential to target large scale African agribusiness operators with proven skills and systems for immigration to WA
- Use for biofuel input, particularly at mining sites (plant gives third highest yield of carbohydrates per cultivated area after sugarcane and sugar beets)
- Low risk and politically stable: North of Australia only developed, politically stable region suited to production
- Drive shift from low tech, high labour cash agrifood product to highly mechanised industrial production at scale
- Starch production is capital intensive; does not suit high risk countries
- WA is free of major cassava pests (e.g. pink mealy bug)

OPPORTUNITIES FOR VALUE-ADDED

- Cassava flour
- Tapioca starch (vast range of applications incl. water treatment, food manufacture, paper making, adhesives, bio plastics and probiotic foods)
- Cassava "potato chips"
- Large and growing use in livestock, fish and poultry feed
- Production of ethanol, amino acids, citric acid and MSG

CHALLENGES/LIMITATIONS

- May need new mindsets, the right genetics and new systems
- Very difficult to export fresh - undergoes postharvest physiological deterioration once harvested – oxidising the plant and rendering it unpalatable
- Starch production is energy intensive (15-20 KWh/t)
- CassTech in Queensland has struggled with government "red tape" (see http://www.andev-project.org/resources/case-study-burdekin-integrated-cassava-project-queensland/)

POTENTIAL ROLE FOR GOVERNMENT

- Facilitating high yield genetics from QLD through state quarantine

Source: UN Comtrade; various other published sources; Coriolis analysis

GRAIN SORGHUM [HS100700]

PRODUCT PROFILE	
Common name(s)	Sorghum, durra, jowari, milo, Egyptian millet, Guineas corn, gaoliang, Kafir corn
Scientific name	Sorghum bicolour
Type of plant	Annual grass
Cultivation cycle	Soil temperatures must be above 17 ° before planting. 90-120 days growing season
Origin	Northern Africa
Part eaten	Grain
Forms/usage	- Whole grains, popped, flour, syrup - Made into flatbreads, couscous, porridge, soups, cakes, starch, syrup production (sweet sorghum) - Made into alcoholic beverages, gluten free beer - Gluten free alternatives - Used for fodder and animal feed - Used in ethanol production (by products protein wet cake and syrup, for animal feed)
Drivers of consumer/ market success	- Fifth most important cereal agrifood product grown in the world - Drought resistant - Significant international research into improving sorghum production - Gluten free market - 70% starch content - Slow digestibility and high insoluble fibre content - Can be double cropped in the right conditions (soybeans in the wet; maize, sorghum or sunflowers in dry)
Why does it suit the North of WA?	- Grown across massive amounts all across the climatic peer group regions (e.g. Sudan 4,524,000t, Ethiopia 4,338,262t, Burkina Faso 1,880,465t, Niger 1,287,000t, Chad 745,000t); - Also came strongly out of US Southwest irrigation data (150,215ha) - Grows in wide range of temperature, toxic soils, recovers after drought - Does not require thorough ploughing - Requires average temperatures of at least 25 °C for maximum yield - Good for rotation (lower cost, short growing season)
Open questions/ challenges?	- Choice between low calorie and improved nutrient profile varieties - Historically grown in the Ord for cattle fattening; not clearly a success

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

GRAIN SORGHUM [HS100700]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$932m
5y CAGR (US$; 08-13)	18%
5y ABS (US$m; 08-13)	+$521m
Average $/kg or l (US$; 2013)	$0.31
Top 10 highest imp/cap (US$; 13)	$4.17
Top 10 lowest imp/cap (US$; 13)	$0.003
Top 3 importers share	99%
Top 10 importers share	~100%
# top 10 importers w/ +10% CAGR	2
Top 3 exporters share	97%
Top 10 exporters share	~100%
Australia export share	45%
Possible size of the prize	
$30-70m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Japan	57%	$531	7%	$160	$0.30	-2%	$4.17
China	40%	$369	177%	$367	$0.34	14%	$0.28
Israel	2%	$18	-4%	-$4	$0.27	-3%	$2.43
Philippines	1%	$5	-6%	-$2	$0.37	4%	$0.05
South Korea	0%	$4	21%	$2	$0.66	8%	$0.08
Malaysia	0%	$1	2%	$0	$0.33	3%	$0.05
Vietnam	0%	$1	N/C	$1	$0.29	N/C	$0.01
Indonesia	0%	$1	-9%	-$0	$0.34	2%	$0.00
Jordan	0%	$1	N/C	$1	$0.39	N/C	$0.10
Thailand	0%	$0	-14%	-$0	$1.89	11%	$0.01
Other	0%	$1	-30%	-$4	$0.38	7%	
TOTAL	100%	$932	18%	$521	$0.31	-1%	

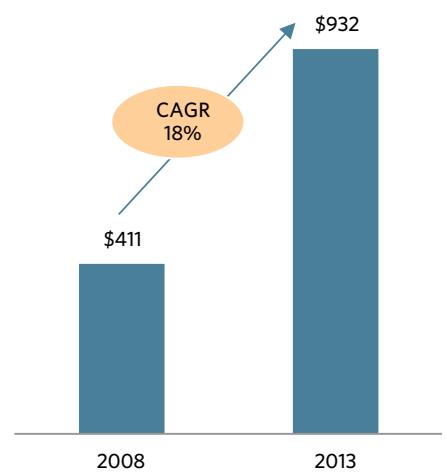
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Australia	45%	$421	25%	$285	$0.35	1%
Argentina	35%	$323	72%	$301	$0.28	-4%
USA	17%	$161	-2%	-$20	$0.30	-2%
Switzerland	1%	$7	-13%	-$7	$0.26	-4%
Netherlands	1%	$5	N/C	$5	$0.32	N/C
United Kingdom	0%	$4	42%	$3	$0.26	-10%
China	0%	$4	-37%	-$32	$0.68	19%
India	0%	$3	-29%	-$12	$0.30	0%
Germany	0%	$1	235%	$1	$0.21	-52%
Thailand	0%	$1	-12%	-$1	$0.44	6%
OTHER	0%	$2	-13%	-$2	$0.31	7%
TOTAL	100%	$932	18%	$521	$0.31	-1%

SORGHUM - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
USA	2,642,600	3.74	9,881,788	-4%
Nigeria	5,500,000	1.22	6,700,000	-6%
Mexico	1,688,917	3.74	6,308,146	-1%
India	6,180,000	0.85	5,280,000	-8%
Sudan (former)	7,136,220	0.63	4,524,000	3%
Ethiopia	1,847,265	2.35	4,338,262	10%
Argentina	889,993	4.09	3,635,837	4%
China	584,310	4.95	2,894,800	9%
Australia	595,000	3.75	2,229,709	-10%
Brazil	792,838	2.68	2,126,179	1%
Burkina Faso	1,806,529	1.04	1,880,465	0%
Other	12,563,376		12,495,951	
World	42,227,048	1.48	62,295,137	-1%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

GRAIN SORGHUM [HS100700]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	●
Can we compete?	●
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	●
Leverage WA & country reputation	◑
OVERALL	●

CURRENT SITUATION

MARKET/COMPETITORS

- High energy drought resistant agrifood product makes it popular in African countries; third of the world production
- USA production covers 7.1m acres over the Sorghum Belt (Kansas and South Dakota) primarily going into animal feed
- Australia (45%, achieving slight premium)and Argentina (35%, showing stronger growth and lower prices)dominate the trade of sorghum into the target markets
- USA is #3 with 17%; shrinking value and lower prices
- Strong growth from China (5y CAGR of 177%) for animal feed products (pigs, chickens and ducks) replacing corn; grain elevators in US offering 10% more for sorghum in 2015; USA exports to China were $1.3b in 2014[1]
- China importing Australian sorghum for domestic alcohol (Baijiu) distillation
- Japan importing sorghum as animal feed

WA/AU

- Australia is a major producer of sorghum; used for livestock feed and ethanol production; QLD 60% of production volume, followed by NSW
- In 2015 Sorghum beats wheat as QLD's most valuable agrifood product (~A$432m)
- Ethanol plant in Australia buys 200,000t of grain and produces 76m litres of ethanol (~1t grain = 400l if ethanol) - located at centre of sorghum production and feedlots
- Research and trials in the 1960's; grown in the Wheatbelt and north of Kununurra for feed and ethanol
- Trials completed in NT & ORIA, production issues - bird damage, low value, bulky, high freight costs
- Lessons from Camballin Irrigation project

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Non-genetically engineered species easier to trade
- Able to increase yields under irrigation
- Significant grain growing capabilities in WA
- Research in WA into grain and sorghum production and utility
- Potential to target large scale African agribusiness operators with proven skills and systems for immigration to WA

OPPORTUNITIES FOR VALUE-ADDED

- Marketed as gluten-free range (substitute for wheat)
- Many processed foods uses
- Health drink from extracted protein
- Main input to alcoholic beverages (distilled in China, beer in Africa)
- Processing into high value animal feed (hay or pellets)
- Ethanol production from sorghum (high starch content) produces syrup and protein wet cake as co-product; valuable input into animal feed/ feedlots

CHALLENGES/LIMITATIONS

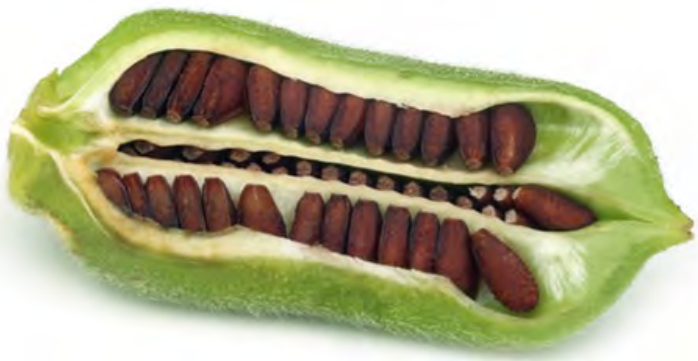
- The issue appears to be getting to scale to create/ enable supporting infrastructure
- Economics marginal under current scale and systems; may need new mindsets, the right genetics and new systems
- Price fluctuations caused by Chinese policies impacting the price of corn
- Price variability A$80-$300/t[2]
- Drying grain problematic
- Lower yields in hotter climates in WA, reduce profit
- Scale required for Bio-refinery/requires storage
- Primary processing required (crack, roll, steam flaked) to increase digestibility for animal feed
- Birds an issue in the West Kimberley

POTENTIAL ROLE FOR GOVERNMENT

- Support research around high protein varieties for feed and higher starch varieties for ethanol
- Joint research programs for feed grain on variable grain size, cost of processing (e.g. steam flaking), particularly for ruminants, and grain weathering

1. USDA; 2. NSW Agfacts: Grain sorghum; Source: UN Comtrade; various other published sources; Coriolis analysis

SESAMUM SEEDS [HS120740]



PRODUCT PROFILE	
Common name(s)	Sesame
Scientific name	Sesamum indicum
Type of plant	Annual flowering shrub
Cultivation cycle	90 to 120 frost free days
Origin	Sub-Saharan Africa
Part eaten	Seed
Forms/usage	- Whole, raw or roasted - Oil - Paste (tahini) - Ingredient in breads, crackers, cakes, snack bars, muesli, sushi, salad dressing, hummus, confectionary
Drivers of consumer/market success	- One of the highest oil content of any seed - Wide variety of uses across many different cuisines - Steady demand from fast food chains - Rich source of vitamins and minerals
Why does it suit the North of WA?	- Grows all across the climatic peer group regions (e.g. Tanzania 420,000t, Uganda 180,000t, Mozambique 110,000t, Ethiopia 187,121t, Burkina Faso 137,347t, Somalia 90,000t, Chad 39,000t) - Robust agrifood product that needs little support - Grows in drought conditions, high heat, excessive rains - Best growth and yields above 23 °C - Well adapted to wet season production in tropics or summer production in warmer temperate area - Insect tolerant
Open questions/ challenges?	- Allergy considerations in any shared processing plant

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

SESAMUM SEEDS [HS120740]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$1,731m
5y CAGR (US$; 08-13)	11%
5y ABS (US$m; 08-13)	+$720m
Average $/kg or l (US$; 2013)	$1.79
Top 10 highest imp/cap (US$; 13)	$14.74
Top 10 lowest imp/cap (US$; 13)	$0.10
Top 3 importers share	70%
Top 10 importers share	97%
# top 10 importers w/ +10% CAGR	5
Top 3 exporters share	49%
Top 10 exporters share	82%
Australia export share	0.004%
Possible size of the prize	
$100m+	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	45%	$773	25%	$524	$1.75	9%	$0.58
Japan	15%	$267	-7%	-$107	$1.89	-1%	$2.10
South Korea	10%	$176	8%	$58	$2.26	4%	$3.53
India	7%	$123	76%	$115	$1.60	3%	$0.10
Israel	6%	$112	10%	$44	$2.02	2%	$14.74
Saudi Arabia	4%	$72	4%	$13	$1.77	-1%	$2.73
Egypt	3%	$52	2%	$5	$2.35	4%	$0.66
Lebanon	3%	$46	9%	$16	$1.91	0%	$10.92
Jordan	3%	$46	12%	$20	$1.95	0%	$7.24
Malaysia	1%	$12	13%	$6	$0.57	-7%	$0.43
Other	3%	$53	15%	$27	$1.29	3%	
TOTAL	100%	$1,731	11%	$720	$1.79	2%	

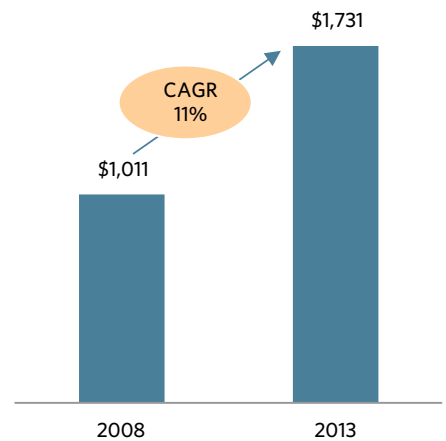
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Ethiopia	21%	$357	21%	$219	$1.89	3%
Sudan	18%	$318	19%	$187	$1.78	-1%
Tanzania	10%	$178	27%	$125	$1.90	-1%
India	8%	$139	-4%	-$31	$1.56	1%
Nigeria	6%	$99	4%	$17	$1.58	-1%
China	5%	$95	5%	$20	$2.42	5%
Togo	4%	$72	N/C	$72	$1.61	N/C
Mozambique	3%	$55	6%	$15	$1.90	3%
Somalia	3%	$54	49%	$46	$1.62	5%
Myanmar	3%	$44	-13%	-$44	$1.72	13%
OTHER	18%	$320	-2%	-$37	$1.78	-2%
TOTAL	100%	$1,731	9%	$589	$1.79	2%

SESAME SEEDS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Myanmar	1,590,000	0.56	890,000	1%
India	1,860,000	0.34	636,000	0%
China	418,450	1.49	623,492	1%
Sudan (former)	2,157,540	0.26	562,000	10%
Tanzania	630,000	0.67	420,000	55%
Ethiopia	282,950	0.66	187,121	0%
Uganda	290,000	0.62	180,000	1%
Nigeria	340,000	0.49	165,000	6%
Burkina Faso	203,449	0.68	137,347	21%
Mozambique	210,000	0.52	110,000	22%
Niger	185,000	0.50	92,000	13%
Other	1,248,980		844,961	
World	9,416,369	0.51	4,847,921	5%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

SESAMUM SEEDS [HS120740]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	●
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	●
Leverage WA & country reputation	●
OVERALL	●

CURRENT SITUATION

MARKET

- China is the biggest market despite being the 3rd largest producer
- Japan is #2 largest sesame importer, with oil from the roasted seed being the principle use
- Together with South Korea, these three account for 70% of the target markets
- Wide spread beyond these three
- Myanmar dominates global production
- China's yield is almost x3 of the other top producers
- Ethiopia, Sudan and Tanzania supply almost 50% of the exports to target markets
- Suppliers are primarily unstable, dry African countries in the Sahel

WA/AU

- Two cultivars recommended for use in Northern WA
- No significant commercial operation identified
- Was researched, trialled and grown commercially in late 1990's; unsuccessful at achieving commercial success to date
- Much trial work done in NT; robust agrifood product, low rainfall required; sandy soils suitable; shattering can be managed; varieties available in NT

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Premium prices exist for high quality, well processed seeds with guaranteed minimum oil content
- Most of target markets supply come from unstable African countries, potential to leverage WA safe and secure reputation
- Potential to target large scale African agribusiness operators with proven skills and systems for immigration to WA

OPPORTUNITIES FOR VALUE-ADDED

- Health products emphasising natural antioxidants content
- Organic sesame seed products
- Sprouting sesame seeds
- Manufacture premium store brands for key international retailers in Asia
- Develop and market premium range of gifting products for Asia market

CHALLENGES/LIMITATIONS

- The key issue appears to be getting to scale
- Lack of feeding value of stubble for livestock
- May need right genetics and new systems
- Significant losses at harvest, need for modified harvester
- Issues with weed control especially broadleaf weeds
- Allergen issues mean cross contamination risks
- High losses in poor weather

POTENTIAL ROLE FOR GOVERNMENT

- Support research into developing cultivars and farm management techniques for WA conditions
- Support research into mechanised harvesting systems that minimise harvest losses

Source: UN Comtrade; various other published sources; Coriolis analysis

SOYA BEANS [HS120100]

PRODUCT PROFILE	
Common name(s)	Soy beans, soya beans, edamame, golden bean, miracle bean
Scientific name	Glycine max
Type of plant	Legume
Cultivation cycle	80-120 days from sowing to harvesting
Origin	East Asia
Part eaten	Bean
Forms/usage	- Must be cooked - Whole in pod or shelled - Soybean meal, soy flour, soy vegetable oil, textured vegetable protein, soy milk, tofu, soy sauce, miso, natto, tempeh, sprouts - Soy protein concentrates and isolates
Drivers of consumer/market success	- Vegetable source of complete protein (38-45% protein content) - High oil content (20%) - More protein per acre than most other land uses - Very wide range of uses across many cuisines - Meat and dairy alternative and extender
Why does it suit the North of WA?	- Grows all across the climatic peer group regions (e.g. Zambia 261,063t, Iran 186,000t, Zimbabwe 90,000t, Burkina Faso 21,773t, Ethiopia 49,110t); also came out of US Southwest irrigation data - Optimum growing average temperature of 20-30 ° - Grow in a wide range of soils - Can be double cropped in the right conditions (soybeans in the wet; maize, sorghum or sunflowers in dry)
Open questions/ challenges?	- Can WA compete with the scale achieved by USA and Brazil? - Historically grown in the Ord; not clearly a success

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

SOYA BEANS [HS120100]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$45,485m
5y CAGR (US$; 08-13)	+ $17,720m
5y ABS (US$m; 08-13)	+ $17,720m
Average $/kg or l (US$; 2013)	$0.61
Top 10 highest imp/cap (US$; 13)	$28.39
Top 10 lowest imp/cap (US$; 13)	$4.70
Top 3 importers share	90%
Top 10 importers share	~100%
# top 10 importers w/ +10% CAGR	4
Top 3 exporters share	93%
Top 10 exporters share	~100%
Australia export share	0.01%
Possible size of the prize	
$100-300m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	84%	$38,009	12%	$16,194	$0.60	1%	$28.39
Japan	4%	$1,883	-4%	-$480	$0.68	1%	$14.79
Indonesia	2%	$1,102	10%	$404	$0.62	1%	$4.70
Thailand	2%	$1,018	1%	$50	$0.61	2%	$16.03
Egypt	2%	$994	14%	$477	$0.92	-6%	$12.62
Vietnam	2%	$784	64%	$719	$0.60	9%	$9.14
South Korea	2%	$738	-1%	-$54	$0.66	2%	$14.83
Malaysia	1%	$350	3%	$45	$0.63	1%	$12.38
Saudi Arabia	1%	$332	N/C	$332	$0.60	N/C	$12.67
Israel	0%	$204	3%	$24	$0.62	2%	$26.86
Other	0%	$69	3%	$9	$0.77	6%	
TOTAL	100%	$45,485	10%	$17,720	$0.61	1%	

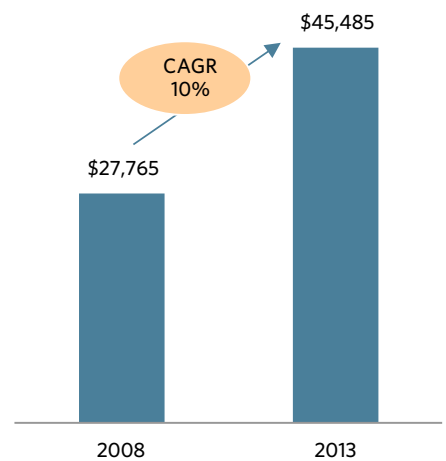
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Brazil	46%	$21,080	19%	$12,330	$0.60	0%
USA	37%	$16,974	8%	$5,265	$0.61	1%
Argentina	9%	$4,176	-8%	-$2,043	$0.62	1%
Uruguay	4%	$1,613	38%	$1,291	$0.62	1%
Canada	2%	$1,046	24%	$683	$0.69	1%
Ukraine	0%	$165	N/C	$165	$0.90	N/C
Paraguay	0%	$157	136%	$155	$0.61	-7%
China	0%	$116	-16%	-$155	$1.04	5%
Switzerland	0%	$46	-9%	-$26	$0.60	0%
Russian Federation	0%	$26	69%	$25	$0.39	2%
OTHER	0%	$87	-63%	-$11,679	$0.65	3%
TOTAL	100%	$45,485	3%	$6,011	$0.61	1%

SOYA BEANS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
USA	30,703,000	2.91	89,483,000	2%
Brazil	27,906,675	2.93	81,724,477	6%
Argentina	19,418,825	2.54	49,306,201	1%
China	6,790,510	1.76	11,950,500	-5%
India	12,200,000	0.98	11,948,000	4%
Paraguay	3,080,000	2.95	9,086,000	8%
Canada	1,819,600	2.86	5,198,400	9%
Uruguay	1,200,000	2.67	3,200,000	33%
Ukraine	1,351,030	2.05	2,774,300	28%
Bolivia	1,237,774	1.90	2,347,282	13%
Russia	1,202,900	1.36	1,636,000	17%
Other	4,634,389		7,378,202	
World	111,544,703	2.47	276,032,362	4%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

SOYA BEANS [HS120100]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	○
Mechanically harvested	●
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	○
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	○
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET/COMPETITORS

- Domestically demand outstripped supply by estimated 30,000 tonnes in 2014
- China is almost 85% of the market taking $38b worth of soya beans in 2013
- Japan is second largest market at 4% taking $1.9b
- Indonesia and Thailand both also take over $1b
- Production and exports are dominated by Brazil (46% market share) and US(37% market share)
- These two are followed by Argentina (9%), Uruguay (4%) and Canada (2%)
- Other suppliers nominal/irrelevant

WA/AU

- Grown across wide area of Australia, mainly QLD and NSW
- NT trials plus NW WA products demonstrate that some varieties of soya bean very difficult to grow in Northern WA climate
- Summer rotation product utilised in both dryland and irrigations systems for sugarcane and cereal farming
- Small WA industry in Ord River
- In AU, oilseed crushing uses almost half of production, though diversification into food uses is growing, predominately flour

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- 94% of soybean production in the US is GE, potential market for non GE soybean in Europe and Asia
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems
- WA has long history of farming; systems and skills to ensure high quality products
- Potential to target large scale African agribusiness operators with proven skills and systems for immigration to WA
- Targeting large scale US agribusiness operators for investment in Stage 4+ of project

OPPORTUNITIES FOR VALUE-ADDED

- GE free soy food products for Japan premium market
- GE free stock feed for organics market
- Non-GM varieties able to achieve a premium
- Meat alternative products for health food markets in Asia
- Soy milk alternative (e.g. Vitasoy)
- High tech processing into soy protein concentrates and isolates

CHALLENGES/LIMITATIONS

- The key issue appears to be getting to scale
- May need right genetics and new systems
- Access to viable seed of suitable varieties
- Weed and pest control
- Water intensive for relatively low value unprocessed

POTENTIAL ROLE FOR GOVERNMENT

- Support for R&D into high yield and quality varieties suited to WA
- Streamline quarantine process for importing seed
- R&D around agronomic limitations

Source: UN Comtrade; various other published sources; Coriolis analysis

TOBACCO, UNMANUFACTURED [HS240110*/240120]

PRODUCT PROFILE	
Common name(s)	Tobacco plant
Scientific name	Nicotiana tabacum
Type of plant	Annual herbaceous plant/shrub
Cultivation cycle	100 to 120 frost free days to reach full maturity
Origin	North America
Part eaten/used	Leaf
Forms/usage	- Further processed to produce smoking tobacco, chewing tobacco, snuff or extracts and essences - Protein can be extracted from leaves
Drivers of consumer/market success	- Growing demand in Asia - Additive nature of nicotine
Why does it suit the North of WA?	- Production is large across a wide range of African climatic peers (e.g. Zambia) - Sunny climate with well-drained soils - Temperatures of 20-30 °C required for adequate growth - Humidity of 80-85% - Soil without a high level of nitrogen is optimal - Soil pH of 5.8 is best for growth
Open questions/ challenges?	- The collapse of the tobacco farming industry in the late 90's/early 2000's should be taken into account - Excise license required to grow tobacco in Australia, rarely granted and no current licensees - Potential labour intensity of post harvest stages

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

TOBACCO, UNMANUFACTURED [HS240110*/240120]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$3,699
5y CAGR (US$; 08-13)	9%
5y ABS (US$m; 08-13)	+$1,289
Average $/kg or l (US$; 2013)	$6.72
Top 10 highest imp/cap (US$; 13)	$26.42
Top 10 lowest imp/cap (US$; 13)	$0.98
Top 3 importers share	62%
Top 10 importers share	96%
# top 10 importers w/ +10% CAGR	5
Top 3 exporters share	51%
Top 10 exporters share	82%
Australia export share	0.002%
Possible size of the prize	$100-150m

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	36%	$1,333	14%	$630	$9.11	6%	$1.00
Indonesia	17%	$617	13%	$289	$5.61	5%	$2.63
Japan	10%	$362	-1%	-$9	$7.44	5%	$2.84
South Korea	8%	$301	7%	$83	$6.33	6%	$6.05
Malaysia	7%	$255	7%	$69	$7.43	6%	$8.99
Vietnam	6%	$229	10%	$87	$5.72	7%	$2.67
Philippines	4%	$141	-7%	-$67	$2.87	-3%	$1.50
Singapore	4%	$132	28%	$94	$6.33	9%	$26.42
Hong Kong SAR	3%	$105	5%	$21	$8.38	8%	$14.99
Egypt	2%	$77	26%	$52	$4.55	-11%	$0.98
Other	4%	$148	6%	$39	$6.00	-5%	
TOTAL	100%	$3,699	9%	$1,289	$6.72	5%	

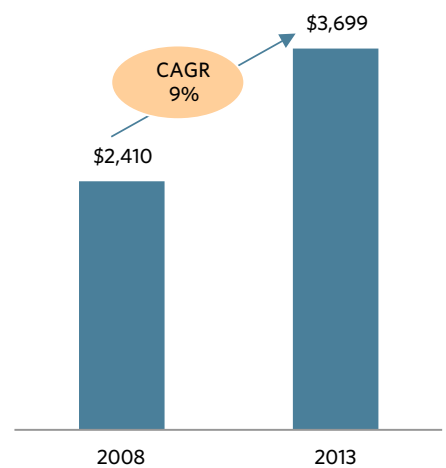
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Brazil	24%	$875	1%	$30	$7.14	5%
Zimbabwe	16%	$595	33%	$453	$9.21	9%
China	11%	$412	14%	$196	$5.40	9%
USA	11%	$402	3%	$63	$8.55	4%
India	5%	$171	3%	$26	$4.64	4%
Argentina	3%	$121	9%	$42	$6.56	4%
Zambia	3%	$120	26%	$82	$8.99	10%
Indonesia	3%	$119	11%	$49	$6.12	3%
Malawi	3%	$117	14%	$56	$5.13	0%
Turkey	3%	$98	5%	$22	$7.45	8%
OTHER	18%	$668	11%	$270	$5.76	3%
TOTAL	100%	$3,699	9%	$1,289	$6.72	5%

TOBACCO - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
China	1,526,910	2.06	3,148,547	2%
Brazil	405,253	2.10	850,673	0%
India	490,000	1.69	830,000	11%
USA	136,068	2.54	345,837	-1%
Indonesia	270,200	0.96	260,200	9%
Zimbabwe	115,000	1.30	150,000	13%
Malawi	120,172	1.11	132,849	-4%
Argentina	59,238	1.95	115,334	-2%
Pakistan	49,775	2.18	108,307	0%
Turkey	136,233	0.66	90,000	-1%
Tanzania	130,000	0.66	86,359	11%
Other	799,300		1,316,962	
World	4,238,149	1.75	7,435,068	2%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



** Additional code; Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other sources; Coriolis analysis*

TOBACCO, UNMANUFACTURED [HS240110*/240120]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	●
Can we compete?	◑
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	○
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Asia and the Middle East want tobacco; target markets imported $3.7b worth of raw tobacco plus another $8.9b worth of cigarettes/etc.
- Production dominated by four countries (China, Brazil, India and USA) who produce almost 70% of world's tobacco, with China a clear leader
- Production has almost doubled since 1960s, shifting to developing countries (US excepted)
- This is reflected in the key suppliers, led by Brazil (24%)
- Key African climatic peers have a strong presence: Zimbabwe (16%), Zambia (3%) and Malawi (3%)
- Malawi exported $117m worth of tobacco to target markets; to put this in perspective, WA exported $54m worth of vegetables, $42m worth of wine and $11m worth of fruit
- Wide range of markets and suppliers
- China is the most important market (36%), followed by Indonesia (17%), Japan (10%) and South Korea (8%)

WA/AU

- Commercial tobacco farming no longer occurs in Australia.
- Deregulation of the heavily regulated and subsidised industry began in the mid 1990's with final sales in 2009.
- An excise licence is necessary to legally grow tobacco in Australia and are rarely granted.

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Previous experience in growing tobacco in Australia
- Position Australia as supplier of product free from pesticide residue and labour concerns
- WA has long history of farming; systems and skills to ensure high quality production
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management, production and processing systems
- The case study of the impact of the white tobacco farmers fleeing Zimbabwe to Zambia suggests challenges are skills and mindset
- Potential to target large scale African agribusiness operators with proven skills and systems for immigration to WA
- Targeting large scale Chinese agribusiness operators for investment in Stage 4+ of project

OPPORTUNITIES FOR VALUE-ADDED

- Premium product from "clean, green" Australia branding
- Niche flavoured tobacco products using unique AU/WA flavours (e.g. similar to rum flavoured rolling tobacco)
- Plant targeting manufactured products for export

CHALLENGES/LIMITATIONS

- Big brother/Nanny state types looking to impose morality on agriculture; target is exports
- Economic growth opportunity likely trumped by politics ("How it would play in the press?")
- May need right genetics and new systems; the key challenge is the potential high levels of post harvest labour
- Scale and/or low costs of the four major global producers hard to compete with
- Political reluctance to be seen to support an industry that generates poor health outcomes
- Previous collapse of industry
- Economics and logistics difficult

POTENTIAL ROLE FOR GOVERNMENT

- Facilitate the granting of excise licence to potential growers

Source: UN Comtrade; various other published sources; Coriolis analysis

COTTON, NOT CARDED OR COMBED [HS520100]

PRODUCT PROFILE	
Common name(s)	Cotton
Scientific name	Gossypium spp.
Type of plant	Perennial shrub but grown as annual
Cultivation cycle	Maturity takes 180 days
Origin	Americas, Africa, India
Part eaten	
Forms/usage	- Fibre from boll around seed - Further processed to produce yarn which is used to make range of textiles, fishing nets, coffee filters, tents, explosives manufacture, paper and bookbinding - Cotton seed cooking oil is possible co-product
Drivers of consumer/ market success	- Australian reputation as reliable supplier of very high quality cotton - Most widely used natural fibre for clothing - Co-product of cotton seed oil possible revenue stream
Why does it suit the North of WA?	- Grows all across the climatic peer group regions in large quantities (e.g. Burkina Faso 280,000t); also came out of US Southwest irrigation data - Grown between latitudes 45° north and 30° south - Successful cultivation requires long frost free period - Needs plenty of sunshine, low humidity - Moderate rainfall of 600 to 1200 mm required or irrigation - Fairly heavy soils required - Salt and environment - Mechanised harvesting
Open questions/ challenges?	- How to compete with the subsidised industries in USA and China? - Can/have past problems with insect pests (particularly Heliothis caterpillars) be overcome? (“up to 50 applications of DDT“)

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

COTTON, NOT CARDED OR COMBED [HS520100]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$14,195 m
5y CAGR (US$; 08-13)	11%
5y ABS (US$m; 08-13)	+ $5,835m
Average $/kg or l (US$; 2013)	$2.04
Top 10 highest imp/cap (US$; 13)	$13.46
Top 10 lowest imp/cap (US$; 13)	$0.34
Top 3 importers share	77%
Top 10 importers share	99%
# top 10 importers w/ +10% CAGR	4
Top 3 exporters share	66%
Top 10 exporters share	88%
Australia export share	17%
Possible size of the prize	
$150-200m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	59%	$8,441	19%	$4,950	$2.04	4%	$6.30
Indonesia	9%	$1,346	2%	$156	$2.00	4%	$5.75
Vietnam	8%	$1,155	20%	$698	$2.02	5%	$13.46
Pakistan	5%	$757	-8%	-$407	$2.02	6%	$4.45
Thailand	5%	$734	1%	$19	$2.13	5%	$11.56
South Korea	4%	$609	12%	$268	$2.07	5%	$12.24
India	3%	$400	-1%	-$21	$2.32	3%	$0.34
Malaysia	2%	$218	24%	$144	$1.94	4%	$7.69
Egypt	1%	$170	2%	$16	$2.43	0%	$2.16
Hong Kong SAR	1%	$154	9%	$56	$1.84	3%	$21.91
Other	1%	$211	-4%	-$43	$2.05	4%	
TOTAL	100%	$14,195	11%	$5,835	$2.04	4%	

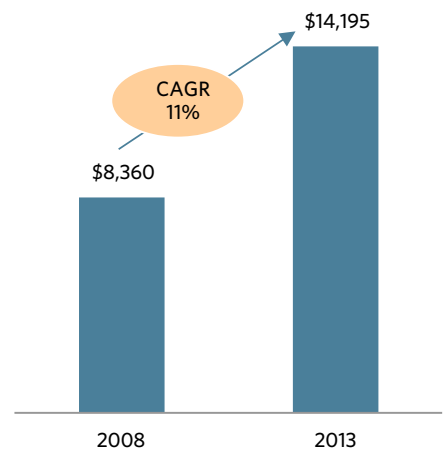
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
USA	28%	$3,976	4%	$703	$2.12	5%
India	21%	$2,930	11%	$1,162	$1.88	5%
Australia	17%	$2,477	46%	$2,102	$2.19	5%
Brazil	8%	$1,180	12%	$510	$2.04	5%
Uzbekistan	4%	$549	9%	$185	$1.99	3%
Burkina Faso	3%	$397	14%	$193	$1.96	3%
Mali	2%	$320	20%	$190	$2.04	4%
Greece	2%	$252	13%	$115	$2.03	-1%
Côte d'Ivoire	2%	$225	28%	$160	$2.00	4%
Benin	1%	$175	3%	$23	$2.03	4%
OTHER	12%	$1,714	7%	$491	$2.02	3%
TOTAL	100%	$14,195	11%	$5,835	$2.04	4%

COTTON LINT - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
China	N/A	N/A	6,298,989	-3%
India			6,052,000	10%
USA			2,842,000	0%
Pakistan			2,171,300	2%
Brazil			1,127,675	-3%
Uzbekistan			1,094,000	-2%
Australia			898,000	47%
Turkey			832,500	4%
Burkina Faso			280,000	1%
Greece			280,000	3%
Turkmenistan			198,000	-10%
Other			2,469,087	
World			24,543,551	2%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

COTTON, NOT CARDED OR COMBED [HS520100]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	○
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	●
Leverage WA & country reputation	◑
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- China is the most important of the target markets with a 59% share; China is the world's largest producer and importer of cotton, for use in its textile industry
- China and India accounted for 51% of end use cotton consumption in 2010
- USA, India and Australia are the key suppliers to the target markets
- Australia achieving standout value growth and premium prices
- Prices are predicted to rise by 8% for Eastern Australian cotton for 2014/2015 season. ABARES predicted global prices to initially fall due to China not stockpiling supplies, but recover in medium term
- ABARES forecasts Australian production to double by 2019/2020 from 470,000 tonnes in 2014/2015

WA/AU

- Previous ventures in the North of WA unsuccessful; cotton a major product from 1963-74
- 583,000 ha in 2011/2012, >5m bales, forecast value of close to $3 billion
- Roughly 1500 cotton farms in Australia, halved between NSW and QLD, mostly family owned
- Employing 8,000 people in 2012
- Average farm grows 656 ha of cotton (irrigated) and employs 8 people
- Australian growers produce the worlds highest yields due to superior genetics and water management
- 94% of Australia's raw cotton is exported, over 75% to China
- Well researched & suited to Kimberley & Pilbara – potential good fit with pastoral industry as a stock feed (seed)

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- GM cotton is a cropping option as the State Government has exempted cotton from the provisions of the Genetically Modified Crop Free Areas Act 2003
- Existing grower expertise within Australia able to be leverage
- WA has long history of farming; systems and skills to ensure high quality production
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems

OPPORTUNITIES FOR VALUE-ADDED

- Eastern Australian producers command premium due to reliable supply of very high quality cotton
- Cotton seed oil is potential co-product revenue stream
- Supply to high end Australian made clothing companies
- Organic cotton for premium clothing manufacturing
- Branding based on unique story around WA products

CHALLENGES/LIMITATIONS

- The key issue appears to be getting to scale
- May need right genetics and new systems
- Limited ginning capacity and high costs in Ord area
- Major investment in ginning and harvesting infrastructure required to service viable industry
- Freight costs are high
- Risk of storm damage and mid-season rain
- Maximum achievable yields are 80% of Eastern Australia to to less sunshine hours in dry season
- Previous cotton industry in Ord river unsuccessful

POTENTIAL ROLE FOR GOVERNMENT

- Extension of east coast expertise to WA farmers
- Support of R&D into varieties more suited to WA climate
- Infrastructure support to service the industry

Source: UN Comtrade; various other published sources; Coriolis analysis

BEANS, DRIED SHELLED [HS071331]

PRODUCT PROFILE	
Common name(s)	Urad, black gram, green gram, mung bean
Scientific name	Vigna mungo, Vigna radiata
Type of plant	Annual flowering legume herb
Cultivation cycle	90-120 frost free days
Origin	India
Part eaten	Seed
Forms/usage	- Whole or hulled, dried - Cooked, sprouted, flour, fermented - Paste, soup, dal, stews, stir-fries, pancakes, dessert, baked goods - Made into starch for cellophane noodles, jelly
Drivers of consumer/market success	- Black gram is one of the most highly prized pulses of India and Pakistan - High levels of protein, vitamins and minerals - Recommended for diabetics and showed to be useful in controlling high cholesterol - Wide range of uses across many cuisines
Why does it suit the North of WA?	- It is native to India and grows all across the climatic peer group regions in massive scale (e.g. Tanzania 1,113,541t); also came out of US Southwest irrigation data - Warm season product - ideal temperature range for growth is 27 to 30 °C - Heat and dry environment friendly - Best growth in slightly acidic soil - Do not tolerate saline soils
Open questions/ challenges?	- Able to find suitable non-saline soils?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

BEANS, DRIED SHELLED [HS071331]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$774m
5y CAGR (US$; 08-13)	14%
5y ABS (US$m; 08-13)	+$364m
Average $/kg or l (US$; 2013)	$0.81
Top 10 highest imp/cap (US$; 13)	$0.72
Top 10 lowest imp/cap (US$; 13)	$0.01
Top 3 importers share	83%
Top 10 importers share	98%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	86%
Top 10 exporters share	97%
Australia export share	6%
Possible size of the prize	
$10-20m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
India	61%	$470	15%	$232	$0.72	2%	$0.40
Indonesia	11%	$87	50%	$75	$0.94	14%	$0.37
Japan	11%	$82	7%	$24	$1.57	7%	$0.64
Philippines	3%	$23	29%	$17	$0.68	32%	$0.24
Vietnam	3%	$23	9%	$8	$1.10	5%	$0.27
Thailand	3%	$22	37%	$17	$0.78	7%	$0.34
Malaysia	3%	$20	16%	$11	$0.93	4%	$0.72
China	2%	$13	-20%	-$25	$0.96	15%	$0.01
Sri Lanka	1%	$11	-4%	-$2	$1.10	9%	$0.54
South Korea	1%	$8	41%	$6	$1.26	35%	$0.15
Other	2%	$16	2%	$1	$0.98	3%	
TOTAL	100%	$774	14%	$364	$0.81	5%	

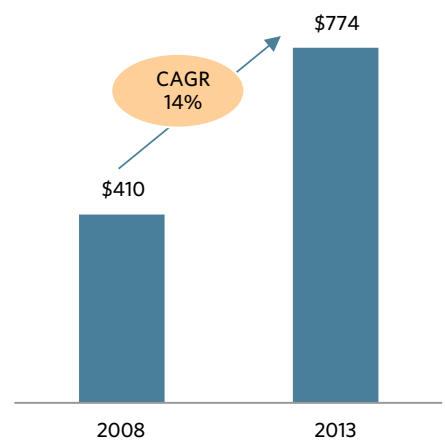
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Myanmar	64%	$499	11%	$201	$0.73	4%
China	15%	$117	13%	$53	$1.34	7%
Australia	6%	$46	37%	$37	$1.08	7%
Tanzania	3%	$23	32%	$18	$0.84	5%
Kenya	2%	$19	88%	$18	$0.86	11%
Ethiopia	2%	$12	32%	$9	$0.70	-3%
Uzbekistan	1%	$11	83%	$10	$0.93	8%
Mozambique	1%	$8	114%	$8	$0.88	11%
Thailand	1%	$7	-9%	-$5	$0.87	4%
Argentina	1%	$7	127%	$7	$0.96	8%
OTHER	3%	$25	11%	$10	$0.72	11%
TOTAL	100%	$774	14%	$364	$0.81	5%

DRY BEANS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Myanmar	2,700,000	1.37	3,700,000	3%
India	9,100,000	0.40	3,630,000	4%
Brazil	2,813,506	1.03	2,892,599	-4%
Mexico	1,754,843	0.74	1,294,634	3%
Tanzania	1,151,376	0.97	1,113,541	14%
USA	530,665	2.09	1,110,668	-1%
China	925,000	1.11	1,027,800	-10%
Kenya	1,030,435	0.51	529,265	15%
Uganda	1,100,000	0.42	461,000	1%
Rwanda	480,012	0.91	438,236	7%
Cameroon	262,006	1.34	351,647	5%
Other	7,205,114		6,256,749	
World	29,052,957	0.78	22,806,139	2%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

BEANS, DRIED SHELLED [HS071331]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	●
COMPETITORS	
Wide spread of sellers	○
Can we compete?	●
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	●
Leverage WA & country reputation	◑
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Myanmar is the top producer with yields only beaten by USA out of the top producers
- China is a very close 2nd but with poor yields
- Myanmar is the largest supplier (64%), China is #2 (15%)
- Australia is #3 (6%) and is showing strong growth of 37% (export value 5y CAGR)
- India is the largest export market (61%) followed by Indonesia and Japan (both 11%)
- Strong demand in 2014 from China due to drought affecting domestic production
- Prices are high and stable

WA/AU

- New varieties are increasing demand for Australian mung beans
- 95% of mung beans produced in Australia are exported
- Processing beans fetched $1,100-$1,300/t (2014); Traders offering over $1,000/t delivered (2015)
- Production is concentrated in NSW and QLD
- New varieties show great promise – disease resistant, high quality & short season fit
- Significant research in NT –

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Australian mung beans meet a particular premium market that other exporters cannot currently match
- Extensive experience in mung bean farming on the east coast
- Australian research and development of commercial cultivars to target premium markets
- WA has long history of farming; systems and skills to ensure high quality production

OPPORTUNITIES FOR VALUE-ADDED

- Australia's "clean, green" reputation allows for premium pricing – all export mung beans must be processed at registered processing establishment
- Innovative starch products
- Easily digested - target elderly consumer
- Manufacture premium store brands for key international retailers in Asia
- Innovative packaging to ensure freshness

CHALLENGES/LIMITATIONS

- The key issue appears to be getting to scale
- Economics of current production volumes using current systems are "currently marginal"
- May need right genetics and new systems
- Lack of experience in cultivating mung beans in WA
- Herbicide choices in the winter product can restrict area available for mung beans
- In Northern Territories, insect damage a big problem for human consumption market

POTENTIAL ROLE FOR GOVERNMENT

- Support for R&D around improved cultivars for WA conditions
- Support for extension of east coast farming expertise to WA farmers
- Mechanism to improve compliance with food safety regulations to meet export regulations

Source: UN Comtrade; various other published sources; Coriolis analysis

LENTILS, DRIED SHELLED [HS071340

PRODUCT PROFILE	
Common name(s)	Lentil, daal, pulse
Scientific name	Lens culinaris
Type of plant	Bushy annual legume
Cultivation cycle	Harvest 110 days after sowing
Origin	Middle East
Part eaten	Seed
Forms/usage	- Cooked, dried, canned - Whole or split, skin on or skinned - Soups, stews, curries, salads - Meat substitute
Drivers of consumer/market success	- Third highest level of protein for legume or nut - High levels of resistant and slowly digested starch - Good source of vitamins and minerals - One of the best vegetable sources of iron, rich in copper and selenium
Why does it suit the North of WA?	- It is native to the Middle East and grows all across the climatic peer group regions (e.g. Ethiopia 129,833t); also came out of US Southwest irrigation data - Tolerant to drought - Grow best in soil pH of 6.0 to 8.0 - Sensitive to saline, boron and sodic soils - Minimum of 350 mm, maximum of 550 mm rainfall
Open questions/ challenges?	- Able to find suitable non-saline soils?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; photo credit (V. Selvas; Public Domain); Coriolis analysis

LENTILS, DRIED SHELLED [HS071340]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$754m
5y CAGR (US$; 08-13)	19%
5y ABS (US$m; 08-13)	+$436m
Average $/kg or l (US$; 2013)	$0.44
Top 10 highest imp/cap (US$; 13)	$5.09
Top 10 lowest imp/cap (US$; 13)	$0.23
Top 3 importers share	82%
Top 10 importers share	98%
# top 10 importers w/ +10% CAGR	3
Top 3 exporters share	86%
Top 10 exporters share	99%
Australia export share	15%
Possible size of the prize	
$20-40m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
India	58%	$436	71%	$406	$0.64	-5%	$0.37
Sri Lanka	14%	$104	-1%	-$4	$0.91	-3%	$5.09
Egypt	11%	$80	1%	$5	$0.11	-39%	$1.02
Pakistan	5%	$39	2%	$4	$0.67	0%	$0.23
Saudi Arabia	5%	$36	43%	$30	$0.82	4%	$1.39
Lebanon	1%	$10	-9%	-$6	$0.83	-5%	$2.32
Jordan	1%	$9	-5%	-$2	$0.80	-9%	$1.37
Kuwait	1%	$8	-9%	-$5	$0.79	-11%	$2.68
Qatar	1%	$7	4%	$1	$0.73	-2%	$4.38
Oman	1%	$7	13%	$3	$0.86	-5%	$2.46
Other	2%	$18	5%	$4	$0.93	-1%	
TOTAL	100%	$754	19%	$436	$0.44	-15%	

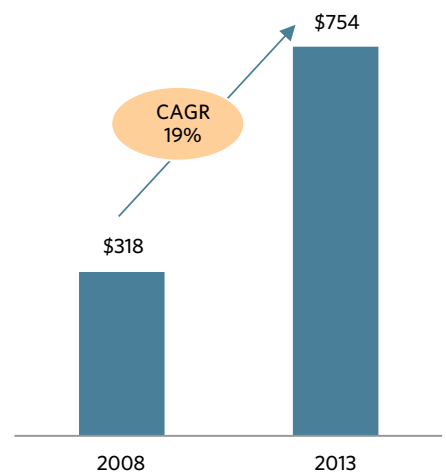
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Canada	65%	$490	29%	$355	$0.41	-16%
Australia	15%	$110	12%	$47	$0.47	-14%
USA	7%	$51	36%	$40	$0.62	-6%
UAE	5%	$34	43%	$29	$0.84	-5%
Turkey	4%	$31	-2%	-$4	$0.23	-28%
Syria	3%	$19	8%	$6	$0.96	2%
Sri Lanka	1%	$6	47%	$5	$0.74	-15%
Myanmar	0%	$2	-12%	-$2	$1.02	11%
India	0%	$2	-24%	-$6	$0.70	-13%
Italy	0%	$1	-15%	-$2	$0.90	-2%
OTHER	1%	$7	-28%	-$31	$0.83	-3%
TOTAL	100%	$754	19%	$436	$0.44	-15%

LENTILS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Canada	1,043,200	1.80	1,880,500	15%
India	810,000	1.40	1,134,000	-10%
Turkey	131,188	3.18	417,000	8%
Australia	64,234	5.05	324,100	17%
USA	108,545	2.10	227,658	10%
Nepal	161,147	1.41	226,931	2%
China	150,000	1.00	150,000	17%
Ethiopia	94,103	1.38	129,833	4%
Syria	34,100	3.79	129,370	2%
Bangladesh	71,535	1.30	93,000	1%
Iran	56,099	1.30	73,000	-9%
Other	100,537		190,229	
World	2,824,688	1.76	4,975,621	3%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

LENTILS, DRIED SHELLED [HS071340]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	○
Can we compete?	●
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	●
Leverage WA & country reputation	●
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Canada and India dominate production globally
- Indian produces a quarter of the lentils globally; majority consumed domestically
- Widespread downgrading of Canadian production in 2014 key driver of high price at last harvest
- Australia is the 4th largest producer and the 2nd largest exporter to the target markets (15%), behind Canada (65%)
- Combined Southern Asia are the key market: India (58%), Sri Lanka (14%), and Pakistan (5%)
- Egypt (11%), Saudi Arabia (5%) and a range of other Middle East markets also important

WA/AU

- Grown mainly in VIC and SA's grain areas, around 150,000 ha
- The total pulse production in WA is 1% of the broadacre sector, lentils small part of that (~320,000t in 2014)
- Sustained high prices have lead to increased plantings in Australia
- GRDC research into lentil production

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Australia produces significantly higher yields than other top producers
- Significant investment by GRDC in lentil breeding programs
- WA has long history of farming; systems and skills to ensure high quality production
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems

OPPORTUNITIES FOR VALUE-ADDED

- Specialised bio fortified varieties that can command premium price
- Premium meat alternative products for the Asian market
- Targeting key characteristics demanded by the target markets (e.g. cooking, splitting characteristics)
- Manufacture premium store brands for key international retailers in Asia

CHALLENGES/LIMITATIONS

- The key issue appears to be getting to scale
- Economics of current production volumes using current systems are "currently marginal"
- May need right genetics and new systems
- Very small sector competing for area with wheat, canola and barley
- Managing Etiella behrii (moths)
- Does not like saline soils
- Other areas of WA are better suited

POTENTIAL ROLE FOR GOVERNMENT

- Support R&D into cultivars and bio fortification of lentils via GRDC

Source: UN Comtrade; various other published sources; Coriolis analysis

GROUND-NUTS IN SHELL, NOT ROASTED OR OTHERWISE [HS120210]

PRODUCT PROFILE	
Common name(s)	Peanut, groundnut
Scientific name	Arachis hypogaea
Type of plant	Annual herbaceous legume
Cultivation cycle	Pods ripen 120-150 days after planting,
Origin	South America
Part eaten	Seed
Forms/usage	- Eaten raw, roasted, fried or boiled - Oil, butter, flour - Ingredient in confectionary, baked goods, sauces, salads, stews - Made into textile materials, cosmetics, plastics, dyes, paints
Drivers of consumer/market success	- Wide range of uses across many cuisines - Used to aid in famine relief - High in protein, vitamins and minerals - Source of the phenolic antioxidant resveratrol
Why does it suit the North of WA?	- The global data shows that they grow huge quantities of groundnuts all across the relevant regions of Africa; just a few: Senegal 709,691t, Chad 414,000t, Burkina Faso 349,688t, Mali 220,000t - Also came strongly out of US Southwest irrigation data (53,633ha); to put this numbers in perspective, WA has ~30,900ha in horticulture; the US Southwest has more area in irrigated peanuts than WA has in all horticulture - Require 5 months of warm weather - 500-1000 mm of water - Grow best in light, sandy loam soil, acidic soils of pH 5.9-7 - Mechanical harvesting - Nitrogen fixing legume - able to use in rotation
Open questions/ challenges?	- Allergy considerations in any shared processing plant - Historically trialled in the Ord; not clearly a success

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

GROUND-NUTS IN SHELL, NOT ROASTED OR OTHERWISE [HS120210]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$171m
5y CAGR (US$; 08-13)	28%
5y ABS (US$m; 08-13)	+$121m
Average $/kg or l (US$; 2013)	$1.02
Top 10 highest imp/cap (US$; 13)	$0.54
Top 10 lowest imp/cap (US$; 13)	$0.004
Top 3 importers share	86%
Top 10 importers share	98%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	86%
Top 10 exporters share	98%
Australia export share	0.1%
Possible size of the prize	
$5-10m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Indonesia	74%	$126	36%	$99	$1.20	23%	$0.54
Malaysia	8%	$14	9%	$5	$1.39	1%	$0.49
Philippines	4%	$6	14%	$3	$0.26	7%	$0.07
China	3%	$5	124%	$5	$0.51	0%	$0.00
Thailand	3%	$4	4%	$1	$0.78	8%	$0.07
Saudi Arabia	2%	$4	N/C	$4	$1.27	N/C	$0.15
Jordan	2%	$3	26%	$2	$1.35	8%	$0.48
Vietnam	1%	$2	18%	$1	$1.90	13%	$0.02
Lebanon	1%	$2	7%	$0	$1.87	5%	$0.36
Singapore	1%	$1	29%	$1	$1.36	0%	$0.24
Other	2%	$3	4%	$1	$1.05	6%	
TOTAL	100%	$171	28%	$121	$1.02	16%	

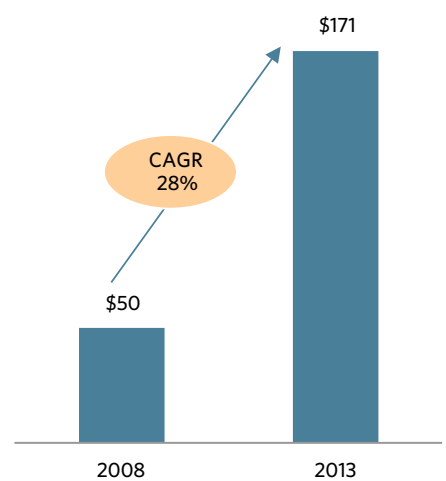
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
India	71%	$120	34%	$93	$1.03	23%
China	13%	$22	30%	$16	$1.09	9%
Senegal	3%	$5	N/C	$5	$0.51	N/C
Mozambique	2%	$4	71%	$4	$0.96	21%
Indonesia	2%	$4	-13%	-$4	$2.00	9%
Vietnam	2%	$3	-1%	-$0	$2.01	9%
Sudan	1%	$2	N/C	$2	$1.18	N/C
USA	1%	$2	213%	$2	$1.36	23%
Cambodia	1%	$2	N/C	$2	$1.92	N/C
Laos	1%	$2	26%	$1	$0.45	15%
OTHER	2%	$4	-17%	-$7	$1.19	15%
TOTAL	100%	$171	25%	$115	$1.02	16%

GROUND-NUTS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
China	4,632,990	3.66	16,972,155	4%
India	5,250,000	1.80	9,472,000	6%
Nigeria	2,360,000	1.27	3,000,000	1%
USA	421,000	4.50	1,893,000	-4%
Sudan (former)	2,161,740	0.82	1,767,000	20%
Myanmar	890,000	1.54	1,375,000	3%
Indonesia	518,982	2.58	1,340,000	0%
Argentina	404,022	2.54	1,025,857	10%
Tanzania	740,000	1.06	785,000	18%
Senegal	769,803	0.92	709,691	-1%
Cameroon	463,209	1.37	635,947	6%
Other	6,806,070		6,678,639	
World	25,417,816	1.80	45,654,289	3%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

GROUND-NUTS IN SHELL, NOT ROASTED OR OTHERWISE [HS120210]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	○
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	○
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET

- USA is predicting 20% increase in area planted due to Farm Bill subsidies.
- USA domestic supply surplus will likely deflate prices and increase the amount they export
- Indonesia dominates imports, taking almost three quarters (74%) and showing strong growth (5y CAGR 36%)
- Range of other primarily Asian markets in the second tier
- China is the major producer, with India #2 with yields half the size
- India is largest supplier (71%) to the target markets, China #2 with 13%
- Wide range of smaller suppliers beyond these two

WA/AU

- QLD growers produce majority of Australian production, some in NT and Northern NSW
- Deregulation of peanut marketing in QLD occurred in 1992, with the Peanut Marketing Board now the Peanut Company of Australia (PCA)
- PCA is largest organisation shelling and marketing peanuts in Australia
- Peanut trials in SA and WA in past
- Previous ventures in the North of WA mixed success; peanuts were a significant product; there was a peanut mill
- Much work done in NT and Qld; product is very suited to NW WA sandy soils

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Positioning AU as a safe and reliable supplier of peanuts free from aflatoxins
- Hi Oleic variety developed by PCA that commands premium price
- Australian production counter seasonal to top producers
- Low incidence of pests and diseases
- Existing expertise of east coast producers able to be leveraged
- Targeting large scale US agribusiness operators for investment in Stage 4+ of project (e.g. Hampton Farms)

OPPORTUNITIES FOR VALUE-ADDED

- Premium Hi Oleic peanuts marketed for health benefits
- Premium peanut butter and snack foods emphasising health benefits
- Manufacture premium store brands for key international retailers in Asia
- Develop and market premium range of gifting products for Asian market
- Innovative packaging to ensure freshness
- Develop product that use unique WA/AU flavours (e.g. bush tomato seasoning)

CHALLENGES/LIMITATIONS

- The key issue appears to be getting to scale
- Economics of current production volumes using current systems are "currently marginal"; needs a good rotational product
- May need right genetics and new systems
- Different variety to that currently grown required to supply Indonesian market
- Lack of genetics for Spanish type variety demanded by Indonesia

POTENTIAL ROLE FOR GOVERNMENT

- Support development and switch to varieties suitable for export to target markets

Source: UN Comtrade; various other published sources; Coriolis analysis

LUCERNE HAY [HS121490]

PRODUCT PROFILE	
Common name(s)	Lucerne, alfalfa
Scientific name	Medicago sativa
Type of plant	Perennial flowering legume
Cultivation cycle	Cut 3 to 4 times a year (up to 12 times in Arizona and southern California)
Origin	South Central Asia
Part eaten	Leaf, seeds
Forms/usage	- Hay, silage, pasture - Seed product (majority exported $30m (2008)) - Sprouts for human consumption
Drivers of consumer/market success	- One of the highest feeding values for all hay products (70% digestibility) - Highest yielding forage plant - Excellent protein (20%), energy, minerals and vitamins - Promotes greater growth rates, milk production and reproductive response than comparable feeds - Able to be sown alone, mixed pastures or with products - Annual yields of good quality lucerne hay greater than 20 tonnes/ha possible
Why does it suit the North of WA?	- US Southwest region strongly shows that large amounts of irrigation area there go to grow animal feeds, particularly "Hay (alfalfa, small grain, other, wild), Haylage, grass silage, greenchop"; most of this is going into intensive dairy (4,000+ cow/farms) and feedlots - Resilient to drought - Well adapted to dryland and irrigation farming systems - Range of soil types, best in well drained with neutral pH
Open questions/ challenges?	- Good cross pollination is critical to ensure maximum yields; bees are most common pollinator; are bees available in the region? - Can irrigated hay exports compete with rain-fed regions?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

LUCERNE HAY [HS121490]

Actual category is "hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches, swedes, mangolds, fodder roots, and similar forage products, whether or not in the form of pellets/Other"; this is predominantly compressed hay

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$1,727m
5y CAGR (US$; 08-13)	10%
5y ABS (US$m; 08-13)	+$668m
Average $/kg or l (US$; 2013)	$0.40
Top 10 highest imp/cap (US$; 13)	$7.61
Top 10 lowest imp/cap (US$; 13)	$0.03
Top 3 importers share	93%
Top 10 importers share	~100%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	93%
Top 10 exporters share	99%
Australia export share	13%
Possible size of the prize	$20-30m

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Japan	54%	$928	3%	$145	$0.42	4%	$7.28
South Korea	22%	$379	8%	$124	$0.36	4%	$7.61
China	17%	$296	121%	$291	$0.37	5%	$0.22
Saudi Arabia	5%	$95	93%	$91	$0.41	-35%	$3.62
Viet Nam	0%	$7	64%	$7	$0.41	5%	$0.09
Kuwait	0%	$6	23%	$4	$0.49	9%	$2.04
Jordan	0%	$5	5%	$1	$0.39	11%	$0.75
Philippines	0%	$3	6%	$1	$0.51	4%	$0.03
Lebanon	0%	$2	59%	$1	$0.39	0%	$0.377
Singapore	0%	$1	70%	$1	$0.52	-11%	$0.21
Other	0%	$6	10%	$2	$0.45	-2%	
TOTAL	100%	$1,727	10%	$668	$0.40	4%	

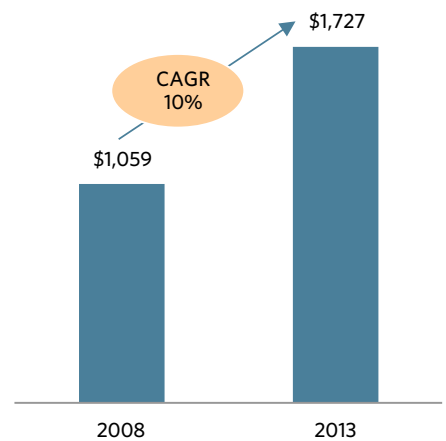
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
USA	75%	$1,305	10%	$512	$0.39	4%
Australia	13%	$232	8%	$76	$0.41	4%
Canada	5%	$79	-2%	-$10	$0.44	4%
Argentina	4%	$63	N/C	$63	$0.47	N/C
Italy	1%	$20	732%	$20	$0.29	-30%
Spain	1%	$10	35%	$8	$0.40	-1%
Sudan	0%	$5	N/C	$5	$0.30	N/C
Mexico	0%	$3	-7%	-$1	$0.36	4%
New Zealand	0%	$2	15%	$1	$0.90	1%
Viet Nam	0%	$2	65%	$2	$0.16	-2%
Other	1%	$6	-15%	-$8	$0.44	6%
TOTAL	100%	$1,727	10%	$660	$0.33	$0.40

HAY- GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
NO AVAILABLE DATA				

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

LUCERNE HAY [HS121490]

Actual category is "hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches, swedes, mangolds, fodder roots, and similar forage products, whether or not in the form of pellets/Other"; this is predominantly compressed hay

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	●
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	○
Can we compete?	●
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	○
Leverage WA & country reputation	○
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- USA dominates the export trade of lucerne both globally and into the target markets
- USA targeting the expanding dairy industry in China
- Australia is the number two exporter into the target markets

WA/AU

- Australia produced 1.05 mil tonnes of lucerne hay in 2012-2013, from ~223,000 ha
- NSW (49%) and VIC(22%) dominate production
- WA has less than 1 % of Australia's lucerne hay production
- Australia exported 101,303 tonnes of lucerne including hay, chaff, meal and pellets in 2012-2013 (10%)
- Average of 13% of domestic production exported over last 5 years
- Over last 5 years, 76% of exports have been meal and pellets

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Wide range of varieties that are suited to range of climates
- Increase in animal protein production in Asia is driving demand for exports of animal feed
- China aims to significantly increase milk supply, all via intensive dairy operations, requiring stockfeed

OPPORTUNITIES FOR VALUE-ADDED

- Improved nutrient profile of pellet and meal products
- High yield and improved nutrient profile varieties developed
- Seed production (more sensitive to climate conditions)
- Providing full ration bales with mix of feedstuffs for complete feed
- Organic/non-GM feed

CHALLENGES/LIMITATIONS

- High bulk/low value; production targeting export would need to be near roads/port
- Weather damage reduces quality
- Only produced in dry season
- Drying and raking crucial step to achieve good quality hay
- Auto toxicity means lucerne fields should be rotated before reseeding
- Fresh lucerne can cause bloating in livestock
- Prices are seasonal
- Logistics barrier makes exporting difficult; difficult phyto-sanitary requirements

POTENTIAL ROLE FOR GOVERNMENT

- Support research into best variety for each climatic region

Source: UN Comtrade; various other published sources; Coriolis analysis

A number of intensive horticulture products emerged from the second screen and are profiled across qualitative/quantitative measures

PRELIMINARY REGIONAL DISTRIBUTION OF IDENTIFIED PRODUCTS IN HIGH MARKET DEMAND

Model; 2015

Regional strength	KIMBERLEY	KIMBERLEY	KIMBERLEY
	PILBARA		
		CANARVON	
Product type	FIELD products	INTENSIVE HORTICULTURE	PERENNIAL TREE/VINE products
Products showing very strong demand growth in target markets and profiled in this stage	Crude sunflower-seed and safflower oil Raw cane sugar, in solid form Manioc, fresh or dried Grain sorghum Manioc (cassava) starch Sesamum seeds Soya beans Tobacco, partly or wholly stemmed/stripped Cotton, not carded or combed Oil-cake/solid residues, of soya-bean Dried beans, shelled Dried lentils, shelled Ground-nuts in shell, not roasted Sunflower seeds Crude ground-nut oil	Essential oils of mints (incl. concretes) Leeks and other alliaceous vegetables, nes	Pistachio, fresh or dried Almonds in shell, fresh or dried Almonds without shells, fresh or dried Fresh grapes Cherries, fresh Dried pepper (excl. crushed or ground) Walnuts in shell, fresh or dried Walnuts without shells, fresh or dried Cashew nuts, in shell dried Apples, fresh Coffee, not roasted or decaffeinated Oil-cake/other solid residues of palm nuts Virgin olive oil and fractions Palm kernel or babassu oil (excl. crude) Castor oil and its fractions

Target markets are more self sufficient in intensive horticulture; therefore they have a much lower demand for imported products (relative to tree or field products).

ESSENTIAL OILS OF MINTS [HS330125]

PRODUCT PROFILE	
Common name(s)	Mint, spearmint, Japanese mint, (excluding peppermint (piperita)
Scientific name	Mentha spp.: arvensis (menthol, Japanese), Spicata (spearmint)
Type of plant	Aromatic herb
Cultivation cycle	Perennial, all year round, propagates by its stolons, harvest in 90 days
Origin	China
Part eaten	Oil extracted from leaf
Forms/usage	- Flavouring in breath freshener, mouth wash, toothpaste, gum, beverages, desserts, confectionary - Cosmetic, medicinal, aromatherapy and insecticide use
Drivers of consumer/market success	- Ingredient in wide range of consumer products - Significant value add and shelf life extension compared to fresh product - Used extensively in alternative health practices - Menthol mint/ Japanese mint contains 60-85% menthol and 12% menthone
Why does it suit the North of WA?	- There is 5,336ha of "mint for oil" in production under irrigation in the US Southwest, primarily in California and Nevada - Thrives in moist conditions in partial shade but also can grow in full sun and tolerate wide range of conditions - Japanese mint favours tropical and subtropical areas 20-40°C - Long days and cooler nights produce desirable oil composition - Mechanical harvesting
Open questions/ challenges?	- Is there appetite to invest in oil processing facility in North of WA? - Are highly mechanised production systems utilised in the USA?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; photo credit (Public Domain); Coriolis analysis

ESSENTIAL OILS OF MINTS [HS330125]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$210m
5y CAGR (US$; 08-13)	38%
5y ABS (US$m; 08-13)	+$168m
Average $/kg or l (US$; 2013)	$21.94
Top 10 highest imp/cap (US$; 13)	$8.64
Top 10 lowest imp/cap (US$; 13)	$0.001
Top 3 importers share	90%
Top 10 importers share	98%
# top 10 importers w/ +10% CAGR	8
Top 3 exporters share	92%
Top 10 exporters share	99%
Australia export share	0.2%
Possible size of the prize	
$5-15m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	60%	$126	49%	$109	$18.77	9%	$0.09
Singapore	20%	$43	92%	$41	$35.75	12%	$8.64
Japan	10%	$20	8%	$7	$25.15	9%	$0.16
Hong Kong SAR	3%	$5	27%	$4	$26.45	-3%	$0.76
Thailand	2%	$4	14%	$2	$28.43	1%	$0.06
Indonesia	2%	$3	16%	$2	$15.41	17%	$0.01
Egypt	1%	$2	27%	$1	$49.34	43%	$0.03
Vietnam	1%	$1	12%	$1	$35.76	12%	$0.02
India	1%	$1	-1%	-$0	$59.52	15%	$0.001
Malaysia	1%	$1	13%	$1	$15.28	10%	$0.04
Other	2%	$3	15%	$2	$19.84	9%	
TOTAL	100%	$210	38%	$168	$21.94	9%	

GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

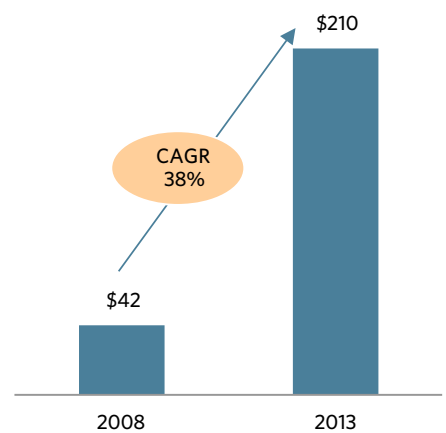
Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
India	72%	$151	46%	$128	$21.80	11%
Singapore	13%	$28	55%	$25	$18.03	10%
USA	7%	$14	14%	$6	$38.98	6%
China	5%	$11	33%	$9	$21.73	9%
Germany	1%	$1	10%	$0	$24.44	20%
Japan	0%	$1	-11%	-$1	$38.28	11%
France	0%	$1	-7%	-$0	$42.77	21%
Indonesia	0%	$1	45%	$1	$24.69	4%
United Kingdom	0%	$1	-2%	-$0	$23.15	0%
Australia	0%	$0	33%	$0	$36.78	21%
OTHER	1%	$1	-3%	-$0	$20.36	21%
TOTAL	100%	$210	38%	$168	$21.94	9%

MINT FOR OIL - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR

NOT AVAILABLE

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

ESSENTIAL OILS OF MINTS [HS330125]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	◑
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	○
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	○
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	○
Required skills for success	◑
Leverage WA & country reputation	●
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Cultivation originated in Brazil and China, but now India taken the leading position in cultivation of the essential oil yielding plant (Japanese mint)
- India has 66,000ha of mint (predominantly Japanese mint) producing 13,000 tonnes of oil (2005)
- India dominates the production of mint and is the major exporter of essential oil of mints (72%); dictating the world price and showing strong growth
- China is single largest market with 60% of target markets
- Singapore is major importer and exporter; suggests it is wholesaling/brokering; note mark-up imports vs. exports
- Appears to be two price bands: rich countries (USA, Japan, France) and developing (India, China, Indonesia); Germany the outlier
- Number two of all essential oils produced globally (following sweet orange)
- Approximately 20,000t of oil produced globally
- Rising cost of production in India

WA/AU

- Essential Oil Producers Association of Australia has roots back to 1788; oil was extracted from the peppermint gum
- Peppermint oil is the most common mint oil in Australia; production is ~10-30t/yr; large supplier with 1,000 acres north of Melbourne
- Mentha Arvensis grows in tropical and sub tropical climates
- "Has been trialled"

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Long history of extracting oil in Australia (eucalyptus, tea tree)
- Leverage sandalwood oil knowledge
- Oil and menthol rates increase at higher temperatures
- Safe and trustworthy production location versus India

OPPORTUNITIES FOR VALUE-ADDED

- Ingredient in many products
- Opportunity to produce medical based products
- Creates platform to expand into HBC/cosmetics/ confectionery

CHALLENGES/LIMITATIONS

- The key issue appears to be getting to scale for oil extraction plant
- Economics of current production volumes using current systems are "currently marginal"
- May need right genetics and new systems
- Would require significant investment in oil extraction/distillation (easy process)
- Premium products will be required to compete with initial cost structures
- Demand for mint and price increases stimulated the production of synthetic menthol

POTENTIAL ROLE FOR GOVERNMENT

- Additional research required into genotypes best suited for WA conditions
- Research into high yielding varieties, farm management (18 spp. of Mentha, only 4 cultivated commercially)

Source: UN Comtrade; various other published sources; Coriolis analysis

LEEKS AND OTHER ALLIACEOUS VEGETABLES, NES [HS070390]

PRODUCT PROFILE	
Common name(s)	Leek
Scientific name	Allium ampeloprasum
Type of plant	Biennial vegetable, grown as annual
Cultivation cycle	150-180 days, summer and overwintering cultivars
Origin	Mediterranean area
Part eaten	Bundle of leaf sheaths
Forms/usage	- Raw, boiled, sautéed, fried - Stocks , soups, stews, quiches
Drivers of consumer/market success	- Source of vitamins and minerals - Common flavouring for stocks - Used across many cuisines
Why does it suit the North of WA?	- Product came into screen as a wide range of identified climatic peers produce it (e.g. Niger); also came strongly out of US Southwest irrigation data - Easy to grow - Require 8 hours of bright sunlight daily, temperatures between 15 to 25 °C - Grow in range of soils - Tolerate of extended harvest - Few pest or disease issues
Open questions/ challenges?	- Can premium quality leeks be grown in hotter temperatures?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

LEEKS AND OTHER ALLIACEOUS VEGETABLES, NES [HS070390]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$159m
5y CAGR (US$; 08-13)	24%
5y ABS (US$m; 08-13)	+$106
Average $/kg or l (US$; 2013)	$1.50
Top 10 highest imp/cap (US$; 13)	$36.88
Top 10 lowest imp/cap (US$; 13)	$0.01
Top 3 importers share	90%
Top 10 importers share	~100%
# top 10 importers w/ +10% CAGR	5
Top 3 exporters share	74%
Top 10 exporters share	92%
Australia export share	0.015%
Possible size of the prize	
$3-5m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Japan	47%	$75	13%	$34	$1.29	3%	$0.59
Qatar	39%	$63	213%	$62	$2.42	24%	$36.88
Singapore	4%	$6	7%	$2	$1.63	12%	$1.21
South Korea	3%	$5	27%	$4	$0.61	-4%	$0.10
Malaysia	3%	$5	3%	$1	$1.41	7%	$0.18
Hong Kong SAR	2%	$4	56%	$3	$0.68	-13%	$0.52
Kuwait	0%	$0	30%	$0	$6.57	11%	$0.11
Thailand	0%	$0	2%	$0	$0.67	9%	$0.00
Saudi Arabia	0%	$0	N/C	$0	$4.17	N/C	$0.01
Bahrain	0%	$0	3%	$0	$3.86	8%	$0.15
Other	0%	$0	-23%	-$0	$0.74	10%	
TOTAL	100%	$159	24%	$106	$1.50	8%	

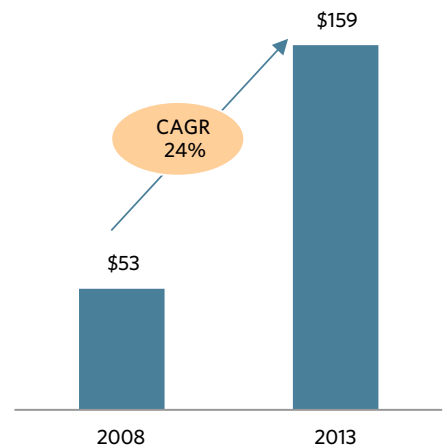
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
China	56%	$90	14%	$42	$1.16	3%
India	12%	$19	180%	$18	$1.47	27%
Netherlands	6%	$9	62%	$8	$6.30	3%
Lebanon	4%	$7	N/C	$7	$4.35	N/C
USA	3%	$5	111%	$5	$5.95	1%
Thailand	3%	$5	49%	$4	$3.46	31%
Egypt	2%	$4	N/C	$4	$1.65	N/C
Bangladesh	2%	$3	N/C	$3	$1.68	N/C
Sri Lanka	2%	$3	385%	$3	$1.63	-14%
Pakistan	2%	$3	654%	$3	$1.69	7%
OTHER	8%	$12	25%	$8	$3.56	19%
TOTAL	100%	$159	24%	$106	$1.50	8%

LEEKS, ETC. - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Indonesia	52,268	9.75	509,382	-1%
Turkey	9,527	25.23	240,391	-1%
Belgium	4,700	38.53	181,100	2%
France	5,187	31.07	161,137	-1%
South Korea	3,076	46.17	142,032	4%
China	4,500	24.89	112,000	3%
Germany	2,631	42.27	111,209	-1%
Netherlands	2,800	37.86	106,000	2%
Poland	4,807	20.49	98,479	-2%
Spain	2,900	31.34	90,900	3%
Kazakhstan	2,200	27.27	60,000	1%
Other	31,203		308,958	
World	125,799	16.86	2,121,588	0%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

LEEKS AND OTHER ALLIACEOUS VEGETABLES, NES [HS070390]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	○
Mechanically harvested	●
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	○
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	○
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	◑
Required skills for success	◑
Leverage WA & country reputation	◑
OVERALL	○

CURRENT SITUATION

MARKET/COMPETITORS

- Two largest markets are Japan (47%) and Qatar (39%)
- Qatar showing very strong growth (5yr CAGR of 213%)
- Appears to be two tiers of exporters: large, low cost producers (China, India) and range of smaller, premium suppliers (Netherlands, USA)
- Indonesia is the top producer, supplying their large domestic market
- Australia's top four destinations by value are Singapore, Japan, New Caledonia and Indonesia.

WA/AU

Australia had an estimated 673 ha of leeks, producing 7460 tonnes in 2013-2014

WA had an estimated 13 ha of leeks, producing 91 tonnes in 2013-2014

Grown in Perth, Manjimup, Myalup, Kununurra and Carnarvon

Main WA supplier is Ellement family with 25 acres under production at Hammond Park, supplying supermarkets and Sumich Group for export

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Existing expertise in growing for supermarkets and export in WA industry
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems
- WA has good reputation as a high quality supplier of fresh vegetables

OPPORTUNITIES FOR VALUE-ADDED

- Trimmed and packaged to allow for branding
- Inclusion into soup vegetable packs
- Stock or soup base products
- Branding around "clean, green" unique WA growers story

CHALLENGES/LIMITATIONS

- Data clearly shows that Asia doesn't really want anything they can grow themselves
- Difficult to produce good quality in hot climates
- Fresh produce with limited shelf life

POTENTIAL ROLE FOR GOVERNMENT

- Support R&D into cultivars suited to Asian palate
- Support marketing of WA as premium food producer for Asia

Source: UN Comtrade; various other published sources; Coriolis analysis

A range of tree/vine products emerged from the second screen and are profiled across qualitative/ quantitative measures

PRELIMINARY REGIONAL DISTRIBUTION OF IDENTIFIED PRODUCTS IN HIGH MARKET DEMAND

Model; 2015

Regional strength	KIMBERLEY		
	PILBARA		
		CANARVON	
Product type	FIELD PRODUCTS	INTENSIVE HORTICULTURE	PERENNIAL TREE/VINE PRODUCTS
Products showing very strong demand growth in target markets and profiled in this stage	Crude sunflower-seed and safflower oil Raw cane sugar, in solid form Manioc, fresh or dried Grain sorghum Manioc (cassava) starch Sesamum seeds Soya beans Tobacco, partly or wholly stemmed/stripped Cotton, not carded or combed Oil-cake/solid residues, of soya-bean Dried beans, shelled Dried lentils, shelled Ground-nuts in shell, not roasted Sunflower seeds Crude ground-nut oil	Essential oils of mints (incl. concretes) Leeks and other alliaceous vegetables, nes	Pistachio, fresh or dried Almonds in shell, fresh or dried Almonds without shells, fresh or dried Fresh grapes Cherries, fresh Dried pepper (excl. crushed or ground) Walnuts in shell, fresh or dried Walnuts without shells, fresh or dried Cashew nuts, in shell dried Apples, fresh Coffee, not roasted or decaffeinated Oil-cake/other solid residues of palm nuts Virgin olive oil and fractions Palm kernel or babassu oil (excl. crude) Castor oil and its fractions

PISTACHIO, FRESH OR DRIED [HS80250]

PRODUCT PROFILE	
Common name(s)	Pistachio, pistache, terebinth nut
Scientific name	Pistacia vera
Type of plant	Small tree, dioecious (separate male and female)
Cultivation cycle	Biennial-bearing, 7-10 years to reach significant production, peak at 20 years (live for 200 years); requires hot summers and cold winters
Origin	Iran, Central Asia, Middle East
Part eaten	Seed
Forms/usage	- Kernels eaten whole, raw or roasted, sold shelled or unshelled - Ingredient in confectionary, dessert, baked goods, cured meats, flavouring - Shells have potential use in mercury pollution clean-up
Drivers of consumer/market success	- Premium edible nut - Growth in consumer snack food market - FDA approved health claim "may reduce the risk of heart disease" - Rich source of protein, dietary fibre, minerals and vitamins - Used widely across many cuisines
Why does it suit the North of WA?	- Came into screen as a handful of identified climatic peers produce it, particularly Iran 476,600t; small beyond there: Tunisia 1,200t, Pakistan 659t, Afghanistan 1,200t, Jordan 732t; also Syria (no data); also came strongly out of US Southwest irrigation data - Desert plant highly tolerant of saline soil and water - Tolerant of temperatures between -10° and 48 °C - Ripening requires long, hot summer - Mechanically harvested, requires pruning
Open questions/ challenges?	- Bulk container shipments prone to spontaneous combustion - Significant time before commercial production reached - Current varieties in Australia may not suit the North of WA with lack of chill hours, however it grows in Morocco, Ivory Coast & Syria - What volume required for efficient processing?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

PISTACHIO, FRESH OR DRIED [HS80250]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$1,123m
5y CAGR (US$; 08-13)	19%
5y ABS (US$m; 08-13)	+$656m
Average $/kg or l (US$; 2013)	$7.76
Top 10 highest imp/cap (US$; 13)	$115.69
Top 10 lowest imp/cap (US$; 13)	$0.06
Top 3 importers share	83%
Top 10 importers share	97%
# top 10 importers w/ +10% CAGR	4
Top 3 exporters share	93%
Top 10 exporters share	-100%
Australia export share	0.1%
Possible size of the prize	
$20-30m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Hong Kong SAR	72%	$813	28%	$578	$8.07	12%	$115.69
China	7%	$81	1%	$4	$6.14	19%	$0.06
India	4%	$47	-1%	-$2	$6.87	0%	$0.04
Israel	3%	$29	5%	$7	$9.27	7%	$3.87
Lebanon	3%	$31	10%	$12	$9.67	12%	$7.31
Japan	2%	$26	8%	$9	$11.06	9%	$0.20
Jordan	3%	$28	21%	$18	$12.71	9%	$4.48
Egypt	1%	$7	-7%	-$3	$5.27	7%	$0.08
Saudi Arabia	2%	$19	19%	$11	$3.65	12%	$0.73
Singapore	1%	$7	18%	$4	$11.70	9%	$1.49
Other	3%	$34	17%	$18	$5.82	8%	
TOTAL	100%	$1,123	19%	$656	$7.76	13%	

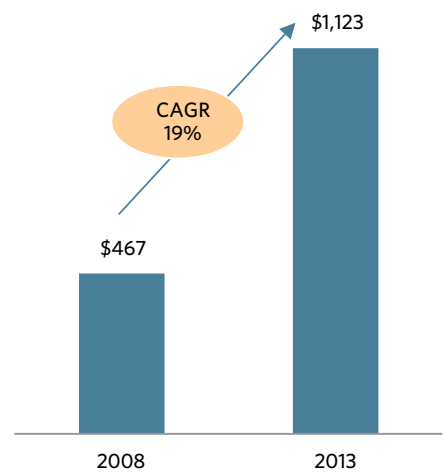
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
USA	63%	$712	40%	$581	$8.16	18%
Iran	27%	$304	4%	$49	$7.16	10%
Syria	3%	$35	25%	$24	$8.40	3%
China	2%	$24	38%	$20	$6.72	9%
Turkey	1%	$15	-7%	-$7	$8.13	5%
United Arab Emirates	1%	$14	49%	$12	$7.14	-2%
Afghanistan	1%	$8	-20%	-$16	$9.16	1%
Italy	0%	$2	-1%	-$0	$34.88	-6%
Jordan	0%	$1	N/A	$1	$6.18	N/A
Taiwan	0%	$1	121%	$1	$6.57	37%
OTHER	0%	$5	-18%	-$8	$6.48	13%
TOTAL	100%	$1,123	19%	$656	$7.76	13%

PISTACHIO - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Iran	246,714	1.94	478,600	1%
USA	82,000	2.40	196,930	9%
Turkey	54,451	1.63	88,600	-6%
China	25,000	2.96	74,000	13%
Syria	40,135	1.36	54,516	1%
Greece	5,600	1.96	11,000	6%
Italy	3,534	0.91	3,202	10%
Afghanistan	1,900	1.11	2,100	-9%
Madagascar	4,750	0.40	1,900	50%
Australia	1,750	1.06	1,850	1%
Tunisia	2,706	0.44	1,200	-14%
Other	27,312		2,075	
World	496,493	1.85	916,921	3%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

PISTACHIO, FRESH OR DRIED [HS80250]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	◑
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	●
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Asia wants nuts; the defined target markets for this project imported $1,123m worth of Pistachios in 2013; it is growing at a CAGR of 19% (!); US exports to region growing at 40%(!) 5y CAGR
- Hong Kong and China combined are ~80% of the target markets
- USA (California) is the #2 producer globally and dominates exports into target markets (63%); it is growing faster than the market and receives a premium
- 80% of US pistachio production sold in split shells as a snack
- Iran is the #1 producer globally and the #2 exporter into target markets
- China is a major producer and consumer of pistachio

WA/AU

- Grown commercially in Australia since 1980's following successful breeding program by CSIRO (Sirora variety); high split rate
- Production occurring in VIC,(#1), SA and WA but not to scale
- Most producers in VIC process (hull, dry, sort) nuts at central location; Nut Producers Australia (NPA); handling majority of production
- Smaller scale fresh pistachios (in hull) into local produce markets; main emphasis on dried pistachios
- Based on plantings, production will peak 2020
- Production yields improved significantly over past 10 years (due to tree age)
- WA production currently in the Wheatbelt (WA Pistachios)

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Improved biosecurity and traceability of products relative to Iran , Syria and China
- Able to produce a clean product; limited if any pesticides, chemicals required
- Existing Australian expertise around large scale production in nut industry

OPPORTUNITIES FOR VALUE-ADDED

- Roasted and salted
- Growing snack food market; split/in-shell most profitable
- Develop high end premium mixed nut snack range for Asia
- Develop a WA based kernel and processing facility (minimum scale required)
- Manufacture premium store brands for key international retailers in Asia
- Develop and market premium range of gifting products for Asia

CHALLENGES/LIMITATIONS

- Chill hour requirements of California/East Coast Australian genetics; current genetics do not suit the North; can more climatically suited genetics (that yield in commercial quantities) be sourced?
- Slow return on investment; 7-10 years to reach significant production
- Fungal issues in higher rainfall areas in NSW (epidemic in 2011); Xanthomonas
- Yields in Australia have been improving at ~5,300kg/ ha (California produce over 6,000kg/ha) but still have to address issues of biennial bearing
- Dependence on one species (Sirora) risky
- High cost of shelling does not cover premium received on kernel
- Increasing production putting downward pressure on price

POTENTIAL ROLE FOR GOVERNMENT

- Further trials in inland Gascoyne, Northern Mid-West and inland Pilbara
- Supporting research around WA suited varieties, causes and mitigation of biennial bearing, causes of shell staining and health properties of pistachios
- Research into the role and drivers of biennial bearing, and potential mitigation strategies
- Facilitate the spread of best practice;, especially to grow yields

Source: UN Comtrade; various other published sources; Coriolis analysis

ALMONDS, FRESH OR DRIED IN-SHELL & SHELLED [HS080211/080212]

PRODUCT PROFILE	
Common name(s)	Almond, badam
Scientific name	Prunus dulcis
Type of plant	Deciduous tree
Cultivation cycle	Autumn maturation of fruit. Commercial production after 3 years, peak reached 5-6 years
Origin	Middle East, South Asia
Part eaten	Seed
Forms/usage	- Can be consumed raw or roasted - Processed into flour, oil, milk or butter - Used in cereals, desserts, confectionary, baked goods, and as gluten free flour alternative - Green almonds can be eaten whole, popular in Middle East - Oil used in cosmetics and woodworking
Drivers of consumer/market success	- Premium nut - Gluten free and lactose free market for flour and milk - Rich source of vitamins and minerals - Used in variety of ways across many cuisines
Why does it suit the North of WA?	- A range of identified climatic peers produce it (e.g. Iran 87,281t, Morocco 96,523t, Algeria 35,000t, Chile 28,560t, Tunisia 52,000t, Israel 8,984t, Jordan 2,143ha, Burkina Faso 1,300t, Iraq 536t, Yemen 165t); also came strongly out of US Southwest irrigation data; these all reach into relevant climate zones - US cultivars have chilling requirements of 300-600 hours below 7.2 °C to break dormancy; optimal temperature growth between 15-30 °C - other varieties exist
Open questions/ challenges?	- Pollination required, though self-pollinating hybrids exist - High yielding US genetics may not suit conditions in the North

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; Cimages creative commons; oriolis analysis

ALMONDS, FRESH OR DRIED IN-SHELL & SHELLED [HS080211/080212]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$1,701m
5y CAGR (US$; 08-13)	22%
5y ABS (US$m; 08-13)	+ $1,059m
Average $/kg or l (US$; 2013)	$2.06
Top 10 highest imp/cap (US$; 13)	$74.50
Top 10 lowest imp/cap (US$; 13)	$0.21
Top 3 importers share	76%
Top 10 importers share	96%
# top 10 importers w/ +10% CAGR	10
Top 3 exporters share	97%
Top 10 exporters share	~100%
Australia export share	8%
Possible size of the prize	
$100-300m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
India	32%	$546	19%	$318	$5.25	5%	$0.46
Hong Kong SAR	31%	$523	30%	$382	$4.92	5%	$74.50
Japan	13%	$225	12%	$99	$7.03	6%	$1.76
South Korea	9%	$161	33%	$122	$7.35	8%	#N/A
Saudi Arabia	3%	$47	N/C	$47	$0.25	N/C	$1.80
China	3%	$43	25%	$29	$3.94	4%	$0.03
Lebanon	2%	$26	10%	$10	$6.37	8%	$6.06
Jordan	1%	$21	27%	$14	$7.16	9%	$3.27
Malaysia	1%	$18	17%	$10	$5.45	10%	$0.64
Egypt	1%	$17	11%	$7	$0.05	-58%	$0.21
Other	4%	$74	7%	$20	$5.56	8%	
TOTAL	100%	$1,701	22%	$1,059	$2.06	-13%	

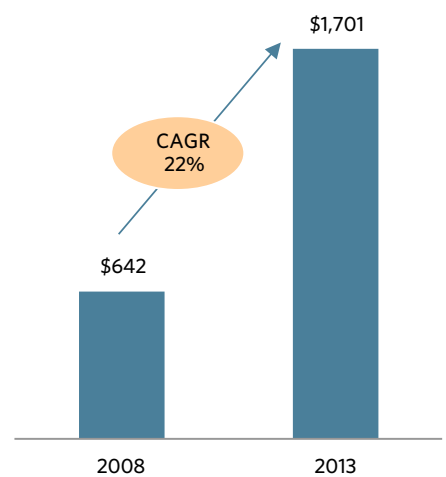
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
USA	89%	$1,507	22%	$952	$2.29	-12%
Australia	8%	$128	33%	$97	$2.17	-11%
Afghanistan	1%	$18	-5%	-$5	$4.84	5%
Iran	1%	$15	6%	$4	$10.40	16%
Spain	0%	$8	9%	$3	$9.22	2%
Syria	0%	$6	6%	$1	$3.54	5%
Canada	0%	$5	64%	$4	$4.53	-3%
China	0%	$5	18%	$3	$3.71	7%
United Arab Emirates	0%	$2	9%	$1	$0.02	-58%
Turkey	0%	$2	49%	$2	$9.37	19%
OTHER	0%	$5	-8%	-$3	$4.15	0%
TOTAL	100%	$1,701	22%	$1,059	$2.06	-13%

ALMONDS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
USA	339,360	5.35	1,814,372	5%
Australia	28,586	5.60	160,000	20%
Spain	534,100	0.28	149,000	-4%
Morocco	153,150	0.63	96,523	2%
Iran	41,261	2.12	87,281	-7%
Syria	51,739	1.61	83,230	0%
Turkey	25,457	3.25	82,850	9%
Italy	55,603	1.31	72,633	-9%
Tunisia	191,120	0.27	52,000	0%
China	14,500	2.97	43,000	6%
Afghanistan	14,114	2.99	42,215	0%
Other	188,255		234,790	
World	1,637,245	1.78	2,917,894	3%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

ALMONDS, FRESH OR DRIED IN-SHELL & SHELLED [HS080211/080212]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	●
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	●
COMPETITORS	
Wide spread of sellers	◑
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	●
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- USA largest producer of almonds with 62% of production; environmental problems in recent years affecting production and impacting price
- Rising costs in USA due to rising cost of pollination (shortage of bees through colony collapse); all almonds pasteurised
- Australia is #2 producer with 5% global production and achieving strong growth and high yields
- Australia is second largest supplier with 8% and showing strong growth (5y CAGR of 33%); market is dominated by the US with 89%
- High demand for almonds (doubled in the last 10 years)
- Wide range of markets
- India is the single largest market with bout a third of target markets; Hong Kong (31%), Japan (13%) and South Korea (9%) together are 53%
- China small; some unmeasured amount of Hong Kong likely transhipped into China

WA/AU

- Australian production in VIC, SA, NSW & WA; 48% of plantings are still maturing
- Australian almonds receiving low $/kilo into Asia
- WA harvested first product in 2013; 4,300 acres on Dandaragan Plateau
- "Select Harvest" made a $65m loss; due to heat and pollination issues

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Positioning Australia as a safe and reliable supplier of almonds free from aflatoxins
- Australian production counter seasonal to USA, Spain and Turkey
- Low incidence of pests and diseases
- Australia large producer of almonds at scale, able to leverage skills and knowledge

OPPORTUNITIES FOR VALUE-ADDED

- Diverse snack range (fresh, salted, flavoured)
- Ingredient in baking, cereals, bars
- Almond: milk, butter, spread, syrup, flour
- Cosmetics: oil
- Manufacture premium store brands for key international retailers in Asia
- Develop and market premium range of gifting products for Asia

CHALLENGES/LIMITATIONS

- Unclear climatic suitability; mixed messages
- Access to bees for pollination (7 hives /hectare required)
- Majority of product from Australia currently exported to India (in the shell); low value
- Suitability of warmer climate almonds to North WA (almonds dislike humidity); may need new genetics from Middle East

POTENTIAL ROLE FOR GOVERNMENT

- Trials in inland Gascoyne, Northern Mid-West and inland Pilbara
- Might make sense to look at Israel and Burkina Faso? What genetics are they using?
- Introducing dry climate adapted varieties through biosecurity
- Support research into self-pollinating varieties to overcome bitterness issue
- Promotion of nutritional value of almonds and nuts

Source: UN Comtrade; various other published sources; Coriolis analysis

FRESH GRAPES [HS080610]

PRODUCT PROFILE	
Common name(s)	Grapes
Scientific name	Vitis vinifera
Type of plant	Deciduous woody vine
Cultivation cycle	Spring to autumn, harvest fruit during summer
Origin	Middle East
Part eaten	Fruiting berry
Forms/usage	- Eaten raw, salads, desserts - Wine, jam, juice, jelly, vinegar - Grape seed extract - Grape seed oil
Drivers of consumer/market success	- Potential health claims through polyphenols content - Largest fruit product in the world - Luxury premium product in Asia
Why does it suit the North of WA?	- Established production in Carnarvon - Temperate climate preferred, warm dry summers and mild winters - Grow in variety of soil types - Tropical temperatures disrupt the normal vine cycle of winter dormancy
Open questions/ challenges?	- Can the need for seasonal manual labour be met in North WA?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$1,654m
5y CAGR (US$; 08-13)	23%
5y ABS (US$m; 08-13)	+$1,060m
Average $/kg or l (US$; 2013)	$2.00
Top 10 highest imp/cap (US$; 13)	$57.53
Top 10 lowest imp/cap (US$; 13)	$0.38
Top 3 importers share	66%
Top 10 importers share	77%
# top 10 importers w/ +10% CAGR	10
Top 3 exporters share	73%
Top 10 exporters share	97%
Australia export share	9%
Possible size of the prize	
$10-20m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	31%	$515	40%	$420	$2.78	9%	$0.38
Hong Kong SAR	24%	$404	17%	$223	$2.42	4%	$57.53
South Korea	11%	$177	20%	$105	$3.01	6%	$3.55
Thailand	7%	$112	20%	$68	$1.34	-4%	$1.76
Indonesia	6%	$101	16%	$53	$2.68	7%	$0.43
Japan	4%	$62	32%	$46	$2.71	3%	$0.48
Singapore	3%	$57	10%	$21	$2.91	2%	$11.47
Saudi Arabia	3%	$55	35%	$42	$1.20	-6%	$2.09
Vietnam	2%	$39	17%	$21	$2.14	2%	$0.46
Malaysia	2%	$36	22%	$23	$1.03	12%	$1.28
Other	6%	$97	10%	$37	$0.63	-11%	
TOTAL	100%	$1,654	23%	$1,060	$2.00	3%	

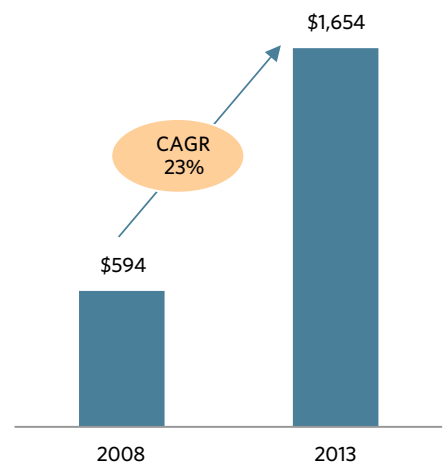
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Chile	35%	$586	26%	$399	$2.38	6%
USA	26%	$425	16%	$226	$2.49	6%
Peru	12%	$192	42%	$159	$2.85	8%
Australia	9%	$149	20%	$88	$2.46	5%
South Africa	6%	$97	22%	$62	$2.08	6%
China	4%	$73	14%	$36	$1.08	-5%
India	2%	$33	52%	$29	$1.62	12%
Mexico	1%	$20	63%	$18	$2.69	6%
Afghanistan	1%	$17	13%	$8	$0.61	-21%
Egypt	1%	$14	76%	$13	$1.76	3%
OTHER	3%	$49	14%	$23	$0.46	-18%
TOTAL	100%	$1,654	23%	$1,060	$2.00	3%

GRAPES (ALL USES) - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
China	730,000	15.82	11,550,024	10%
Italy	702,100	11.41	8,010,364	1%
USA	394,848	19.62	7,744,997	3%
Spain	944,200	7.92	7,480,000	5%
France	760,615	7.26	5,518,371	-2%
Turkey	468,792	8.56	4,011,409	0%
Chile	219,651	15.01	3,297,981	7%
Argentina	233,721	12.33	2,881,346	0%
India	118,000	21.04	2,483,000	7%
Iran	207,537	9.86	2,046,420	-2%
South Africa	125,000	14.80	1,850,000	0%
Other	2,250,723		20,307,210	
World	7,155,187	10.79	77,181,122	3%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

FRESH GRAPES [HS080610]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	○
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	●
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	○
Required skills for success	●
Leverage WA & country reputation	◑
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- China and Hong Kong are more than half (55%) of target markets imports
- Every market growing at a double digit 5y CAGR
- South Korea and Singapore paying the highest premiums
- Northern Hemisphere supply is basically the US with 26% and and a very distant Mexico (1%)
- Southern Hemisphere supply more varied, with Chile leading with a third, followed by Peru (12%), Australia (9%) and South Africa (6%)
- Chile, USA and Peru the top 3 countries exporting to target markets; Australia #4
- Peru achieving highest premiums and amongst the highest growth

WA/AU

- Australia is the #4 exporter to target markets
- WA supplies primarily for the domestic market (WA); supply reaching 5,500 t in 2013, Gross Farm value of $24.5m (12/13)
- Grown commercially first in the Swan Valley and extended to Carnarvon, near Geraldton and the SW

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Leverage WA's premium position in wine
- Counter-seasonal supply
- Close proximity to Asia for chilled air delivery (if space is available at reasonable cost)
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and post harvest handling techniques
- Small scale window opportunity

OPPORTUNITIES FOR VALUE-ADDED

- New cultivars attractive to Asian tastes (sweet and strong flavour) becoming available now
- Invest in research that adds to potential premium (taste, size, firmness etc.)
- Innovative packaging to maximise freshness
- Develop and market premium range of gifting products for Asia
- Branding based around unique WA story
- Processed into beverages

CHALLENGES/LIMITATIONS

- The key issue for export competitiveness is scale and the cost of labour (relative to key competitors)
- The domestic industry is struggling to compete with imports from California; this suggests it needs to focus on improving competitiveness before it looks to export at any large scale
- Fresh grapes are perishable; however best practice postharvest handling ensures that fresh grapes can be transported well
- Increasing efficiencies to increase returns
- Increased competition from interstate and international imports putting pressure on domestic suppliers
- WA will need to compete with other counter-seasonal new world suppliers (Other AU states, Chile, Peru)
- Mediterranean fruit fly

POTENTIAL ROLE FOR GOVERNMENT

- Support development of new cultivars with appeal to Asian tastes
- Support sharing best practice to achieve consistent fruit quality
- Undertake appropriate biosecurity and pest management best practice measures

Source: UN Comtrade; various other published sources; Coriolis analysis

DRIED PEPPER (EXCL. CRUSHED OR GROUND) [HS090411]

PRODUCT PROFILE	
Common name(s)	Pepper, peppercorns
Scientific name	Piper nigrum
Type of plant	Flowering woody vine
Cultivation cycle	Perennial, plants bear fruit from fourth or fifth year
Origin	South India/Borneo
Part eaten	Seed
Forms/usage	- Dried and used whole, cracked, crushed or ground as a spice and seasoning - Pepper spirit and oil used in cosmetic and pharmaceutical products
Drivers of consumer/market success	- One of the most important spices across many cuisines - Good source of manganese and vitamin K - Digestive health benefits among others
Why does it suit the North of WA?	- A range of identified climatic peers produce it, albeit in relatively small amounts: e.g. Mexico 3,199t, Ethiopia 3,800t, Uganda 2,087t, Rwanda 2,684t, Zimbabwe 1,650t, Niger 1,220t, Tanzania 400t; these all reach into relevant climate zones - Best grown below 900 m above sea level - Grown in soil that is not too dry or susceptible to flooding - Thrives in warm and wet tropical climate
Open questions/ challenges?	- How will the North of WA compete with Vietnam? - Four or five years until commercial production - Currently manually pruned and harvested

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

DRIED PEPPER (EXCL. CRUSHED OR GROUND) [HS090411]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$533m
5y CAGR (US$; 08-13)	20%
5y ABS (US$m; 08-13)	+$315
Average $/kg or l (US$; 2013)	$6.02
Top 10 highest imp/cap (US$; 13)	$24.24
Top 10 lowest imp/cap (US$; 13)	$0.01
Top 3 importers share	59%
Top 10 importers share	92%
# top 10 importers w/ +10% CAGR	10
Top 3 exporters share	81%
Top 10 exporters share	98%
Australia export share	0.02%
Possible size of the prize	
$3-5m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Singapore	23%	$121	24%	$80	$6.81	14%	$24.24
Vietnam	18%	$98	28%	$70	$6.76	14%	$1.14
India	18%	$96	15%	$49	$6.07	11%	$0.08
Egypt	9%	$49	15%	$25	$6.21	10%	$0.62
Japan	8%	$41	13%	$18	$8.43	12%	$0.32
South Korea	5%	$29	15%	$14	$7.09	13%	$0.58
China	3%	$17	12%	$7	$6.94	11%	$0.01
Malaysia	3%	$15	13%	$7	$6.33	14%	$0.55
Thailand	3%	$13	119%	$13	$6.58	18%	$0.21
Philippines	2%	$13	70%	$12	$5.23	47%	$0.13
Other	8%	$41	14%	$20	$2.83	10%	
TOTAL	100%	$533	20%	$315	$6.02	13%	

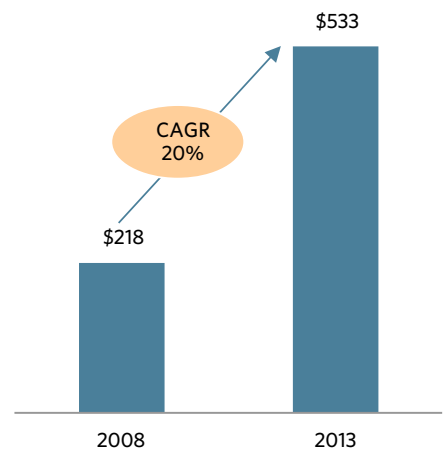
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Vietnam	36%	$191	27%	$132	$5.84	16%
Indonesia	29%	$155	22%	$97	$6.87	14%
Sri Lanka	16%	$84	33%	$64	$5.48	7%
Malaysia	11%	$60	10%	$23	$7.32	14%
India	3%	$14	5%	$3	$5.14	10%
Brazil	1%	$6	-4%	-$1	$4.93	6%
Cambodia	1%	$4	197%	$4	$6.01	74%
United Arab Emirates	1%	$3	33%	$2	$2.29	1%
China	1%	$3	-24%	-$8	$2.38	-7%
Singapore	0%	$2	-7%	-$1	$7.24	16%
OTHER	2%	$11	1%	$1	$6.12	17%
TOTAL	100%	$533	20%	$315	$6.02	13%

PEPPER (PIPER SP.) - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Vietnam	50,998	3.20	163,000	5%
Indonesia	178,200	0.50	88,700	2%
India	125,000	0.42	53,000	2%
Brazil	18,472	2.29	42,312	-9%
China	17,300	1.80	31,200	3%
Sri Lanka	39,490	0.68	26,730	3%
Malaysia	10,600	2.50	26,500	4%
Madagascar	5,000	1.00	5,000	-2%
Ethiopia	6,000	0.63	3,800	28%
Ghana	5,386	0.66	3,535	0%
Mexico	2,594	1.23	3,199	-14%
Other	22,888		25,550	
World	481,929	0.98	472,526	1%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

DRIED PEPPER (EXCL. CRUSHED OR GROUND) [HS090411]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	○
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	◑
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	○
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET/ COMPETITORS

- Vietnam is the #1 producer of pepper, followed by Indonesia and India, accounting for four fifths of the market
- Indonesia achieving yields significantly above average
- Singapore is the largest single market taking about a quarter of the target market
- Vietnam is a major importer(18%, #2) and the top exporter(36%)
- Strong import CAGR across all top 10 markets
- Peppercorns most widely traded spice in the world (by value)

WA/AU

- One commercial company in far north QLD; producing 3 tonnes; finds it difficult to compete with imports; very niche
- "Possible – grown widely in Thailand and Asia – land in West Kimberley very low – but well drained – not so humid"

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- None identified

OPPORTUNITIES FOR VALUE-ADDED

- Target high value markets (Singapore and Malaysia)
- Develop products using unique WA/AU flavours (e.g. Mountain Pepper, Bush Tomato, Pepperberry)
- Innovative packaging to ensure freshness

CHALLENGES/LIMITATIONS

- High labour requirements the key challenge
- Required to propagate cuttings; then harvest year three after planting; maximum yields years 5-7, healthy plants will last up to 15 years
- Currently no mechanised production system in commercial use
- Competing with Vietnam, Indonesia, India
- Labour required for staking and training, pruning, harvesting (2 products/year); multiple picks per harvest
- Well drained soils required to prevent footrot, and integrated pest management strategies required to prevent slow decline

POTENTIAL ROLE FOR GOVERNMENT

- None identified

Source: UN Comtrade; various other published sources; Coriolis analysis

WALNUTS IN SHELL & SHELLED [HS080231/080232]

PRODUCT PROFILE	
Common name(s)	Walnut
Scientific name	Juglans regia
Type of plant	Deciduous tree
Cultivation cycle	Fruit falls in autumn, grafted trees bear in 3-4 years
Origin	Persia
Part eaten	Seed kernels
Forms/usage	- Shelled or unshelled, raw or roasted, whole, halved, chopped - Candied - Flour, butter, whip, oil - Salads, muesli, snack bars, baked goods
Drivers of consumer/market success	- Nutrient dense, high in polyunsaturated fatty acids - Wide range of uses across many cuisines - Range of options fro co-product use
Why does it suit the North of WA?	- A number of identified climatic peers produce it: e.g. Iran 453,988t, Mexico 106,945t, Chile 42,668t, Egypt 21,608t, Morocco 9,256t; also came strongly out of US Southwest irrigation data; these all reach into relevant climate zones - Some varieties require a chilling period of 600-800 hours below 10 °C - Other varieties produced in Iran, Iraq, Jordan, Lebanon, Mexico, Morocco - Drought resistant - Light-demanding trees - Benefit from wind protection - Nuts are best stored refrigerated in low humidity - Mechanised harvesting and processing
Open questions/ challenges?	- How to achieve scale to compete with California and China? - Are high yielding warmer climate varieties available?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

WALNUTS IN SHELL & SHELLED [HS080231/080232]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$628m
5y CAGR (US$; 08-13)	27%
5y ABS (US$m; 08-13)	+$435m
Average $/kg or l (US$; 2013)	$4.39
Top 10 highest imp/cap (US$; 13)	$32.64
Top 10 lowest imp/cap (US$; 13)	$0.05
Top 3 importers share	75%
Top 10 importers share	98%
# top 10 importers w/ +10% CAGR	7
Top 3 exporters share	92%
Top 10 exporters share	99%
Australia export share	1%
Possible size of the prize	
$5-15m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Hong Kong SAR	37%	$229	82%	$218	$4.26	10%	$32.64
South Korea	19%	$122	23%	$78	$10.24	3%	$2.44
Japan	19%	$121	11%	$50	$10.56	3%	$0.95
China	10%	$61	37%	$48	$3.19	12%	$0.05
Israel	7%	$41	5%	$10	$9.13	3%	$5.40
Lebanon	2%	$11	18%	$6	$6.03	9%	$2.50
Egypt	1%	$8	14%	$4	$0.23	-37%	$0.10
Saudi Arabia	1%	$8	N/C	$8	$6.95	N/C	$0.31
Singapore	1%	$7	21%	$4	$10.70	6%	$1.34
Jordan	1%	$6	5%	$1	$6.42	-1%	$0.97
Other	2%	$14	18%	$8	$4.85	6%	
TOTAL	100%	$628	27%	$435	$4.39	-5%	

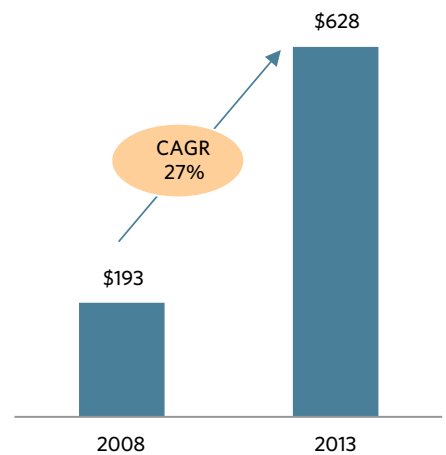
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
USA	86%	$542	28%	$382	$6.03	-2%
Chile	4%	$23	155%	$23	$7.37	-2%
Ukraine	2%	$10	26%	$7	$5.06	10%
China	1%	$8	-6%	-$3	$7.06	4%
Australia	1%	$8	48%	$7	$4.36	15%
India	1%	$7	9%	$2	$0.19	-43%
Kyrgyzstan	1%	$6	214%	$6	$1.21	-18%
Turkey	1%	$5	153%	$5	$6.37	26%
Moldova	0%	$3	47%	$3	$6.35	13%
Canada	0%	$3	235%	$3	$6.11	45%
OTHER	2%	$13	1%	$1	$4.45	7%
TOTAL	100%	$628	27%	$435	$4.39	-5%

WALNUTS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
China	425,000	4.00	1,700,000	15%
Iran	57,386	7.91	453,988	1%
USA	113,120	3.71	420,000	1%
Turkey	108,767	1.95	212,140	4%
Ukraine	14,100	8.21	115,800	8%
Mexico	72,563	1.47	106,945	6%
Chile	18,995	2.25	42,668	12%
India	31,000	1.16	36,000	-1%
France	19,563	1.72	33,716	-2%
Romania	1,478	21.49	31,764	0%
Serbia	14,400	1.50	21,652	-2%
Other	122,709		283,373	
World	999,081	3.46	3,458,046	7%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

WALNUTS IN SHELL & SHELLED [HS080231/080232]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	●
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	●
COMPETITORS	
Wide spread of sellers	○
Can we compete?	◑
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	●
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Consumer demand increasing domestically and internationally
- Prices have increased for past 5 years, despite big products
- China dominates production, but is a net importer
- The USA dominates the export target market (86%) as the 3rd largest producer
- Chile (4%)is a distant #2, but coming on strong
- Yields are very variable across top producers
- Four East Asian countries lead the target markets for imports: Hong Kong (37%), South Korea (19%), Japan (19%) and China (10%)
- Some unmeasured amount of Hong Kong likely being on-shipped into China (potentially after processing)
- Israel (7%), Lebanon (2%) lead Middle Eastern markets

WA/AU

- 174 growers in Australia as of 2010-2011, 929,000 trees
- Around 3,000 ha planted in walnut trees in Australia
- In shell production increased to around 8,000 tonnes in 2013, expected to grow to 11,000 by 2016
- Currently approximately 90% of national production is from Walnuts Australia (Webster Ltd), with 2,200 ha in TAS and NSW
- Several cracking facilities operate, with state –of-the-art factory commissioned in NSW in 2014
- In WA, walnuts are currently grown in the South West

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Nutritional studies have shown health benefits of walnuts
- Australia is able to supply off season fresh walnuts to Northern Hemisphere
- New cracking facilities increase potential to export as shelled. Currently majority exported in shell.
- Australia free from many disease and pests that afflict other walnut growing countries
- Excellent varieties available in Australia as rootstocks

OPPORTUNITIES FOR VALUE-ADDED

- Health food products emphasising health benefits of walnuts
- Organic walnut products
- Counter-season freshness emphasised in marketing walnuts for snacking
- Manufacture premium store brands for key international retailers in Asia
- Develop and market premium range of gifting products for Asia

CHALLENGES/LIMITATIONS

- Unclear climatic suitability; mixed messages
- Long growth period of trees before full production is reached (10-12 years)
- Significant tariff barriers in current and potential export markets

POTENTIAL ROLE FOR GOVERNMENT

- Investigate production in Egypt for lessons for WA
- Trial new genetics in inland Gascoyne, Northern Mid-West and inland Pilbara
- Promotion of nutritional value of walnuts
- Support of R&D into varieties and post harvest handling and storage

Source: UN Comtrade; various other published sources; Coriolis analysis

CASHEW NUTS, IN SHELL DRIED [HS080131]

PRODUCT PROFILE	
Common name(s)	Cashew tree
Scientific name	Anacardium occidentale
Type of plant	Tropical evergreen tree
Cultivation cycle	3 years before commercial harvest for dwarf species
Origin	North eastern Brazil
Part eaten	Seed
Forms/usage	- Raw or roasted, eaten whole or used as ingredient, oil - Muesli, snack bars, dessert, stir fries, salads, juice - Thickener in soups, curries, stews, desserts - Shell derivatives used in lubricants, paints, fungicides, pharmaceuticals - Cashew apple is eaten fresh, juiced, cooked in curries, made into preserves or an alcoholic beverage
Drivers of consumer/market success	- Rich source of protein, vitamins, minerals and dietary fibre - Premium edible nut - Potential value add through use of cashew apple co-product
Why does it suit the North of WA?	- Adapted to latitudes 25° north and south of the equator - Temperatures should not drop below 10 °C - Very frost sensitive - Drought resistant - Will grow well on marginal soils unlike other fruit trees
Open questions/ challenges?	- Possible to use co-product of cashew apple but needs to be processed onsite as not suitable for transport

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

CASHEW NUTS, IN SHELL DRIED [HS080131]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$1,424m
5y CAGR (US$; 08-13)	10%
5y ABS (US$m; 08-13)	+$558m
Average $/kg or l (US$; 2013)	$0.93
Top 10 highest imp/cap (US$; 13)	$6.87
Top 10 lowest imp/cap (US$; 13)	$0.003
Top 3 importers share	99%
Top 10 importers share	~100%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	54%
Top 10 exporters share	93%
Australia export share	0.002%
Possible size of the prize	
$2-3m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
India	57%	$812	5%	$169	$0.98	0%	$0.69
Vietnam	41%	$590	22%	$371	$0.93	-26%	$6.87
Saudi Arabia	1%	$9	N/C	$9	$5.03	N/C	$0.36
China	0%	$6	99%	$5	$0.61	19%	$0.00
Singapore	0%	$2	22%	$1	$4.72	-6%	$0.47
Thailand	0%	$1	603%	$1	$8.02	31%	$0.02
Egypt	0%	$1	14%	$1	$0.02	-68%	$0.01
Indonesia	0%	$1	8%	$0	$0.94	8%	$0.00
Qatar	0%	$1	37%	$1	$2.82	9%	$0.41
Malaysia	0%	$0	22%	$0	$2.27	-10%	$0.01
Other	0%	$1	-13%	-$1	$3.09	2%	
TOTAL	100%	$1,424	10%	$558	$0.93	-5%	

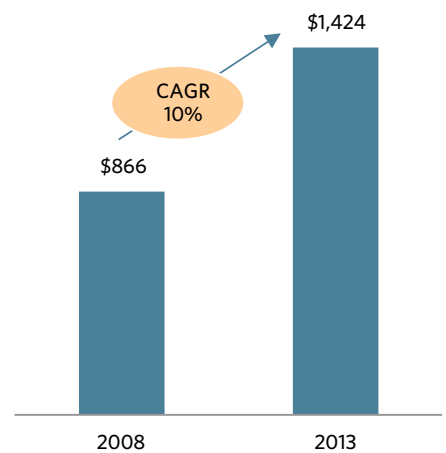
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Côte d'Ivoire	28%	$395	8%	$125	$0.85	-6%
Guinea-Bissau	14%	$197	10%	$72	$1.01	-6%
Tanzania	12%	$172	19%	$100	$1.22	3%
Ghana	12%	$169	25%	$113	$0.91	-5%
Benin	9%	$128	9%	$44	$0.99	0%
Cambodia	5%	$68	15%	$34	$1.10	-23%
Indonesia	5%	$66	-7%	-$26	$1.28	-1%
Nigeria	5%	$65	8%	$21	$0.86	-15%
Gambia	3%	$37	7%	$10	$0.96	-3%
Senegal	2%	$29	43%	$24	$0.89	-4%
OTHER	7%	$99	11%	$41	$0.66	-8%
TOTAL	100%	$1,424	10%	$558	$0.93	-5%

CASHEW NUTS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Vietnam	300,856	3.69	1,110,800	-2%
Nigeria	380,000	2.50	950,000	5%
India	992,000	0.76	753,000	3%
Côte d'Ivoire	900,000	0.50	450,000	6%
Benin	485,000	0.37	180,000	16%
Philippines	28,663	5.10	146,289	5%
Guinea-Bissau	247,674	0.56	138,195	4%
Tanzania	410,583	0.31	127,947	-1%
Indonesia	575,200	0.20	117,400	-6%
Burkina Faso	120,000	0.96	115,000	75%
Brazil	695,289	0.16	109,679	-15%
Other	321,745		241,650	
World	5,457,009	0.81	4,439,960	2%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

CASHEW NUTS, IN SHELL DRIED [HS080131]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	◑
Value-added opportunities	●
MARKETS	
Wide spread of markets/buyers	○
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	●
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	○
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET/COMPETITORS

- Vietnam, Nigeria and India are the top producers
- Côte d'Ivoire is the major supplier to target markets (28%)
- Mix of predominantly African countries supplying raw nuts
- India and Vietnam are the major markets (98%) for in shell cashews, shelling them manually and exporting shelled cashews
- Other markets are tiny

WA/AU

- Australia is the highest per capita consumer of cashews
- "Has been extensively trialled in NT"; mixed messages on outcomes; issue appears to be commercial yield
- Cashews Australia owns the only commercial cashew farm in Australia in Northern Queensland which is currently for sale, with 27,000 productive trees and 21,000 nearing production
- "There have been efforts to get a Kimberley Cashew/peanut up and going in the past but they have floundered for lack of capital."

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Import substitution potential exists as Australia imported 17,452 tonnes of shelled cashews in 2014, valued at $113 mil USD
- Australia is safe and reliable supplier of food products, cashews susceptible to aflatoxin contamination if not stored correctly
- Health benefits of cashew nuts
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management, production and processing systems

OPPORTUNITIES FOR VALUE-ADDED

- Co-product of cashew apple could provide secondary revenue stream
- Development of premium snack range for Asian market – focus on health benefits and WA story
- Develop innovative products targeting use of cashews in sauces and curries
- Manufacture premium store brands for key international retailers in Asia
- Innovation in packaging to ensure freshness

CHALLENGES/LIMITATIONS

- Low yields of dry countries relative to tropical producers, such as Vietnam
- Production not at scale to justify processing plant, necessitating exporting in shell
- Slow growth rate of trees (3 years for dwarf species, longer for other)
- Lack of experience in cashew farming and success stories
- Shelling is labour intensive, involving toxins

POTENTIAL ROLE FOR GOVERNMENT

- Facilitating the extension and licencing of the CSIRO research into hybrids completed in 2000

Source: UN Comtrade; various other published sources; Coriolis analysis

COFFEE, NOT ROASTED OR DECAFFEINATED [HS090111]

PRODUCT PROFILE	
Common name(s)	Coffee
Scientific name	Coffea spp.
Type of plant	Flowering shrub or small tree
Cultivation cycle	Fruits after 3-5 years, 9 months to ripen
Origin	Middle East
Part eaten	Seed
Forms/usage	- Processed through either dry or wet processes then milled in order to ready for roasting - Source of coffee
Drivers of consumer/market success	- Coffee is one of the world's most widely consumed beverages - Fresher beans are superior - Australian growing practices create premium product - Organic product possible
Why does it suit the North of WA?	- A number of identified climatic peers produce it: e.g. Mexico 231,596t, Ethiopia 270,000t, Peru 256,241t, Uganda 190,000t, Kenya 39,800t, Rwanda 19,574t and Yemen 19,984t; these all reach into relevant climate zones - Robusta coffee beans ideally grown at 24-30 °C - Bean Belt is between Tropics of Cancer and Capricorn - Mechanised harvesting developed in QLD - Eastern Australia grows Arabica beans - Pest and disease free
Open questions/ challenges?	- What level of quality loss is associated with mechanised harvesting?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

COFFEE, NOT ROASTED OR DECAFFEINATED [HS090111]

QUANTITATIVE

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$2,867m
5y CAGR (US$; 08-13)	7%
5y ABS (US$m; 08-13)	+$809m
Average $/kg or l (US$; 2013)	$2.84
Top 10 highest imp/cap (US$; 13)	$16.69
Top 10 lowest imp/cap (US$; 13)	$0.07
Top 3 importers share	70%
Top 10 importers share	91%
# top 10 importers w/ +10% CAGR	4
Top 3 exporters share	59%
Top 10 exporters share	88%
Australia export share	0.03%
Possible size of the prize	$3-5m

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Japan	52%	$1,479	5%	$302	$3.24	1%	$11.61
South Korea	11%	$314	5%	$65	$2.95	3%	$6.31
Malaysia	7%	$190	14%	$92	$2.24	-1%	$6.70
Saudi Arabia	4%	$128	8%	$42	$3.57	3%	$4.88
India	4%	$123	16%	$65	$1.95	0%	$0.10
China	3%	$99	19%	$58	$2.25	1%	$0.07
Israel	3%	$72	3%	$9	$2.56	0%	$9.46
Thailand	2%	$71	17%	$38	$2.08	-2%	$1.12
Lebanon	2%	$70	7%	$21	$2.70	1%	$16.69
Egypt	2%	$68	6%	$17	$2.24	-6%	$0.87
Other	9%	$252	10%	$99	$2.46	0%	
TOTAL	100%	$2,867	7%	$809	$2.84	0%	

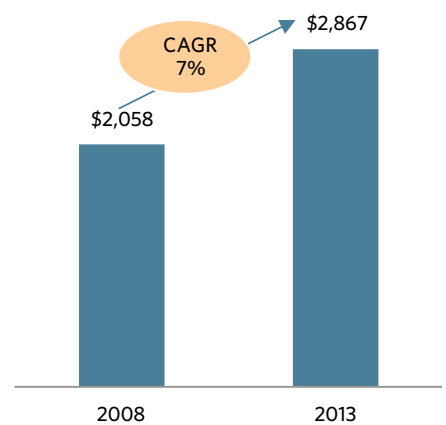
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Brazil	26%	$737	13%	$340	$3.29	3%
Vietnam	18%	$528	4%	$96	$2.07	-1%
Indonesia	14%	$414	11%	$167	$2.25	-1%
Colombia	10%	$287	-3%	-$48	$3.67	2%
Ethiopia	7%	$201	12%	$88	$3.62	3%
Guatemala	6%	$159	3%	$20	$3.77	1%
India	2%	$54	7%	$16	$2.98	1%
Honduras	2%	$53	1%	$3	$3.09	0%
Peru	2%	$47	6%	$12	$3.02	1%
Tanzania	2%	$45	10%	$17	$3.26	0%
OTHER	12%	$343	7%	$98	$3.16	0%
TOTAL	100%	$2,867	7%	$809	$2.84	0%

GREEN COFFEE - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Brazil	2,085,522	1.42	2,964,538	1%
Vietnam	584,600	2.50	1,461,000	7%
Indonesia	1,240,900	0.56	698,900	0%
Colombia	771,728	0.85	653,160	-1%
India	376,305	0.85	318,200	4%
Honduras	276,100	0.99	273,480	3%
Ethiopia	520,000	0.52	270,000	1%
Peru	399,523	0.64	256,241	-1%
Guatemala	251,020	1.01	253,186	0%
Mexico	700,117	0.33	231,596	-2%
Uganda	312,000	0.61	190,000	-2%
Other	2,625,020		1,350,538	
World	10,142,835	0.88	8,920,840	1%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

COFFEE, NOT ROASTED OR DECAFFEINATED [HS090111]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	○
Mechanically harvested	◑
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	●
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	○
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET/COMPEITORS

- Identified target markets import more raw coffee ($2.9b) than WA exports grain (A$2.7b)
- Production matches top exporters with Brazil dominating with 26% of the market
- Production is dominated by developing countries enjoying scale and low costs
- Japan is the main market (52%), followed by South Korea (11%) and Malaysia (7%)
- China and India show the most growth of the target markets in imports
- Current prices are high due to tightened supply through drought and currency fluctuations in Brazil and a Central American plant fungus
- Demand is increasing in both importing and producing countries

WA/AU

- Australian coffee is grown between Noosa and Coffs Harbour, and in Northern Queensland regions
- Over 750 ha with potential production of 1,000t/yr.
- Australia developed the world's first mechanised harvester in 1980's, revitalising the industry
- Mountain Top Coffee is the most awarded and best known of the Australian plantations, a 25 ha single estate with majority of beans destined for export
- "Has been trialled" – "only suitable site for Arabica in WA is Mt Elizabeth Station" [Kimberley]

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Global demand for coffee is projected to increase by nearly 25% over the next 5 years
- Australia's reputation for high quality premium products
- Australian subtropical coffee has unique flavour that has gained overseas recognition
- Australia free from serious pests and diseases that afflict other coffee growing nations
- Expertise of east coast producers able to be leveraged

OPPORTUNITIES FOR VALUE-ADDED

- Premium organic market available due to lack of serious pests or disease
- Premium, single estate products that target high end market in Asia, marketing WA story
- Roast in AU to specific high end consumer requirements
- Develop and market premium range of gifting products for Asia
- Develop new packaging to ensure freshness of product
- Develop new products using unique WA/AU flavours (e.g. cinnamon myrtle)

CHALLENGES/LIMITATIONS

- Climatic suitability marginal other than Northern Kimberley
- Scale
- Lack of experience in coffee growing in WA

POTENTIAL ROLE FOR GOVERNMENT

- Investigate coffee production in Yemen and Kenya
- Extension of east coast experience to WA farmers
- Support R&D into improved mechanised harvesting

Source: UN Comtrade; various other published sources; Coriolis analysis

PALM KERNEL OIL & OIL-CAKE [HS151329/230660]

PRODUCT PROFILE	
Common name(s)	African oil palm, macaw-fat
Scientific name	Elaeis guineensis
Type of plant	Palm
Cultivation cycle	Palm fruit take 5-6 months from pollination to maturity
Origin	West and Southwest Africa
Part eaten	Kernel of palm fruit
Forms/usage	- Commercial cooking oil - Soap, washing powder and personal care products - Post oil extraction leaves palm kernel cake (expeller) used as protein/ animal feed, burned to generate electricity
Drivers of consumer/market success	- Longer shelf life than other vegetable oils - Remains stable at high cooking temperatures - Cheaper than other oils - High levels of antioxidants - Most efficient oilseed (10 x more oil per ha) - Palm kernel cake is high protein, medium grade protein feed for ruminants
Why does it suit the North of WA?	- A number of identified climatic peers produce it: e.g. Peru 51,000t, 26,000t, Angola 23,000t, Senegal 7,400t; these all reach into relevant climate zones - Nursery needs uninterrupted supply of clean water and sufficient topsoil - Suits humid tropics or semi-arid tropics - Requires high rainfall of minimum of 1600 mm/yr.
Open questions/ challenges?	- Potential to supply ecologically friendly palm kernel oil? - How to compete with Indonesia's scale and low costs?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

PALM KERNEL OIL & OIL-CAKE [HS151329/230660]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$1,078m
5y CAGR (US$; 08-13)	21%
5y ABS (US$m; 08-13)	+$667
Average $/kg or l (US$; 2013)	$0.38
Top 10 highest imp/cap (US$; 13)	$3.30
Top 10 lowest imp/cap (US$; 13)	$0.36
Top 3 importers share	69%
Top 10 importers share	97%
# top 10 importers w/ +10% CAGR	5
Top 3 exporters share	100%
Top 10 exporters share	100%
Australia export share	-
Possible size of the prize	$5m

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	44%	$478	72%	$447	$0.47	-12%	$0.36
South Korea	15%	$164	8%	$52	$0.19	-2%	$3.30
Japan	10%	$105	2%	$9	$0.47	-14%	$0.82
Malaysia	8%	$87	25%	$59	$0.74	-9%	$3.07
Thailand	6%	$65	94%	$63	$0.58	38%	$1.03
Sri Lanka	4%	$40	29%	$29	$1.51	14%	$1.95
Saudi Arabia	3%	$31	2%	$4	$0.22	-2%	$1.20
Vietnam	3%	$28	9%	$10	$0.18	3%	$0.32
Philippines	2%	$27	40%	$22	$0.64	38%	$0.28
Egypt	2%	$21	-5%	-$7	$1.01	-25%	$0.27
Other	3%	$31	-9%	-$19	$0.43	-17%	
TOTAL	100%	$1,078	21%	$667	$0.38	0%	

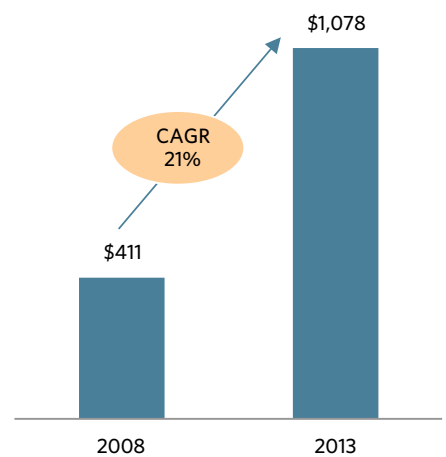
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Indonesia	61%	$655	36%	$513	$0.40	9%
Malaysia	38%	$414	10%	$158	$0.36	-8%
Thailand	0%	$3	169%	$3	$0.61	2%
Singapore	0%	$2	-24%	-$7	$1.15	6%
UAE	0%	$0	5%	$0	$1.01	23%
Cambodia	0%	$0	20%	$0	$0.32	-1%
USA	0%	$0	71%	$0	$5.15	88%
India	0%	$0	-11%	-$0	$0.20	4%
Turkey	0%	$0	498%	$0	$1.36	-43%
China	0%	$0	21%	$0	$0.22	-34%
OTHER	0%	$1	-11%	-$1	$0.43	3%
TOTAL	100%	$1,078	21%	$667	$0.38	0%

PALM KERNELS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Indonesia	N/A	N/A	6,880,000	8%
Malaysia			4,859,302	1%
Nigeria			1,100,000	-1%
Thailand			450,000	9%
Brazil			226,700	9%
Colombia			224,427	5%
Papua New Guinea			132,000	5%
Ecuador			112,000	2%
Honduras			105,000	7%
Côte d'Ivoire			99,000	5%
DR Congo			75,000	9%
Other			693,943	
World			14,957,372	4%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

PALM KERNEL OIL & OIL-CAKE [HS151329/230660]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	◑
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	◑
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	○
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	○
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET/COMPETITORS

- Indonesia and Malaysia dominate global production and exports to target markets (99%)
- China is the largest of the target markets (44%), followed by South Korea (15%) and Japan (10%)
- Indonesia and Malaysia are the only real suppliers of any account
- All other suppliers very minor
- Malaysian palm kernel oil prices are down from last year

WA/AU

- Palm Plantations of Australia on east coast claims to be one of largest palm seed producers in world
- No significant commercial operation identified
- "Some trial work in NT – Katherine Research Station in 2006, results unknown"

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Demand from biofuel industry is predicted to drive increased production
- High quality genetic material available through palm seed producers Palm Plantations of Australia
- Expertise in growing oil palms on east coast able to be leveraged
- Safe and secure production location
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems

OPPORTUNITIES FOR VALUE-ADDED

- Sustainable palm kernel oil products are in demand due to consumer concerns
- Palm kernel cake co-product potential revenue stream as livestock feed

CHALLENGES/LIMITATIONS

- "Climatically not suitable except from the far northern Coastal fringe"
- Potential production not likely to be at scale to justify processing plant
- Current production systems are labour intensive; high labour costs in Australia in comparison to major producers
- High manual labour involved in transplanting from nursery and weeding
- Scale

POTENTIAL ROLE FOR GOVERNMENT

- Extension of grower expertise from seed companies on east coast to WA farmers

Source: UN Comtrade; various other published sources; Coriolis analysis

OLIVE OIL, VIRGIN [HS150910]

PRODUCT PROFILE	
Common name(s)	Olive
Scientific name	Olea europaea
Type of plant	Small evergreen tree
Cultivation cycle	Olives are harvested in autumn and winter, commercial yield in year four.
Origin	Mediterranean basin
Part eaten	Oil from mechanical pressing of whole olives
Forms/usage	- Dressing on salads, breads, pasta - Cooking oil - Marinating vegetables, cheese - Used in cosmetics, pharmaceuticals, soaps, oil lamps
Drivers of consumer/market success	- Good source of vitamin E , K and phenolics - Premium status of Australian olive oils - Wide range of uses across many cuisines
Why does it suit the North of WA?	- To be clear: product came into screen as a wide range of identified climatic peers produce it: e.g. Egypt 510,000t, Morocco 1,181,675t, Tunisia 1,100,000t, Algeria 578,740t, Israel 67,000t; these are all "BWh", like the area south of Broome - Native to Mediterranean climate, hot weather and sunny positions - Tolerates drought - Grows best in calcareous soils and coastal climate conditions - Grows in any light soil
Open questions/ challenges?	- Can WA compete against traditional sources of olive oil in the Asian market? - How can WA position and protect its olive oil as premium products?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

OLIVE OIL, VIRGIN [HS150910]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$558m
5y CAGR (US$; 08-13)	16%
5y ABS (US$m; 08-13)	+$292m
Average $/kg or l (US$; 2013)	$4.63
Top 10 highest imp/cap (US$; 13)	$2.42
Top 10 lowest imp/cap (US$; 13)	$0.13
Top 3 importers share	77%
Top 10 importers share	94%
# top 10 importers w/ +10% CAGR	6
Top 3 exporters share	84%
Top 10 exporters share	98%
Australia export share	1%
Possible size of the prize	$2-3m

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
Japan	38%	$212	13%	$96	$5.68	-2%	$1.67
China	31%	$172	33%	$131	$4.98	0%	$0.13
Saudi Arabia	8%	$44	28%	$31	$2.99	-2%	$1.68
South Korea	7%	$38	-3%	-$6	$4.24	-1%	$0.77
Israel	2%	$11	10%	$4	$4.06	-1%	$1.48
Lebanon	2%	$10	34%	$8	$2.21	-5%	$2.42
Singapore	2%	$9	6%	$2	$4.37	-1%	$1.86
Thailand	1%	$8	5%	$2	$4.65	-1%	$0.13
Hong Kong SAR	1%	$8	4%	$1	$3.85	-2%	$1.18
Kuwait	1%	$8	47%	$7	$3.67	14%	$2.63
Other	6%	$36	11%	$15	$3.96	3%	
TOTAL	100%	$558	16%	$292	$4.63	-1%	

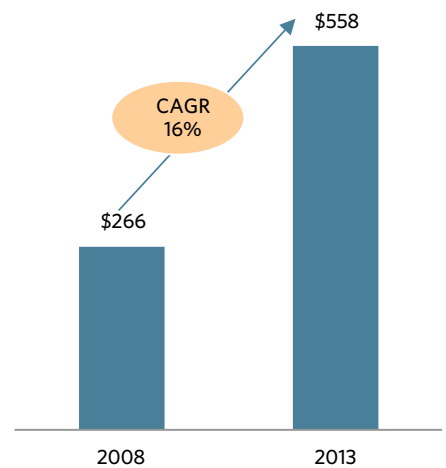
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Spain	45%	$253	18%	$142	$4.60	-1%
Italy	33%	$184	14%	$87	$5.91	-1%
Turkey	6%	$31	21%	$19	$3.00	-8%
Syria	4%	$24	5%	$5	$2.57	-6%
Greece	3%	$17	22%	$11	$5.48	-3%
Tunisia	2%	$12	23%	$8	$4.32	-1%
Lebanon	1%	$7	79%	$6	$3.21	3%
Australia	1%	$6	16%	$3	$7.60	3%
Occ. Palestinian Terr.	1%	$6	13%	$3	$3.31	10%
Jordan	1%	$5	7%	$1	$3.28	-1%
OTHER	2%	$13	-34%	-$91	$5.10	-4%
TOTAL	100%	$558	16%	$292	$4.63	-1%

OLIVES - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
Spain	2,500,000	3.15	7,875,800	7%
Italy	1,146,863	2.56	2,940,545	-3%
Greece	930,000	2.15	2,000,000	-5%
Turkey	825,830	2.03	1,676,000	3%
Morocco	922,235	1.28	1,181,675	9%
Tunisia	1,822,820	0.60	1,100,000	-1%
Syria	697,443	1.21	842,097	0%
Algeria	348,196	1.66	578,740	18%
Egypt	52,100	9.79	510,000	1%
Portugal	347,300	1.01	350,900	0%
Argentina	63,000	2.73	172,000	-1%
Other	653,488		1,168,943	
World	10,309,275	1.98	20,396,700	2%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

OLIVE OIL, VIRGIN [HS150910]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	●
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	●
COMPETITORS	
Wide spread of sellers	○
Can we compete?	◑
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	●
Leverage WA & country reputation	●
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- Asia is really developing a taste for olive oil; regional imports are $558m and growing at 16% per annum
- Spain dominates production, followed by Italy, Greece and Turkey.
- They are the major suppliers to target markets with Spain supplying 45% and Italy 33%
- Range of other Mediterranean countries (and Australia) make up the rest
- Significant production slumps (50%) in Spain and Italy in 2014-2015 growing season has lead to reduced supply
- Consumer prices for olive oil have increased by 10% globally
- Japan is the largest of the target markets (38%), China is #2, taking 31 % and is growing at 5y CAGR of 33%

WA/AU

- Australia's olive oil market comprised of ~70% imported and 30% domestic, consuming around 45,000 tonnes
- Australian production was in excess of 20 mil litres in 2013, estimated 1,500 growers with over 35,000 ha
- VIC largest producer – 60% of production, WA next largest with over 1.5 mil trees
- Boundary Bend Ltd is largest Australian producer, 2.5 mil trees, 10.5 mil litres annually
- Industry Associations currently lobbying for increased labelling protection and regulations

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Reputation as premium virgin olive oil producer
- Reputation of Australian regulations to ensure against adulterated products
- Health benefits of olive oil
- Counter seasonal production to major producers, freshest oil available
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management, production and processing systems

OPPORTUNITIES FOR VALUE-ADDED

- Premium, single estate oils that provide provenance of unique WA story
- Develop and market premium range of gifting products for Asia
- Develop products that incorporate unique WA/AU flavours
- Develop nutraceutical sector market

CHALLENGES/LIMITATIONS

- Mixed messages on climatic suitability
- Competing in Asia's premium markets against traditional olive oil producing countries
- Adulteration and mislabelling is major issue in international market
- Low cost imports driving down retail price
- Difficult to compete with heavily subsidised countries (e.g. Spain)
- "Can become and invasive pest under certain conditions"

POTENTIAL ROLE FOR GOVERNMENT

- Lessons from Egypt (510,00t) and Israel (67,000t)
- Support enforcement of regulations to protect against adulteration and mislabelling of products

Source: UN Comtrade; various other published sources; Coriolis analysis

CASTOR OIL & FRACTIONS [HS151530]

PRODUCT PROFILE	
Common name(s)	Castor oil plant, caster bean , palm of Christ
Scientific name	Ricinus communis
Type of plant	Suckering perennial shrub
Cultivation cycle	140-180 days
Origin	Mediterranean basin, Africa
Part eaten	Oil pressed from seed
Forms/usage	- Food additives, flavourings, chocolate, confectionary, mould inhibitor, packaging, preservatives - Manufacturing of soaps, lubricants, hydraulic fluids, paints, dyes, coating, inks, plastics, waxes, nylon, pharmaceuticals, perfumes, biodiesel
Drivers of consumer/market success	- Ricinoleic acid content commands higher feed stock price - Oil content of 50% - Can withstand long periods of drought, though requires 20.6-24.7 cm/ha of water to produce high yields - Mechanical harvesting
Why does it suit the North of WA?	- Range of climatic peers product it in quantity: Mozambique 60,000t, Ethiopia 13,000t, Angola 4,000t, Tanzania 3,000t, Kenya 3,000t, Sudan 1,000t - Grows easily in tropical, sub tropical and temperate regions - In frost free areas, can be grown up to attitudes of 2,500 m - Not cold hardy - Drought resistant - Can grow in wide range of soils, providing they are well drained. - Can grow in soil not fit for other food products - Oil production varieties developed for mechanised harvest
Open questions/ challenges?	- Is the classification of castor oil plant by state government as invasive an issue? - Can WA compete with India?

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

CASTOR OIL & FRACTIONS [HS151530]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$392m
5y CAGR (US$; 08-13)	15%
5y ABS (US$m; 08-13)	+$198m
Average $/kg or l (US$; 2013)	$1.38
Top 10 highest imp/cap (US$; 13)	$0.45
Top 10 lowest imp/cap (US$; 13)	$0.01
Top 3 importers share	93%
Top 10 importers share	99%
# top 10 importers w/ +10% CAGR	4
Top 3 exporters share	99%
Top 10 exporters share	~100%
Australia export share	
Possible size of the prize	
$20-30m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	80%	$316	22%	$197	$1.36	-1%	$0.24
Thailand	7%	$29	3%	$4	$1.34	-1%	$0.45
Japan	5%	$21	-5%	-$6	$1.38	-1%	$0.17
South Korea	3%	$11	3%	$2	$1.53	-1%	$0.22
Malaysia	1%	$4	-12%	-$3	$2.02	4%	$0.13
Indonesia	1%	$3	0%	-$0	$1.75	1%	$0.01
Singapore	1%	$2	22%	$1	$1.81	-1%	$0.45
Israel	0%	$1	7%	$0	$1.61	-5%	$0.18
Vietnam	0%	$1	38%	$1	$1.88	7%	$0.01
Egypt	0%	$1	32%	$1	$1.81	0%	$0.01
Other	1%	$3	7%	$1	$1.83	-3%	
TOTAL	100%	$392	15%	$198	$1.38	-1%	

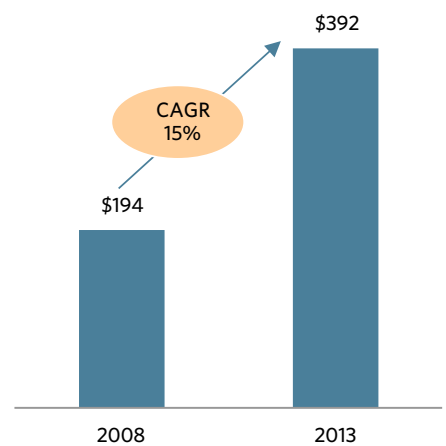
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
India	96%	$376	16%	$196	$1.36	-1%
Thailand	2%	$9	28%	$7	$1.57	-1%
Japan	1%	$3	-18%	-$5	$2.95	9%
United Kingdom	0%	$1	37%	$1	$2.52	-5%
USA	0%	$1	12%	$0	$5.68	7%
China	0%	$0	16%	$0	$2.86	5%
Germany	0%	$0	-5%	-$0	$2.79	3%
Taiwan	0%	$0	-14%	-$0	$2.41	7%
Singapore	0%	$0	4%	$0	$1.94	-19%
Australia	0%	$0	3%	$0	$4.02	-3%
OTHER	0%	$1	-27%	-$3	$2.38	7%
TOTAL	100%	$392	15%	$196	$1.38	-1%

CASTOR OIL SEEDS - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
India	1,096,000	1.50	1,644,000	7%
China	70,000	0.86	60,000	-21%
Mozambique	183,000	0.33	60,000	3%
Ethiopia	7,000	1.86	13,000	13%
Brazil	43,635	0.29	12,526	-37%
Myanmar	14,800	0.81	12,000	-3%
Thailand	14,000	0.86	12,000	1%
Paraguay	8,000	1.38	11,000	-3%
South Africa	8,500	0.73	6,200	1%
Vietnam	8,000	0.75	6,000	0%
Pakistan	3,818	1.07	4,104	0%
Other	61,674		24,617	
World	1,518,427	1.23	1,865,447	3%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

CASTOR OIL & FRACTIONS [HS151530]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	●
Mechanically harvested	◑
Value-added opportunities	◑
MARKETS	
Wide spread of markets/buyers	○
Premium for quality/ safety	◑
COMPETITORS	
Wide spread of sellers	○
Can we compete?	◑
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	●
Required skills for success	◑
Leverage WA & country reputation	○
OVERALL	◑

CURRENT SITUATION

MARKET/COMPETITORS

- To summarise: Asia and the Middle East imported almost $400m worth of castor oil [to put this number in perspective WA as a whole exported A $350m worth of meat in 12/13]
- India dominates production and exports to target markets with 96% of the market
- China main importer of the target markets(80%), with domestic production not meeting demand
- Japan (5%) and South Korea (3%) are the only other markets over 1%
- India dominates export/import supply into target markets with 96% of exports
- Thailand is a distant #2 with 2%
- Industry estimates demand rising by 3-5% per annum

WA/AU

- "Grows like a weed" in Carnarvon (and elsewhere?)
- No significant commercial operation identified

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- It grows "like a weed" in Carnarvon (elsewhere?) without irrigation; Mozambique is the third largest global producer
- Castor oil flagged by RIRDC in 2007 as potential bio based product opportunity
- WA has long history of farming; systems and skills to ensure high quality production
- Capabilities of relevant research bodies to develop new cultivars, improved pest and disease management and production systems
- Potential to target large scale African agribusiness operators with proven skills and systems for immigration to WA
- Targeting large scale Chinese agribusiness operators for investment in Stage 4+ of project (China is largest (~80%) importer in target markets)

OPPORTUNITIES FOR VALUE-ADDED

- High quality oil from safe and reliable source for use in innovative high tech industries that require high level of purity and quality
- Used in cashew nut processing

CHALLENGES/LIMITATIONS

- Can mechanised production in the North of WA compete with high labour production in India?
- What is minimum competitive scale to develop oil processing plant?
- Presence of extremely toxic ricin protein and a potent allergen must be considered
- Invasive plant regarded as environmental weed in Western Australia, though currently unassessed
- Low value

POTENTIAL ROLE FOR GOVERNMENT

- Support for R&D into non toxic varieties
- Support during local government consent process for potential farmers as currently unassessed and therefore prohibited

Source: UN Comtrade; various other published sources; Coriolis analysis

GUAVAS, MANGOES & MANGOSTEENS, FRESH [HS080450] – FOCUS ON MANGO

PRODUCT PROFILE	
Common name(s)	Mango
Scientific name	Mangifera indica
Type of plant	Large long-lived tropical evergreen fruit tree
Cultivation cycle	- Fruit takes 3-6 months to ripen - Some varieties yield twice a year - Prefer deep, well drained soils slightly acidic; tolerate dry, waterlogging and moderate salinity
Origin	South Asia
Part eaten	Fruit
Forms/usage	- Ripe fruit eaten whole - Juice - Flavour (ice cream, yoghurt) - Puree, dried, canned - Unripe fruit used in chutneys
Drivers of consumer/market success	- Popular fruit (#3 global production after bananas and apples) - Popular flavour for juices, smoothies - Good source of vitamins
Why does it suit the North of WA?	- Opportunity to extend harvest traditionally late September to late March - Adapted to hot climates - Tolerant of variety of soils types - Tolerant of waterlogging and drought
Open questions/ challenges?	- Labour intensive: can WA compete given the costs of labour for production and harvesting? - Australian holds premium pricing position in markets; is this scalable? (e.g. 5x or 10x volume?); preliminary cost curve analysis suggests not.

Source: UN FAO; New Oxford Book of Food Plants; Wikipedia; various websites; various publications; images creative commons; Coriolis analysis

GUAVAS, MANGOES & MANGOSTEENS, FRESH [HS080450]

QUANTITATIVE SCORECARD	
ACROSS TARGET MARKETS	
Import value (US$m; 2013)	$622m
5y CAGR (US$; 08-13)	17%
5y ABS (US$m; 08-13)	+$334m
Average $/kg or l (US$; 2013)	$1.34
Top 10 highest imp/cap (US$; 13)	$12.17
Top 10 lowest imp/cap (US$; 13)	$0.18
Top 3 importers share	64%
Top 10 importers share	96%
# top 10 importers w/ +10% CAGR	8
Top 3 exporters share	75%
Top 10 exporters share	94%
Australia export share	2%
Possible size of the prize	
$2-3m	

TOTAL IMPORTS BY 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total import share	Import value; CIF receiver			$/kg		Import per capita US$; 13
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR	
China	39%	$245	27%	$170	$1.77	8%	$0.18
Hong Kong SAR	12%	$76	2%	$7	$0.80	-6%	$10.81
Vietnam	12%	$74	53%	$65	$2.18	4%	$0.86
Saudi Arabia	8%	$49	15%	$25	$0.85	5%	$1.87
Japan	7%	$42	-4%	-$8	$4.79	2%	$0.33
Singapore	5%	$29	11%	$11	$1.37	7%	$5.82
South Korea	4%	$26	30%	$19	$3.98	-1%	$0.50
Kuwait	4%	$24	15%	$12	$1.51	-2%	$8.17
Malaysia	3%	$21	25%	$14	$0.42	13%	$0.73
Bahrain	2%	$10	38%	$8	$1.31	11%	$12.17
Other	4%	$26	13%	$12	$0.90	8%	
TOTAL	100%	$622	17%	$334	$1.34	4%	

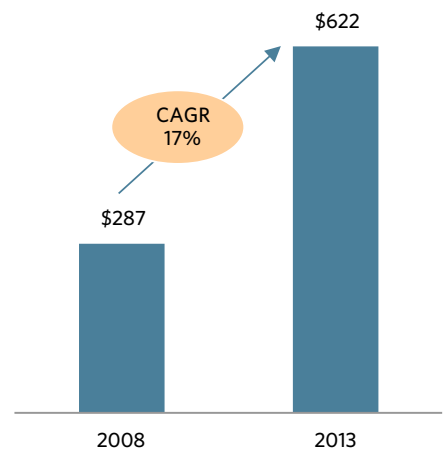
GLOBAL EXPORTS TO 22 TARGET MARKETS (FROM ALL SOURCES)

Country	Total export share	Export value; CIF receiver			$/kg	
		US$m; 13	5y CAGR	5y ABS	US$; 13	5y CAGR
Thailand	64%	$396	25%	$267	$1.45	5%
Philippines	7%	$45	6%	$11	$1.78	2%
India	4%	$23	23%	$15	$1.28	1%
Egypt	4%	$22	47%	$19	$1.30	-1%
Pakistan	3%	$22	9%	$8	$0.74	6%
Taiwan	3%	$20	11%	$8	$2.30	-6%
Yemen	3%	$17	4%	$3	$0.63	-2%
Mexico	2%	$14	-6%	-$5	$3.84	2%
Australia	2%	$13	7%	$3	$3.41	2%
Malaysia	2%	$12	9%	$4	$1.17	6%
OTHER	6%	$38	0%	$0	$0.83	1%
TOTAL	100%	$622	17%	$334	$1.34	4%

MANGOES, ETC. - GLOBAL PRODUCTION

Country	Area	Yield	Production	5y CAGR
India	2,500,000	7.20	18,002,000	5%
China	465,000	9.57	4,450,000	3%
Thailand	380,000	8.27	3,141,950	6%
Indonesia	196,000	10.50	2,058,607	0%
Mexico	198,883	9.56	1,901,871	2%
Pakistan	171,289	9.68	1,658,562	-1%
Brazil	70,372	16.53	1,163,000	0%
Bangladesh	124,000	7.66	950,000	3%
Nigeria	130,000	6.54	850,000	1%
Egypt	91,770	9.09	834,543	12%
Philippines	196,248	4.23	831,026	-1%
Other	917,812	8.13	7,458,511	5%
World	5,441,374	7.96	43,300,070	4%

TOTAL IMPORT VALUE BY ALL 22 TARGET MARKETS



Note 1: Unable to separate mangoes from code; Note 2: Totals may not add due to rounding; both exports and imports are as reported by receiver and US$ CIF; Source: UN Comtrade; various other published sources; Coriolis analysis

GUAVAS, MANGOES & MANGOSTEENS, FRESH [HS080450]

QUALITATIVE

QUALITATIVE SCORECARD	
PRODUCTS	
Hot, dry environment product	◑
Mechanically harvested	○
Value-added opportunities	○
MARKETS	
Wide spread of markets/buyers	●
Premium for quality/ safety	○
COMPETITORS	
Wide spread of sellers	◑
Can we compete?	○
NORTH OF WA	
Trucking, shipping friendly *(not perishable)*	○
Required skills for success	○
Leverage WA & country reputation	○
OVERALL	○

CURRENT SITUATION

MARKET/COMPETITORS

- Top 4 global producers - India, China, Thailand and Indonesia – account for 65% of global production
- China, HK and Vietnam largest importers in the target markets
- Australia (and Mexico) receiving significant premiums into the target markets
- Australian mangos primarily exported to three key markets: Hong Kong, Singapore and UAE
  - Small population (21m people), high income, "city states" (ex-Abu-Dhabi)
  - No clear market traction outside these three

WA/AU

- Existing mango operations in Australia; primarily on the East Coast (QLD); approximately 20 exporting companies
- 55,000t grown in tropical and subtropical Australia; exported 7,000t (13% of production) in 2014/15 season
- Access to USA (able to compete with Mexico) and Indonesian markets (currently very small and low value imports)
- WA production of mangos across multiple zones: Wanneroo, Gingin, Dandaragan, Geraldton, Carnarvon, West Kimberley, Kununurra; able to extend season from October to April

PATHWAYS TO GROWTH

SOURCES OF LEVERAGE

- Counter-seasonal window into Northern Hemisphere markets
- Mix of varieties and growing locations results in extended growing/harvest window
- Full 12 month supplier of mangoes; partnering companies in Pakistan
- Best practice postharvest and logistics management results in longer shelf life
- Rule of law; functioning food safety and quality assurance systems

OPPORTUNITIES FOR VALUE-ADDED

- Fresh-cut solutions, particularly those enabled by new packaging technologies: ready-to-eat mangos and pre-prepared fruit salad mix
- Dried or freeze-dried
- Valued-added in fruit & nut mix or muesli bars
- Organic mangos

CHALLENGES/LIMITATIONS

- High labour requirement
- Australian mangoes very expensive; country at high point on export cost curve; increasing volumes while maintaining prices will be a challenge
- WA needs to compete with other counter-seasonal suppliers: Peru, Brazil, Indonesia (parts), South Africa, Chile, etc.
- "Any export markets will be challenging for mangoes ...in countries where we have competitors."
- Relatively small "size of the prize" for exports relative to many other opportunities
- Mangos are perishable; in addition, Australian varieties more sensitive than those from Central and South American
- Consistent fruit quality required for repeat business. in particular in high value markets (e.g. USA)
- Fruit fly management; mangos susceptible to attack (discovered in the Ord)

POTENTIAL ROLE FOR GOVERNMENT

- Role for R&D around advancing or delaying mango flowering
- Improving phytosanitary protocols in key markets
- R&D required to: improving yields, increase quality, extend shelf-life

Source: UN Comtrade; various published sources; Coriolis analysis

CONTENTS

High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
070200	Tomatoes, fresh or chilled	$337	12%	19%	$231	$196	$0.54	7%	◑
070310	Onions and shallots, fresh or chilled	$932	13%	12%	$645	$394	$0.44	6%	◑
070320	Garlic, fresh or chilled	$646	16%	18%	$497	$360	$0.27	0%	◑
070390	Leeks and other alliaceous vegetables, nes	$159	11%	24%	$102	$106	$1.50	9%	●
070410	Cauliflowers and headed broccoli, fresh or chilled	$139	13%	14%	$97	$65	$0.88	3%	◑
070420	Brussels sprouts, fresh or chilled	$9	12%	6%	$6	$2	$0.12	-9%	○
070490	White and red cabbages, kohlrabi, kale...etc.	$459	10%	17%	$279	$251	$0.49	0%	◑
070511	Cabbage lettuce, fresh or chilled	$107	17%	18%	$86	$61	$0.75	4%	◑
070519	Lettuce, fresh or chilled, (excl. cabbage lettuce)	$42	11%	13%	$28	$19	$0.90	4%	◑
070521	Witloof chicory, fresh or chilled	$5	3%	3%	$1	$1	$3.89	2%	○
070529	Chicory, fresh or chilled, (excl. witloof)	$10	1%	1%	$1	$1	$3.11	-2%	○
070610	Carrots and turnips, fresh or chilled	$308	13%	11%	$216	$124	$0.59	4%	◑
070690	Beetroot...radishes and other similar edible root	$94	1%	10%	$13	$36	$0.81	2%	○
070700	Cucumbers and gherkins, fresh or chilled	$28	6%	5%	$13	$6	$0.38	5%	○
070810	Peas, fresh or chilled	$29	0%	17%	-$1	$16	$0.83	1%	○
070820	Beans, fresh or chilled	$30	6%	8%	$13	$10	$1.00	5%	○
070890	Leguminous vegetables, fresh or chilled, nes	$21	7%	14%	$10	$10	$1.20	6%	◑
070910	Globe artichokes, fresh or chilled	$1	2%	62%	$0	$1	$1.42	11%	◑
070920	Asparagus, fresh or chilled	$92	1%	5%	$12	$21	$6.20	4%	◑
070930	Aubergines, fresh or chilled	$21	9%	9%	$12	$7	$0.48	2%	○
070940	Celery, fresh or chilled	$33	9%	14%	$20	$16	$1.06	5%	◑
070951	Mushrooms, fresh or chilled	$33	13%	15%	$23	$17	$1.48	4%	◑
070960	Fruits of genus Capsicum or Pimenta, fresh or chilled	$276	9%	15%	$162	$140	$1.46	2%	◑
070970	Spinach, fresh or chilled	$20	19%	20%	$17	$12	$1.01	3%	◑
070990	Other vegetables, fresh or chilled, nes	$369	3%	1%	$96	$22	$0.85	8%	○
071010	Potatoes, frozen	$65	5%	4%	$24	$11	$1.16	5%	○
071021	Shelled or unshelled peas, frozen	$58	6%	11%	$26	$24	$0.14	-18%	○
071022	Shelled or unshelled beans, frozen	$52	5%	7%	$19	$15	$1.54	5%	○
071029	Leguminous vegetables, shelled or unshelled, frozen	$169	4%	9%	$60	$61	$2.01	3%	○
071030	Spinach, frozen	$61	17%	13%	$49	$28	$1.46	3%	◑
071040	Sweet corn, frozen	$134	5%	8%	$49	$42	$1.48	3%	○
071080	Vegetables, frozen, nes	$605	10%	11%	$376	$247	$1.17	2%	◑
071090	Mixtures of vegetables, frozen	$98	4%	6%	$34	$25	$1.46	2%	○

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0"

High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
071120	Olives provisionally preserved, not for immediate consumption	$6	10%	23%	$4	$4	$1.70	7%	◑
071130	Capers provisionally preserved, not for immediate consumption	$0	-29%	4%	-$0	$0	$0.56	-10%	○
071140	Cucumbers and gherkins provisionally preserved	$24	2%	3%	$5	$3	$0.61	4%	○
071190	Other vegetables and mixture of vegetables provisionally preserved	$120	3%	7%	$28	$35	$0.72	2%	○
071220	Dried onions	$55	6%	3%	$24	$8	$0.90	-7%	○
071290	Dried vegetables, nes	$387	6%	8%	$177	$127	$2.39	0%	◑
071310	Dried peas, shelled	$1,206	17%	5%	$965	$283	$0.47	7%	◑
071320	Dried chickpeas, shelled	$534	14%	16%	$386	$279	$0.41	1%	◑
071331	Dried beans, shelled	$774	20%	14%	$651	$364	$0.81	9%	●
071332	Dried adzuki beans, shelled	$72	6%	7%	$32	$20	$0.89	7%	○
071333	Dried kidney beans, incl. white pea beans, shelled	$249	16%	11%	$194	$103	$0.37	-1%	◑
071339	Dried beans, shelled, nes	$165	4%	8%	$59	$53	$0.51	5%	○
071340	Dried lentils, shelled	$754	20%	19%	$636	$436	$0.44	0%	●
071350	Dried broad beans and horse beans, shelled	$363	15%	9%	$271	$128	$0.29	1%	◑
071390	Dried leguminous vegetables, shelled, nes	$609	12%	12%	$421	$269	$0.98	13%	◑
071410	Manioc, fresh or dried	$2,221	26%	29%	$1,998	$1,597	$0.26	12%	●
071420	Sweet potatoes, fresh or dried	$52	19%	20%	$42	$31	$0.79	10%	◑
071490	Roots and tubers with high starch content, fresh or dried	$144	7%	13%	$69	$65	$1.53	9%	◑
080111	Coconuts, desiccated, shelled	$82	6%	5%	$37	$19	$0.26	-9%	○
080119	Coconuts, fresh, shelled	$109	21%	19%	$93	$63	$0.22	3%	◑
080121	Brazil nuts, in shell fresh	$3	22%	-15%	$3	-$4	$2.27	3%	○
080122	Brazil nuts, shelled dried	$4	15%	6%	$3	$1	$5.28	16%	◑
080131	Cashew nuts, in shell dried	$1,424	16%	10%	$1,101	$558	$0.93	3%	●
080132	Cashew nuts, shelled dried	$348	18%	9%	$279	$121	$1.91	-4%	◑
080211	Almonds in shell, fresh or dried	$834	26%	28%	$749	$587	$3.37	6%	●
080212	Almonds without shells, fresh or dried	$868	15%	17%	$658	$472	$1.50	-9%	●
080221	Hazelnuts in shell, fresh or dried	$62	9%	11%	$35	$25	$3.72	10%	◑
080222	Hazelnuts without shells, fresh or dried	$49	14%	9%	$36	$17	$0.28	-21%	○
080231	Walnuts in shell, fresh or dried	$272	50%	62%	$267	$248	$3.99	10%	●
080232	Walnuts without shells, fresh or dried	$355	16%	16%	$278	$188	$4.76	2%	●
080240	Chestnuts, fresh or dried	$113	-2%	4%	-$28	$20	$0.87	-12%	○
080250	Pistachio, fresh or dried	$1,123	16%	19%	$859	$656	$7.82	12%	●
080290	Other nuts, fresh or dried, nes	$756	20%	21%	$637	$463	$2.26	6%	●

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0"

High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
080300	Bananas, including plantains, fresh or dried	$1,868	8%	6%	$1,015	$445	$0.44	0%	◑
080410	Dates, fresh or dried	$357	16%	14%	$279	$171	$0.69	10%	◑
080420	Figs, fresh or dried	$111	18%	15%	$89	$55	$4.80	13%	◑
080430	Pineapples, fresh or dried	$278	12%	10%	$187	$105	$0.49	0%	◑
080440	Avocados, fresh or dried	$209	14%	20%	$154	$124	$2.45	2%	◑
080450	Guavas, mangoes and mangosteens, fresh or dried	$622	15%	17%	$465	$334	$1.34	5%	◑
080510	Oranges, fresh or dried	$1,130	7%	7%	$536	$328	$0.79	4%	◑
080520	Mandarins, clementines, wilkings...etc., fresh or dried	$471	15%	12%	$358	$200	$0.87	6%	◑
080540	Grapefruit, fresh or dried	$215	-2%	1%	-$39	$10	$0.88	1%	○
080590	Citrus fruit, fresh or dried, nes	$8	3%	20%	$2	$5	$0.61	10%	◑
080610	Fresh grapes	$1,654	18%	23%	$1,330	$1,060	$2.00	6%	●
080620	Dried grapes	$268	12%	13%	$180	$124	$1.99	6%	◑
080711	Watermelons, fresh	$112	13%	6%	$79	$29	$0.28	3%	○
080719	Melons, fresh	$91	5%	2%	$32	$9	$0.62	0%	○
080720	Papaws (papayas), fresh	$28	-3%	5%	-$9	$6	$0.83	4%	○
080810	Apples, fresh	$1,633	15%	16%	$1,232	$860	$0.15	-12%	●
080820	Pears and quinces, fresh	$322	11%	10%	$209	$120	$0.88	6%	◑
080910	Apricots, fresh	$18	5%	30%	$7	$13	$0.16	-14%	○
080920	Cherries, fresh	$696	17%	27%	$554	$487	$7.29	7%	●
080930	Peaches, including nectarines, fresh	$78	11%	21%	$51	$48	$0.15	-13%	○
080940	Plums and sloes, fresh	$198	11%	28%	$129	$141	$0.21	-15%	◑
081010	Strawberries, fresh	$154	11%	16%	$102	$81	$5.00	3%	◑
081020	Raspberries, blackberries, mulberries and logan	$33	12%	16%	$23	$17	$12.17	6%	◑
081030	Black, white or red currants and gooseberries	$0	-28%	11%	-$1	$0	$5.33	11%	◑
081040	Cranberries, bilberries...etc., fresh	$85	15%	27%	$64	$59	$8.01	1%	◑
081050	Kiwifruit	$495	11%	9%	$327	$172	$1.63	-2%	◑
081090	Other fruit, fresh, nes	$1,412	21%	23%	$1,210	$903	$0.71	2%	●
081110	Strawberries, frozen	$133	7%	9%	$63	$48	$0.71	-5%	○
081120	Raspberries, blackberries...etc., frozen	$34	10%	9%	$21	$12	$0.58	-12%	○
081190	Other fruit and nuts, frozen, nes	$386	14%	9%	$279	$140	$0.70	-8%	◑
081210	Cherries, provisionally preserved, not for immediate consumption	$8	17%	12%	$6	$4	$0.05	-29%	◑
081290	Fruit and nuts, provisionally preserved, not for immediate consumption	$50	-1%	5%	-$6	$12	$1.57	3%	○
081310	Dried apricots	$37	10%	8%	$23	$12	$3.49	5%	◑

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0"

High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
081320	Dried prunes	$78	4%	7%	$25	$22	$2.57	3%	○
081330	Dried apples	$6	21%	11%	$5	$3	$1.74	-7%	◑
081340	Other dried fruit, nes	$181	11%	9%	$116	$63	$1.44	8%	◑
081350	Mixtures of dried fruit and nuts, nes	$13	15%	42%	$10	$11	$1.30	14%	◑
081400	Peel of citrus fruit or melons, fresh, frozen,	$11	9%	5%	$6	$2	$2.14	3%	○
090111	Coffee, not roasted or decaffeinated	$2,867	14%	7%	$2,108	$809	$2.84	9%	●
090112	Decaffeinated coffee, not roasted	$39	10%	11%	$24	$15	$3.40	8%	◑
090122	Roasted, decaffeinated coffee	$31	10%	5%	$20	$7	$9.33	9%	◑
090190	Coffee husks and skins	$25	17%	19%	$20	$15	$3.44	5%	◑
090210	Green tea in immediate packings	$50	13%	17%	$36	$27	$8.39	8%	◑
090220	Green tea, nes	$85	8%	11%	$46	$34	$2.80	4%	◑
090230	Black tea (fermented) and partly fermented tea	$477	12%	8%	$329	$146	$8.07	3%	◑
090240	Black tea (fermented) and partly fermented tea and other	$996	8%	6%	$526	$244	$2.90	4%	◑
090300	Mate	$10	16%	36%	$8	$8	$3.44	11%	◑
090411	Dried pepper (excl. crushed or ground)	$533	16%	20%	$411	$315	$6.02	13%	●
090412	Pepper, crushed or ground	$89	20%	16%	$74	$47	$5.51	8%	◑
090420	Fruits of genus Capsicum or Pimenta, dried, crushed or ground	$312	10%	3%	$189	$47	$1.77	6%	◑
090500	Vanilla	$14	-10%	14%	-$27	$7	$19.95	-8%	○
090700	Cloves (whole fruit, cloves and stems)	$152	7%	10%	$75	$57	$8.22	16%	◑
090810	Nutmeg	$39	9%	12%	$22	$17	$11.59	13%	◑
090820	Mace	$13	7%	7%	$6	$4	$13.90	10%	◑
090830	Cardamoms	$201	8%	4%	$107	$39	$8.53	7%	◑
090910	Seeds of anise or badian	$36	17%	29%	$29	$26	$1.97	4%	◑
090920	Seeds of coriander	$88	14%	7%	$64	$27	$1.03	7%	◑
090950	Seeds of fennel; juniper berries	$0	-39%	-68%	-$4	-$8	$1.30	8%	○
091010	Ginger	$253	9%	5%	$145	$56	$0.93	7%	○
100110	Durum wheat	$2,213	12%	-12%	$1,477	-$2,054	$0.50	12%	◑
100190	Spelt, common wheat and meslin	$11,544	12%	3%	$7,892	$1,427	$0.35	7%	◑
100200	Rye	$33	-7%	-2%	-$37	-$4	$0.47	16%	○
100300	Barley	$5,043	14%	2%	$3,671	$503	$0.32	7%	◑
100400	Oats	$73	10%	8%	$46	$24	$0.41	5%	○
100510	Maize seed	$691	12%	7%	$474	$200	$0.39	10%	◑
100590	Maize (excl. seed)	$14,006	11%	5%	$9,283	$2,873	$0.25	7%	◑

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High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
100610	Rice in the husk (paddy or rough)	$113	16%	2%	$87	$11	$0.80	5%	◑
100620	Husked (brown) rice	$352	14%	7%	$260	$98	$0.25	-2%	○
100630	Semi-milled or wholly milled rice	$5,235	13%	-4%	$3,707	-$1,207	$0.64	6%	○
100640	Broken rice	$305	5%	18%	$113	$171	$0.40	7%	◑
100700	Grain sorghum	$932	15%	18%	$703	$521	$0.31	8%	●
100810	Buckwheat	$31	4%	-4%	$9	-$7	$0.67	12%	○
100820	Millet	$42	12%	9%	$29	$15	$0.50	9%	◑
100830	Canary seed	$13	14%	15%	$10	$7	$0.08	-15%	◑
100890	Other cereal, nes	$22	22%	25%	$19	$15	$0.42	7%	◑
110100	Wheat or meslin flour	$757	13%	0%	$524	$16	$0.49	7%	◑
110210	Rye flour	$0	-40%	-59%	-$3	-$2	$0.76	6%	○
110220	Maize (corn) flour	$12	3%	-2%	$3	-$2	$0.71	6%	○
110230	Rice flour	$2	-21%	-9%	-$16	-$1	$0.61	4%	○
110290	Other cereal flour, nes	$105	17%	10%	$83	$39	$0.98	12%	◑
110311	Groats and meal of wheat	$61	13%	36%	$43	$48	$0.62	7%	◑
110313	Groats and meal of maize (corn)	$170	11%	11%	$109	$70	$0.03	-17%	◑
110319	Groats and meal of other cereals, nes	$21	22%	-33%	$18	-$129	$0.38	14%	○
110412	Rolled or flaked oat grains	$114	14%	17%	$83	$61	$0.33	-9%	◑
110419	Rolled or flaked grains of other cereals, nes	$22	-2%	2%	-$4	$2	$0.43	10%	○
110422	Other worked grains of oats, nes	$7	10%	20%	$4	$4	$0.18	-9%	○
110423	Other worked grains of maize (corn), nes	$16	1%	-5%	$2	-$4	$0.61	11%	○
110429	Other worked grains of other cereals, nes	$49	9%	-10%	$29	-$35	$0.52	7%	○
110430	Cereal germ, whole, rolled, flaked or ground	$2	7%	2%	$1	$0	$1.09	3%	○
110510	Potato flour and meal	$47	9%	15%	$28	$24	$1.25	7%	◑
110520	Potato flakes, granules and pellets	$95	10%	12%	$58	$42	$1.59	3%	◑
110610	Flour and meal of the dried leguminous vegetables	$16	10%	13%	$10	$7	$0.94	8%	◑
110620	Flour and meal of sago, roots or tubers of 0714	$16	12%	2%	$11	$2	$0.56	5%	○
110630	Flour, meal and powder of products of Chapter 8	$51	16%	19%	$39	$29	$1.40	-4%	◑
110710	Malt not roasted	$843	7%	-1%	$404	-$26	$0.62	6%	○
110720	Roasted malt	$98	16%	8%	$75	$31	$0.39	-2%	○
110811	Wheat starch	$37	10%	5%	$23	$8	$0.46	7%	○
110812	Maize (corn) starch	$121	11%	0%	$78	-$1	$0.15	-5%	○
110813	Potato starch	$184	8%	13%	$100	$83	$0.28	-4%	○

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High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
110814	Manioc (cassava) starch	$1,030	18%	21%	$829	$627	$0.48	10%	●
110819	Other starches, nes	$134	17%	15%	$105	$67	$0.39	0%	◑
110820	Inulin	$45	16%	12%	$34	$19	$3.10	2%	◑
110900	Wheat gluten	$126	7%	6%	$64	$31	$0.38	-9%	○
120100	Soya beans	$45,485	18%	10%	$36,860	$17,720	$0.61	9%	●
120210	Ground-nuts in shell, not roasted or otherwise cooked	$171	25%	28%	$153	$121	$1.02	8%	●
120220	Shelled ground-nuts, not roasted or otherwise cooked	$447	12%	14%	$309	$212	$1.24	10%	◑
120300	Copra	$39	8%	-13%	$20	-$39	$0.65	5%	○
120400	Linseed	$132	22%	28%	$114	$94	$0.67	7%	◑
120600	Sunflower seeds	$249	12%	35%	$172	$194	$1.41	15%	●
120710	Palm nuts and kernels	$14	9%	16%	$8	$7	$0.51	9%	◑
120720	Cotton seeds	$184	11%	9%	$120	$64	$0.37	6%	◑
120730	Castor oil seeds	$12	24%	17%	$10	$7	$0.53	8%	◑
120740	Sesamum seeds	$1,731	18%	11%	$1,400	$720	$1.79	9%	●
120750	Mustard seeds	$13	4%	2%	$5	$1	$1.01	7%	○
120760	Safflower seeds	$5	1%	59%	$0	$5	$0.41	0%	◑
120799	Other oil seeds and oleaginous fruits, nes	$122	16%	6%	$95	$29	$1.06	6%	◑
120810	Soya bean flour and meal	$71	14%	-5%	$52	-$21	$0.83	7%	○
120890	Other flours and meal of oil seeds or oleaginous Fruit	$11	12%	30%	$8	$8	$1.09	-4%	◑
120921	Lucerne (alfalfa) seed, of a kind used for sowing	$91	13%	30%	$64	$67	$7.13	12%	◑
120929	Other seeds of forage plants, of a kind used for sowing	$80	6%	10%	$34	$31	$0.76	10%	◑
121210	Locust beans (incl. locust bean seeds), fresh	$9	22%	78%	$8	$8	$1.08	9%	◑
121291	Sugar beet, fresh or dried	$1	9%	5%	$0	$0	$0.96	22%	○
121300	Cereal straw and husks	$174	8%	7%	$93	$50	$0.28	2%	○
121410	Lucerne (alfalfa) meal and pellets	$107	8%	8%	$55	$33	$0.40	7%	○
121490	Other forage products, nes	$1,727	8%	10%	$951	$668	$0.40	6%	◑
130232	Mucilages and thickeners of locust beans, bean	$188	12%	12%	$128	$80	$7.06	11%	◑
130239	Mucilages and thickeners, derived from vegetables	$172	7%	8%	$88	$57	$8.94	5%	◑
140420	Cotton linters	$98	8%	4%	$54	$16	$0.51	6%	○
150710	Crude soya-bean oil	$3,335	6%	-7%	$1,533	-$1,433	$1.12	7%	○
150790	Soya-bean oil (excl. crude) and fractions	$255	0%	-8%	-$10	-$128	$1.30	8%	○
150810	Crude ground-nut oil	$122	23%	39%	$107	$99	$1.80	5%	◑
150890	Ground-nut oil (excl. crude) and fractions	$18	3%	-10%	$5	-$12	$3.20	10%	○

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High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
150910	Virgin olive oil and fractions	$558	18%	16%	$449	$292	$4.63	3%	●
150990	Olive oil and fractions (excl. virgin)	$176	9%	8%	$102	$58	$3.83	3%	◑
151110	Crude palm oil	$5,909	14%	8%	$4,258	$1,832	$0.82	7%	◑
151190	Palm oil (excl. crude) and liquid fractions	$11,689	14%	5%	$8,560	$2,539	$0.86	7%	◑
151211	Crude sunflower-seed and safflower oil and fractions	$2,652	29%	41%	$2,439	$2,171	$1.23	7%	●
151219	Sunflower-seed and safflower oil (excl. crude)	$296	11%	5%	$195	$63	$1.56	5%	◑
151221	Crude cotton-seed oil, whether or not gossypol	$0	-35%	-57%	-$7	-$7	$1.30	6%	○
151229	Cotton-seed oil (excl. crude) and its fractions	$16	6%	-6%	$7	-$6	$1.20	4%	○
151311	Crude coconut (copra) oil and fractions thereof	$160	3%	-15%	$36	-$197	$0.85	7%	○
151319	Coconut copra oil (excl. crude) and its fractions	$278	9%	-2%	$159	-$34	$0.63	2%	○
151321	Crude palm kernel or babassu oil and fractions	$518	15%	-10%	$392	-$382	$0.83	7%	○
151329	Palm kernel or babassu oil (excl. crude) and fractions	$725	19%	24%	$601	$474	$0.90	7%	●
151511	Crude linseed oil	$31	13%	15%	$22	$16	$1.46	8%	◑
151519	Linseed oil (excl. crude) and fractions	$35	1%	-4%	$4	-$7	$1.58	6%	○
151521	Crude maize (corn) oil	$191	15%	19%	$142	$111	$1.30	6%	◑
151529	Maize (corn) oil (excl. crude) and fractions	$169	4%	-9%	$57	-$98	$1.85	9%	○
151530	Castor oil and its fractions	$392	22%	15%	$340	$198	$1.38	4%	●
151540	Tung oil and its fractions	$0	-40%	-52%	-$15	-$4	$2.48	7%	○
151550	Sesame oil and fractions	$52	10%	11%	$32	$21	$2.94	6%	◑
170111	Raw cane sugar, in solid form	$6,666	20%	20%	$5,555	$3,943	$0.46	9%	●
170112	Raw beet sugar, in solid form	$481	14%	133%	$348	$474	$0.49	8%	◑
170191	Cane or beet sugar, containing added flavouring	$20	4%	11%	$6	$8	$0.99	14%	◑
170199	Cane or beet sugar, in solid form, nes	$2,107	11%	6%	$1,374	$566	$0.62	9%	◑
180100	Cocoa beans, whole or broken, raw or roasted	$1,356	7%	-5%	$638	-$422	$2.48	3%	○
180200	Cocoa shells, husks, skins and other cocoa wast	$7	-6%	-14%	-$6	-$8	$0.31	0%	○
200110	Cucumbers and gherkins, preserved by vinegar or	$28	5%	9%	$11	$10	$1.24	3%	○
200210	Tomatoes, whole or in pieces, preserved other than vinegar	$161	9%	8%	$91	$50	$1.06	4%	○
200290	Tomatoes, preserved otherwise than by vinegar or acetic acid	$488	12%	10%	$327	$179	$1.08	4%	◑
230210	Brans, sharps and other residues of maize	$172	21%	35%	$146	$134	$0.26	2%	◑
230220	Brans, sharps and other residues of rice	$1	-23%	-19%	-$8	-$1	$0.12	2%	○
230230	Brans, sharps and other residues of wheat	$338	15%	7%	$251	$95	$0.27	10%	◑
230240	Brans, sharps and other residues of other cereals	$61	23%	17%	$53	$33	$0.38	9%	◑
230250	Brans, sharps and other residues of leguminous	$26	18%	30%	$21	$19	$0.44	4%	◑

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High ● Medium ◑ Low ○

HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value		Absolute import growth		US$/kg or l 2013	10y CAGR $/kg or l	Overall
			10y	5y	10y	5y			
230400	Oil-cake and other solid residues, of soya-bean	$10,332	15%	10%	$7,829	$3,878	$0.54	9%	
230500	Oil-cake and other solid residues, of ground-nuts	$14	5%	-22%	$5	-$35	$0.40	6%	○
230610	Oil-cake and other solid residues of cotton seeds	$20	1%	11%	$2	$8	$0.37	9%	◑
230620	Oil-cake and other solid residues of linseed	$0	-6%	5%	-$0	$0	$0.32	4%	○
230630	Oil-cake and other solid residues of sunflower	$123	17%	17%	$98	$68	$0.16	3%	◑
230650	Oil-cake and other solid residues of coconut or copra oil	$213	16%	9%	$163	$74	$0.23	9%	◑
230660	Oil-cake and other solid residues of palm nuts	$353	31%	17%	$328	$194	$0.18	10%	●
240110	Tobacco, not stemmed/stripped	$509	6%	16%	$215	$262	$5.01	5%	◑
240120	Tobacco, partly or wholly stemmed/stripped	$3,189	10%	8%	$2,002	$1,028	$7.10	4%	●
240130	Tobacco refuse	$79	22%	13%	$68	$36	$1.09	5%	◑
240210	Cigars, cheroots and cigarillos containing tobacco	$108	10%	5%	$67	$24	$134.56	7%	◑
240220	Cigarettes containing tobacco	$8,001	7%	8%	$4,080	$2,673	$27.10	7%	◑
240290	Cigars, cigarillos, cigarettes, etc., not containing tobacco	$41	-1%	-1%	-$6	-$3	$14.39	-1%	○
240310	Smoking tobacco with or without tobacco substitutes	$326	3%	6%	$89	$87	$7.22	1%	◑
240391	Homogenized or reconstituted tobacco	$108	5%	12%	$41	$45	$3.81	-1%	○
330111	Essential oils of bergamot (incl. concretes)	$0	-38%	-61%	-$2	-$2	$11.16	-7%	○
330112	Essential oils of orange (incl. concretes)	$82	10%	14%	$49	$39	$4.37	4%	◑
330113	Essential oils of lemon (incl. concretes)	$67	12%	-1%	$46	-$5	$34.47	11%	◑
330114	Essential oils of lime (incl. concretes)	$0	-33%	41%	-$4	$0	$118.72	19%	◑
330119	Essential oils of citrus fruit (incl. concretes)	$68	9%	11%	$38	$28	$26.66	5%	◑
330124	Essential oils of peppermint (incl. concretes)	$71	0%	2%	$0	$6	$37.71	8%	◑
330125	Essential oils of mints (incl. concretes)	$210	20%	38%	$177	$168	$21.94	8%	●
520100	Cotton, not carded or combed	$14,195	14%	11%	$10,221	$5,835	$2.04	5%	●
530110	Flax, raw or retted	$1	-19%	-15%	-$7	-$1	$2.18	2%	○
530121	Flax, broken or scutched, but not spun	$296	7%	10%	$148	$112	$2.53	2%	◑

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CONTENTS

The seven states of the US Southwest are reasonable peers for Northern Western Australia regions; they highlight the opportunities for agrifood growth in the North

COMPARISON OF AGRICULTURAL AND CLIMATIC METRICS OF US SOUTHWEST STATES

Various; 2015 or as available

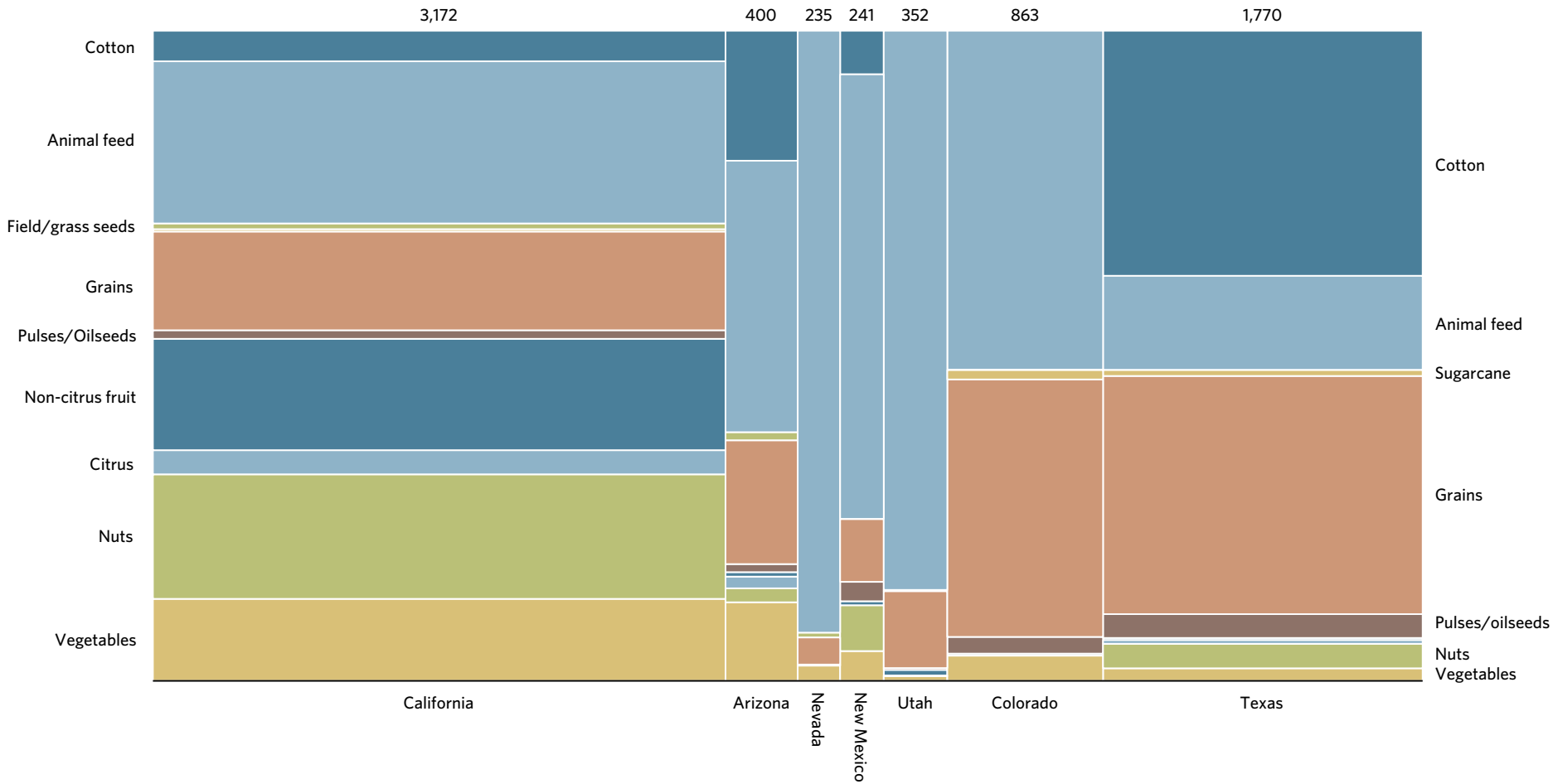
	Texas	California	New Mexico	Arizona	Nevada	Colorado	Utah
Area	696,241 km^2	423,970 km^2	315,194 km^2	295,234 km^2	286,367 km^2	269,837 km^2)	219,887 km^2
Value of agricultural production	$25,376m	$42,627m	$2,550m	$3,732m	$764m	$7,781m	$1,816m
Value of agricultural production per square kilometre	$36,447	$100,542	$8,090	$12,641	$2,668	$28,836	$8,259
Irrigated area (hectare)	1,816,697	3,181,619	275,314	356,371	278,338	1,018,505	446,876
Population	27,695,284	38,802,500	2,085,572	6,731,484	2,839,099	5,355,866	2,949,902
Largest City	Dallas-Ft. Worth	Los Angeles	Albuquerque	Phoenix	Las Vegas	Denver	Salt Lake City
Average annual precipitation	88.1cm	33.5cm	24.1cm	21.1cm	11.4cm	40.1cm	41.9cm
Average number of days of rain	79	35	60	36	26	89	91
Average monthly temperature Jan/July	6.7 29.4	13.9 20.7	2.1 25.8	12.3 33.8	8.3 32.9	0 23	0 25
Average relative humidity (Afternoon in mid-summer month)	42%	68%	27%	20%	15%	34%	22%

Source: USDA Census of Agriculture; NOAA (US); Wikipedia (area and population); Coriolis analysis

US Southwest peers produce a wide range of products with their irrigated land; however, the biggest use of water is animal feed, followed by grains, nuts and cotton

US SOUTHWEST POTENTIALLY IRRIGATED AREA BY PRODUCT CATEGORY

Hectare; 000; 2012

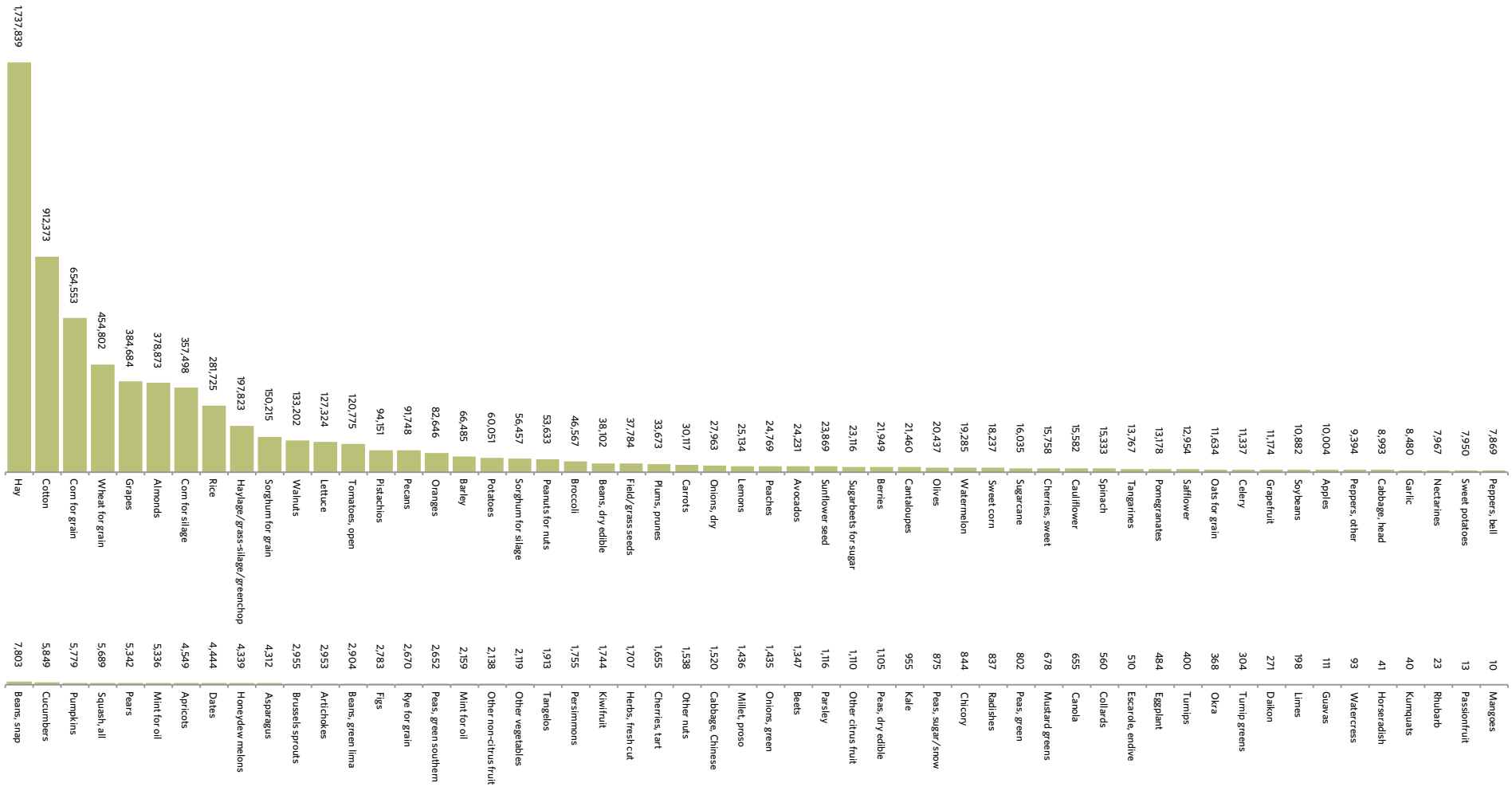


Note: the totals given here will not match total irrigated area (given earlier) for a range of reasons, including multiple products in a year and different measures (potential vs. actual); treat as directional; Source: USDA Census of Agriculture data; Coriolis analysis

Drilling into the product level shows a classic "long tail" distribution; these product level categories feed into the Phase I market demand workstream

AGGREGATE US SOUTHWEST IRRIGATED AREA BY PRODUCT

Hectare; 000; 2012



Note: Total of values given here will not match total irrigated area (given earlier) for a range of reasons, including multiple products in a year and different measures (potential vs. actual); treat as directional; Source: USDA Census of Agriculture data; Coriolis analysis

Forty-two agri-food peer group countries, primarily developing nations, were initially identified

COMPARISON OF BASIC DEMOGRAPHIC & AGRICULTURAL METRICS OF IDENTIFIED CLIMATIC PEERS

Various; 2015 or as available

	Area (km^2)	Population	Value of agriculture US$m; 2012	Ag value/km^2 US$; 12
Argentina	2,780,400	40,518,951	$38,659m	$13,904
Sudan	2,505,813	39,154,490	$16,105m	$6,427
Algeria	2,381,741	35,423,000	$19,699m	$8,271
Saudi Arabia	2,149,690	26,246,000	$5,850m	$2,721
Mexico	1,964,375	108,396,211	$48,354m	$24,616
Libya	1,759,540	6,420,000	N/A	N/A
Iran	1,628,750	75,078,000	$56,697m	$34,810
Peru	1,285,216	29,132,013	$13,944m	$10,849
Chad	1,284,000	11,274,106	$3,686m	$2,871
Niger	1,267,000	15,290,000	$4,031m	$3,181
Angola	1,246,700	18,993,000	$7,632m	$6,122
Mali	1,240,192	14,517,176	$6,922m	$5,582
Ethiopia	1,104,300	79,221,000	$11,033m	$9,991
Bolivia	1,098,581	9,879,000	$3,683m	$3,353
Mauritania	1,025,520	3,291,000	N/A	N/A
Egypt	1,002,000	78,742,000	$34,772m	$34,703
Tanzania	945,087	45,040,000	$3,819m	$4,041
Namibia	824,116	2,212,000	$538m	$653
Mozambique	801,590	21,350,080	$9,599m	$11,975
Pakistan	796,095	170,056,000	$30,569m	$38,398
Chile	756,102	17,103,000	$10,238m	$13,540
Zambia	752,612	12,935,000	$2,962m	$3,936
Afghanistan	652,090	29,117,000	N/A	N/A

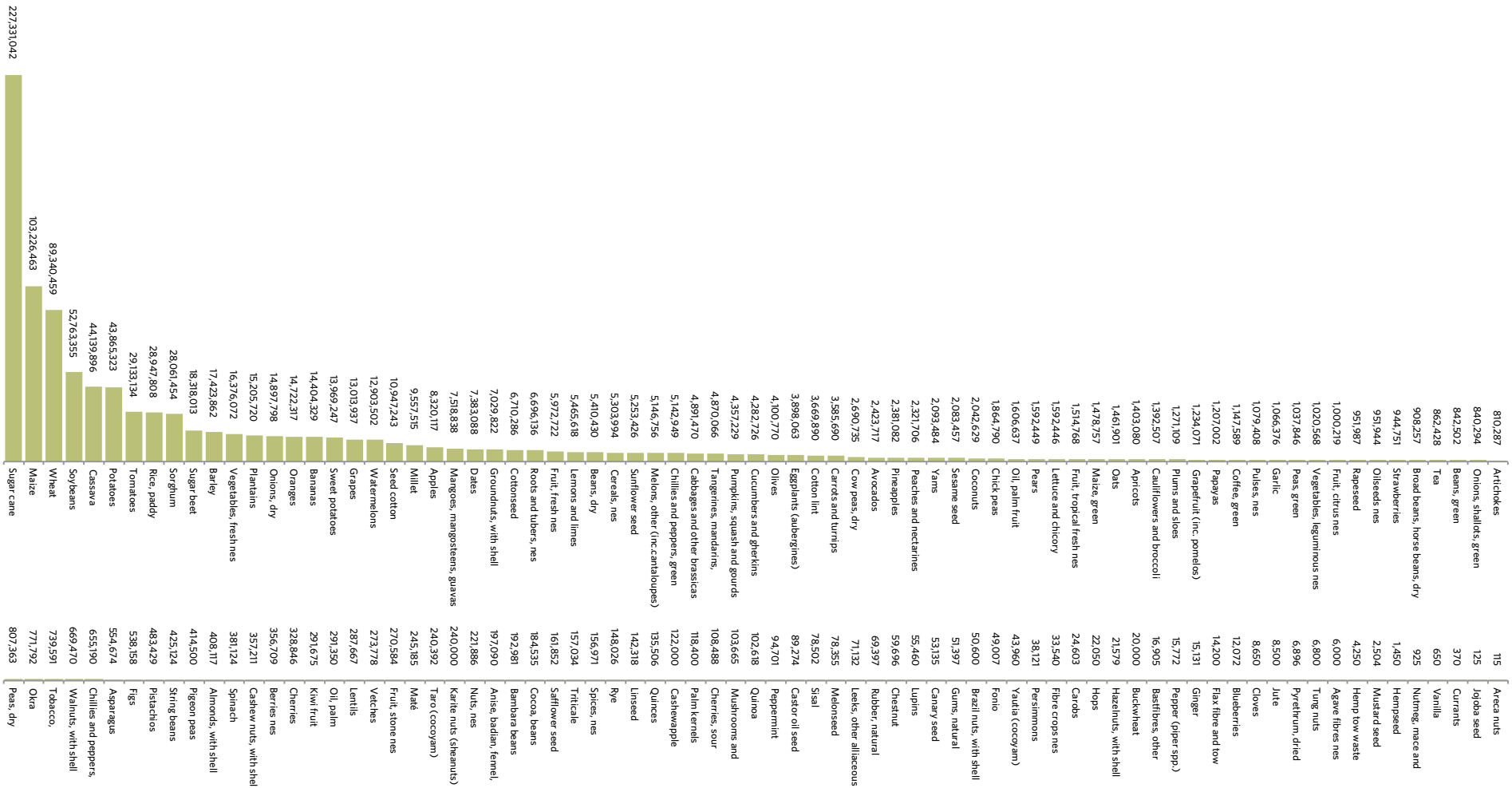
	Area (km^2)	Population	Value of agriculture US$m; 2012	Ag value/km^2 US$; 12
Somalia	637,657	9,133,000	N/A	N/A
Botswana	582,000	1,950,000	$43m	$75
Kenya	580,367	40,863,000	$11,781m	$20,299
Yemen	527,968	24,256,000	$5,531m	$10,476
Morocco	446,550	31,869,000	$12,739m	$28,527
Iraq	438,317	31,467,000	$5,969m	$13,619
Zimbabwe	390,757	12,523,000	$846m	$2,165
Oman	309,500	2,845,000	$103m	$333
Burkina Faso	274,222	15,757,000	$1,990m	$7,257
Uganda	241,038	33,796,000	N/A	N/A
Senegal	196,722	12,534,000	$1,030m	$5,238
Tunisia	163,610	10,432,500	$3,727m	$22,783
Eritrea	117,600	5,073,000	$404m	$3,432
Jordan	89,342	6,316,000	$1,694m	$18,956
UAE	83,600	4,599,000	N/A	N/A
Rwanda	26,338	9,998,000	$3,916m	$148,667
Israel	22,072	7,602,400	$4,547m	$205,989
Kuwait	17,818	2,985,000	N/A	N/A
Qatar	11,586	1,696,563	$61m	$5,239

Source: UN FAO (various databases); Coriolis analysis

Drilling into the product level shows a classic "long tail" distribution; these product level categories feed into the Phase I market demand workstream

AGGREGATE AREA BY PRODUCT: DEFINED CLIMATIC PEER GROUP FOR NORTHERN WESTERN AUSTRALIA

Hectare; 000; 2012



Source: UN FAO database; Coriolis analysis

POTENTIAL PRODUCT CONVERTED INTO RELATED TRADE CODES – P1

70200	Tomatoes, fresh or chilled
70310	Onions and shallots, fresh or chilled
70320	Garlic, fresh or chilled
70390	Leeks and other alliaceous vegetables, nes
70410	Cauliflowers and headed broccoli, fresh or chilled
70420	Brussels sprouts, fresh or chilled
70490	White and red cabbages, kohlrabi, kale…etc.,
70511	Cabbage lettuce, fresh or chilled
70519	Lettuce, fresh or chilled, (excl. cabbage lettuce
70521	Witlof chicory, fresh or chilled
70529	Chicory, fresh or chilled, (excl. witloof)
70610	Carrots and turnips, fresh or chilled
70690	Beetroot...radishes and other similar edible
70700	Cucumbers and gherkins, fresh or chilled
70810	Peas, fresh or chilled
70820	Beans, fresh or chilled
70890	Leguminous vegetables, fresh or chilled, nes
70910	Globe artichokes, fresh or chilled
70920	Asparagus, fresh or chilled
70930	Aubergines, fresh or chilled
70940	Celery, fresh or chilled
70951	Mushrooms, fresh or chilled
70952	Truffles, fresh or chilled
70960	Fruits of genus Capsicum or Pimenta, fresh
70970	Spinach, fresh or chilled
70990	Other vegetables, fresh or chilled, nes
71010	Potatoes, frozen
71021	Shelled or unshelled peas, frozen
71022	Shelled or unshelled beans, frozen
71029	Leguminous vegetables, shelled or unshelled
71030	Spinach, frozen
71040	Sweet corn, frozen
71080	Vegetables, frozen, nes
71090	Mixtures of vegetables, frozen
71120	Olives provisionally preserved, not for immed
71130	Capers provisionally preserved, not for immed
71140	Cucumbers and gherkins provisionally preserved
71190	Other vegetables and mixture of vegetables pro
71220	Dried onions
71290	Dried vegetables, nes
71310	Dried peas, shelled
71320	Dried chickpeas, shelled
71331	Dried beans, shelled
71332	Dried adzuki beans, shelled
71333	Dried kidney beans, incl. white pea beans,
71339	Dried beans, shelled, nes
71340	Dried lentils, shelled
71350	Dried broad beans and horse beans, shelled
71390	Dried leguminous vegetables, shelled, nes
71410	Manioc, fresh or dried
71420	Sweet potatoes, fresh or dried
71490	Roots and tubers with high starch content
80111	Coconuts, desiccated, shelled
80119	Coconuts, fresh, shelled
80121	Brazil nuts, in shell fresh
80122	Brazil nuts, shelled dried
80131	Cashew nuts, in shell dried
80132	Cashew nuts, shelled dried
80211	Almonds in shell, fresh or dried
80212	Almonds without shells, fresh or dried
80221	Hazelnuts in shell, fresh or dried
80222	Hazelnuts without shells, fresh or dried
80231	Walnuts in shell, fresh or dried
80232	Walnuts without shells, fresh or dried
80240	Chestnuts, fresh or dried
80250	Pistachio, fresh or dried
80290	Other nuts, fresh or dried, nes
80300	Bananas, including plantains, fresh or dried
80410	Dates, fresh or dried
80420	Figs, fresh or dried
80430	Pineapples, fresh or dried
80440	Avocados, fresh or dried
80450	Guavas, mangoes and mangosteens, fresh or dried
80510	Oranges, fresh or dried
80520	Mandarins, clementines, wilkings…etc., fresh
80540	Grapefruit, fresh or dried
80590	Citrus fruit, fresh or dried, nes
80610	Fresh grapes
80620	Dried grapes
80711	Watermelons, fresh
80719	Melons, fresh
80720	Papaws (papayas), fresh
80810	Apples, fresh
80820	Pears and quinces, fresh
80910	Apricots, fresh
80920	Cherries, fresh
80930	Peaches, including nectarines, fresh
80940	Plums and sloes, fresh
81010	Strawberries, fresh
81020	Raspberries, blackberries, mulberries and Logan berries
81030	Black, white or red currants and gooseberries
81040	Cranberries, bilberries…etc., fresh
81050	Kiwifruit
81090	Other fruit, fresh, nes
81110	Strawberries, frozen
81120	Raspberries, blackberries...etc., frozen
81190	Other fruit and nuts, frozen, nes
81210	Cherries, provisionally preserved, not for immed. consumption
81290	Fruit and nuts, provisionally preserved
81310	Dried apricots
81320	Dried prunes
81330	Dried apples
81340	Other dried fruit, nes
81350	Mixtures of dried fruit and nuts, nes
81400	Peel of citrus fruit or melons, fresh, frozen
90111	Coffee, not roasted or decaffeinated
90112	Decaffeinated coffee, not roasted
90121	Roasted coffee, not decaffeinated
90122	Roasted, decaffeinated coffee
90190	Coffee husks and skins
90210	Green tea in immediate packings
90220	Green tea, nes
90230	Black tea (fermented) and partly fermented tea
90240	Black tea (fermented) and partly fermented tea
90300	Mate
90411	Dried pepper (excl. crushed or ground)
90412	Pepper, crushed or ground
90420	Fruits of genus Capsicum or Pimenta, dried, crushed
90500	Vanilla
90700	Cloves (whole fruit, cloves and stems)
90810	Nutmeg
90820	Mace
90830	Cardamoms
90910	Seeds of anise or badian
90920	Seeds of coriander
90950	Seeds of fennel; juniper berries
91010	Ginger
100110	Durum wheat
100190	Spelt, common wheat and meslin
100200	Rye
100300	Barley
100400	Oats
100510	Maize seed
100590	Maize (excl. seed)
100610	Rice in the husk (paddy or rough)
100620	Husked (brown) rice
100630	Semi-milled or wholly milled rice
100640	Broken rice
100700	Grain sorghum
100810	Buckwheat
100820	Millet
100830	Canary seed
100890	Other cereal, nes
110100	Wheat or meslin flour
110210	Rye flour
110220	Maize (corn) flour
110230	Rice flour

POTENTIAL PRODUCT CONVERTED INTO RELATED TRADE CODES – P2

110290	Other cereal flour, nes
110311	Groats and meal of wheat
110313	Groats and meal of maize (corn)
110319	Groats and meal of other cereals, nes
110412	Rolled or flaked oat grains
110419	Rolled or flaked grains of other cereals, nes
110422	Other worked grains of oats, nes
110423	Other worked grains of maize (corn), nes
110429	Other worked grains of other cereals, nes
110430	Cereal germ, whole, rolled, flaked or ground
110510	Potato flour and meal
110520	Potato flakes, granules and pellets
110610	Flour and meal of the dried leguminous vegetables
110620	Flour and meal of sago, roots or tubers of 0714
110630	Flour, meal and powder of products of Chapter 8
110710	Malt not roasted
110720	Roasted malt
110811	Wheat starch
110812	Maize (corn) starch
110813	Potato starch
110814	Manioc (cassava) starch
110819	Other starches, nes
110820	Inulin
110900	Wheat gluten
120100	Soya beans
120210	Ground-nuts in shell, not roasted or otherwise processed
120220	Shelled ground-nuts, not roasted or otherwise processed
120300	Copra
120400	Linseed
120600	Sunflower seeds
120710	Palm nuts and kernels
120720	Cotton seeds
120730	Castor oil seeds
120740	Sesamum seeds
120750	Mustard seeds
120760	Safflower seeds
120799	Other oil seeds and oleaginous fruits, nes
120810	Soya bean flour and meal
120890	Other flours and meal of oil seeds
120921	Lucerne (alfalfa) seed, of a kind used for sowiing
120929	Other seeds of forage plants, of a kind used for
121210	Locust beans (incl. locust bean seeds),
121291	Sugar beet, fresh or dried
121300	Cereal straw and husks
121410	Lucerne (alfalfa) meal and pellets
121490	Other forage products, nes
130214	Sap and extract of pyrethrum and roots of plant
130232	Mucilages and thickeners of locust beans, bean
130239	Mucilages and thickeners, derived from vegetables
130239	Mucilages and thickeners, derived from vegetables
140420	Cotton linters
150710	Crude soya-bean oil
150790	Soya-bean oil (excl. crude) and fractions
150810	Crude ground-nut oil
150890	Ground-nut oil (excl. crude) and fractions
150910	Virgin olive oil and fractions
150990	Olive oil and fractions (excl. virgin)
151110	Crude palm oil
151190	Palm oil (excl. crude) and liquid fractions
151211	Crude sunflower-seed and safflower oil and fractions
151219	Sunflower-seed and safflower oil (excl. crude)
151221	Crude cotton-seed oil, whether or not gossypol
151229	Cotton-seed oil (excl. crude) and fractions
151311	Crude coconut (copra) oil and fractions
151319	Coconut copra oil (excl. crude) and fractions
151321	Crude palm kernel or babassu oil and fractions
151329	Palm kernel or babassu oil (excl. crude) and factions
151511	Crude linseed oil
151519	Linseed oil (excl. crude) and fractions
151521	Crude maize (corn) oil
151529	Maize (corn) oil (excl. crude) and fractions
151530	Castor oil and its fractions
151540	Tung oil and its fractions
151550	Sesame oil and fractions
170111	Raw cane sugar, in solid form
170112	Raw beet sugar, in solid form
170191	Cane or beet sugar, containing added flavouring
170199	Cane or beet sugar, in solid form, nes
180100	Cocoa beans, whole or broken, raw or roasted
180200	Cocoa shells, husks, skins and other cocoa waste
200110	Cucumbers and gherkins, preserved by vinegar
200210	Tomatoes, whole or in pieces, preserved other than by vinegar
200290	Tomatoes, preserved otherwise than by vinegar
230210	Brans, sharps and other residues of maize
230220	Brans, sharps and other residues of rice
230230	Brans, sharps and other residues of wheat
230240	Brans, sharps and other residues of other cerea
230250	Brans, sharps and other residues of leguminous
230400	Oil-cake and other solid residues, of soya-bean
230500	Oil-cake and other solid residues, of ground-nuts
230610	Oil-cake and other solid residues of cotton seeds
230620	Oil-cake and other solid residues of linseed
230630	Oil-cake and other solid residues of sunflower
230650	Oil-cake and other solid residues of coconut
230660	Oil-cake and other solid residues of palm nuts
240110	Tobacco, not stemmed/stripped
240120	Tobacco, partly or wholly stemmed/stripped
240130	Tobacco refuse
240210	Cigars, cheroots and cigarillos containing tobacco
240220	Cigarettes containing tobacco
240290	Cigars, cigarillos, cigarettes, etc., not containing tobacco
240310	Smoking tobacco with or without tobacco substitute
240391	Homogenized or reconstituted tobacco
240399	Other manufactured tobacco, nes
330111	Essential oils of bergamot (incl. concretes and absolutes)
330112	Essential oils of orange (incl. concretes and absolutes)
330113	Essential oils of lemon (incl. concretes and absolutes)
330114	Essential oils of lime (incl. concretes and absolutes)
330119	Essential oils of citrus fruit (incl. concretes and absolutes)
330124	Essential oils of peppermint (incl. concretes and absolutes)
330125	Essential oils of mints (incl. concretes and absolutes)
330126	Essential oils of vetiver (incl. concretes and absolutes)
520100	Cotton, not carded or combed
530110	Flax, raw or retted
530121	Flax, broken or scutched, but not spun

CONTENTS

A wide range animal feeds are used to produce a wide range of animal proteins

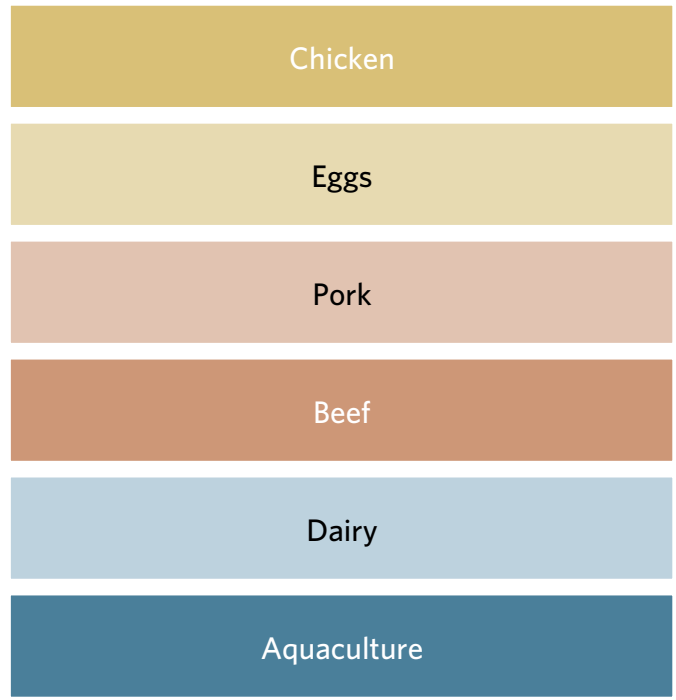
CLASSES OF ANIMAL FEED USED IN INTENSIVE SYSTEMS

Simplified model; 2015

Type	Examples	
Cereal Grains & Grasses	Wheat Sorghum Barley Rye Triticale Oats	Maize Millet Rice Hay/Haylage/Silage Greenchop Other
Vegetables	Pumpkins Swedes	Other
Protein	Soybean meal/cake Canola seed Lupins Cottonseed Sunflowers Peas	Palm kernel expeller Carob Other
Animal by products	Whey Other	
Fats & Oils	Plant oils Fish oils	
Minerals, vitamins, other	Wide range	

MAJOR ANIMAL PRODUCTS PRODUCED INTENSIVELY

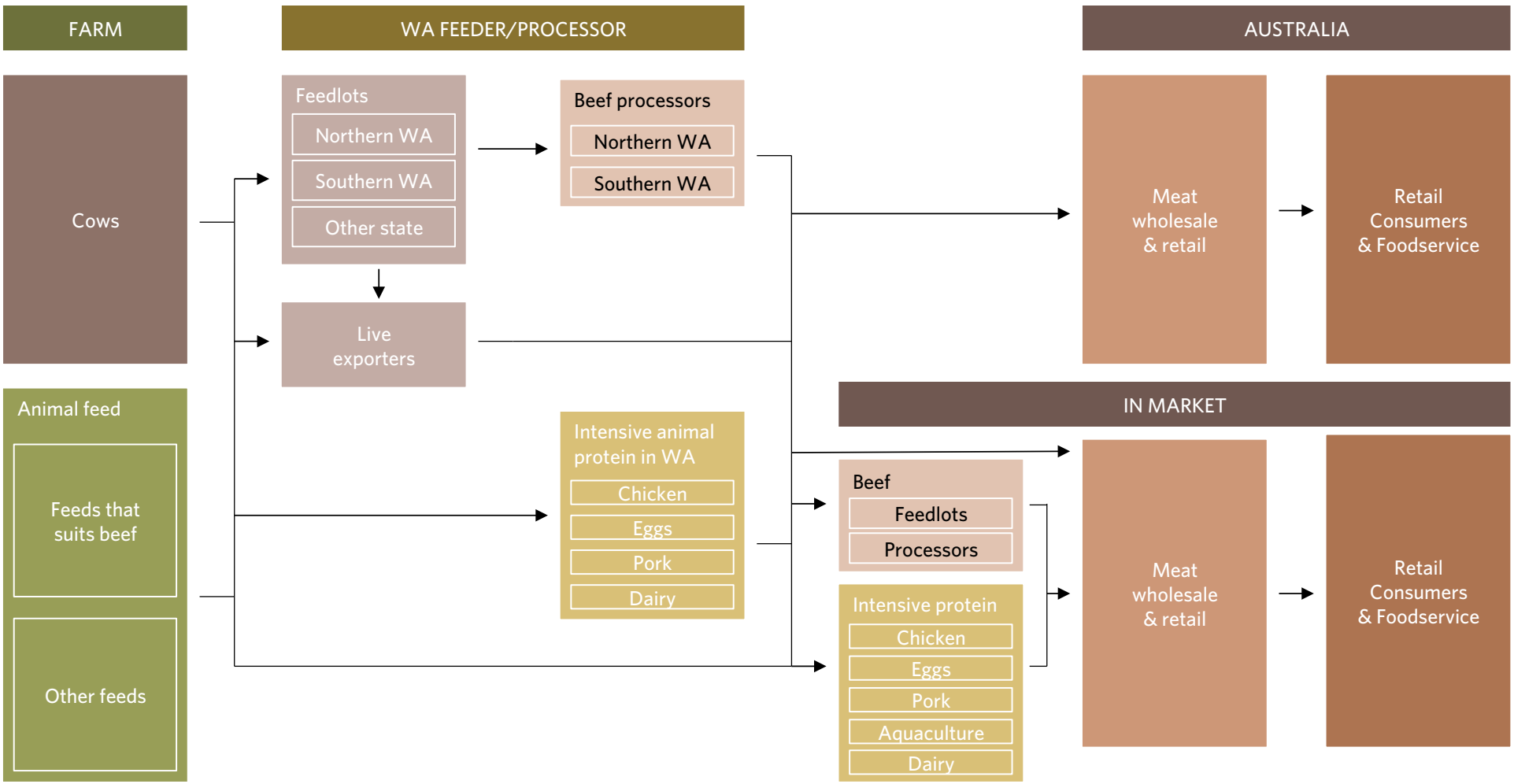
Major products; 2015



Animal feed produced in new irrigated precincts can go to a wide range of markets and supply chains

SIMPLIFIED SUPPLY CHAIN FOR ANIMAL FEED FROM WESTERN AUSTRALIA

Model; 2015



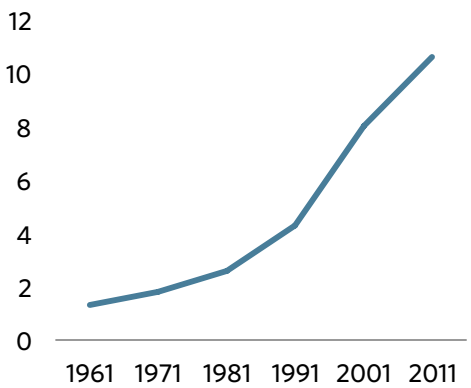
Source: Coriolis analysis

Target markets in Asia & the Middle East have large and growing animal protein production, leading to strongly growing animal feed imports

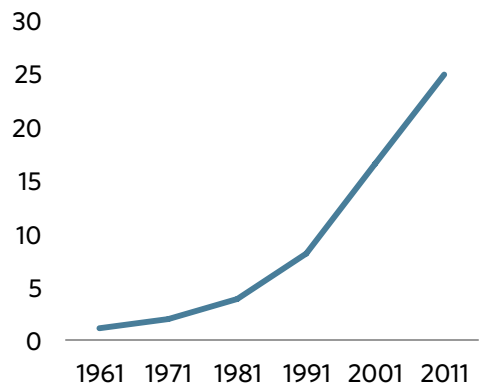
AGGREGATE ANIMAL PROTEIN PRODUCTION ACROSS 22 TARGET MARKETS

Tonnes; m; 1961-2011

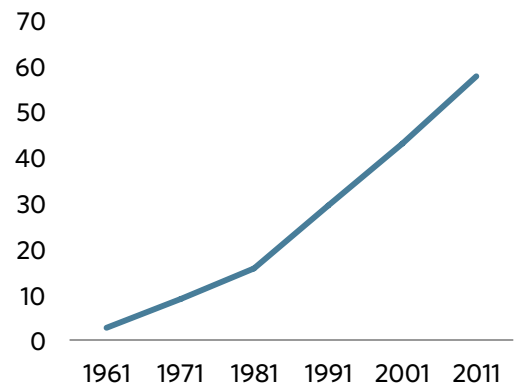
BEEF



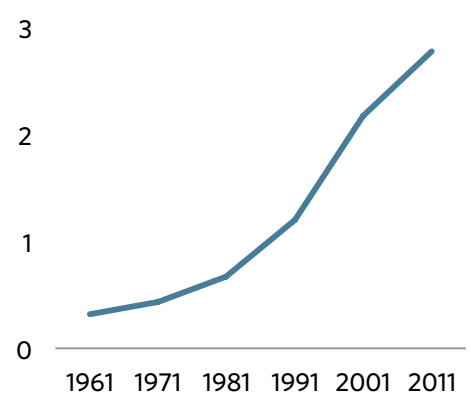
CHICKEN



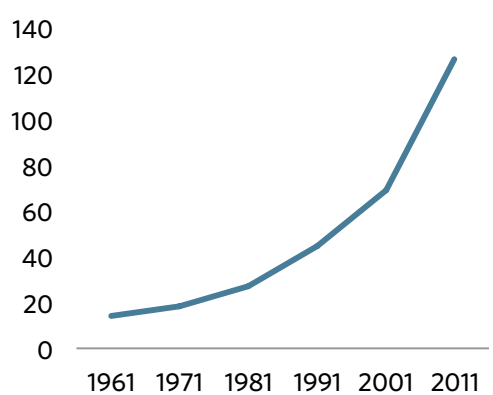
PORK



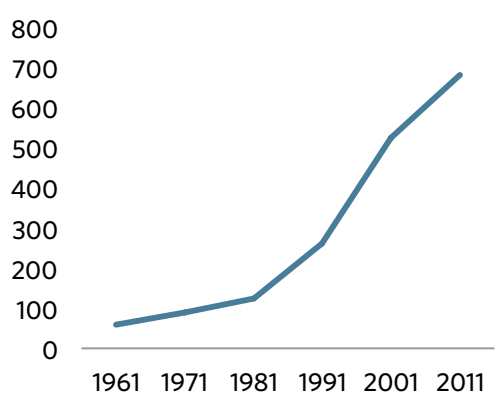
SHEEP



MILK



EGGS*

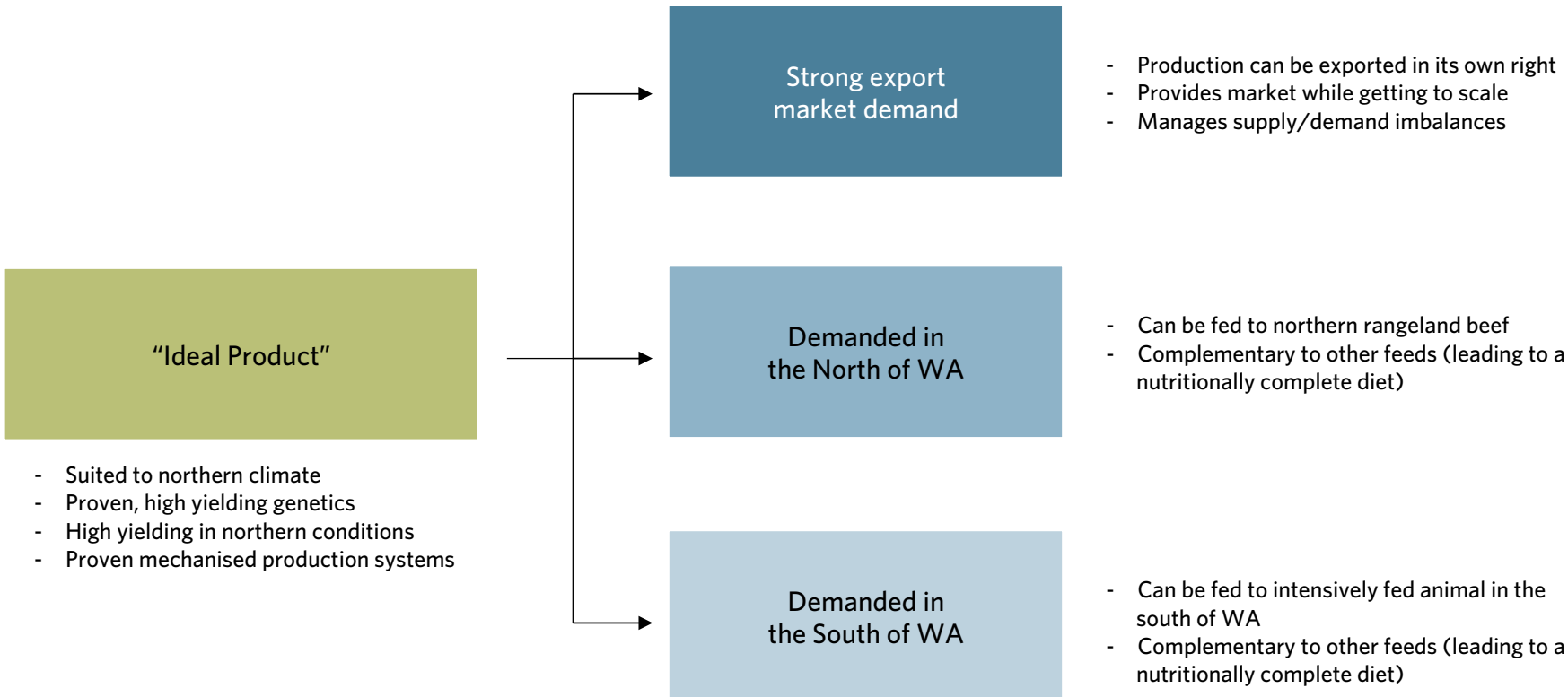


Note: Eggs quantity in '000 million; Source: UN FAO FAOSTAT database; Coriolis analysis

The hypothetical "ideal product" to produce in the North of Western Australia for animal feeding would suits multiple markets, thus spreading risk and smoothing out supply/demand imbalances

WHAT IS THE IDEAL ANIMAL FEED PRODUCT FOR THE NORTH?

Model; 2015



High ● Medium ◑ Low ○

MARKET DEMAND LEADERS – POTENTIAL ANIMAL FEEDS

A wide range of potential animal feeds were identified as having strong market demand

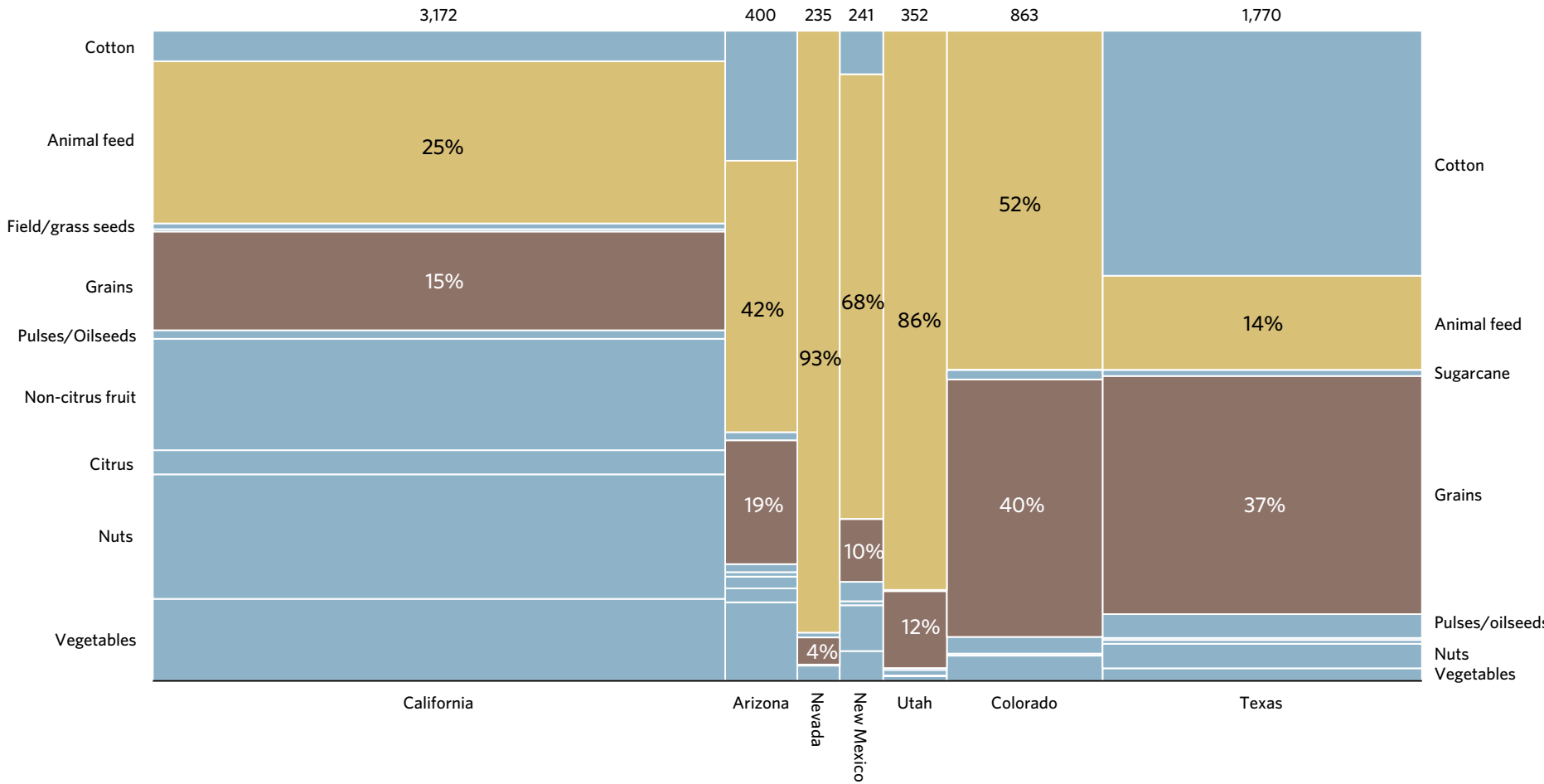
	HS6 Code	Classification	Target markets total imports US$m; 2013	CAGR import value 10y	CAGR import value 5y	Absolute import growth 10y	Absolute import growth 5y	US$/kg or l 2013	10y CAGR $/kg or l	Overall
Products showing very strong demand growth in target markets and so passed into next stage	71410	Manioc, fresh or dried	$2,221	26%	29%	$1,998	$1,597	$0.26	12%	●
	100700	Grain sorghum	$932	15%	18%	$703	$521	$0.31	8%	●
	120740	Sesamum seeds	$1,731	18%	11%	$1,400	$720	$1.79	9%	●
	120100	Soya beans	$45,485	18%	10%	$36,860	$17,720	$0.61	9%	●
	230400	Oil-cake/solid residues, of soya-bean oil	$10,332	15%	10%	$7,829	$3,878	$0.54	9%	●
	71331	Dried beans, shelled	$774	20%	14%	$651	$364	$0.81	9%	●
	71340	Dried lentils, shelled	$754	20%	19%	$636	$436	$0.44	0%	●
	120210	Ground-nuts in shell, not roasted	$171	25%	28%	$153	$121	$1.02	8%	●
	120600	Sunflower seeds	$249	12%	35%	$172	$194	$1.41	15%	●
Great products also showing good growth that "just missed the cut"	230210	Brans, sharps and other residues of maize	$172	21%	35%	$146	$134	$0.26	2%	◑
	230240	Brans, sharps/other residues of other cereals	$61	23%	17%	$53	$33	$0.38	9%	◑
	71310	Dried peas, shelled	$1,206	17%	5%	$965	$283	$0.47	7%	◑
	71320	Dried chickpeas, shelled	$534	14%	16%	$386	$279	$0.41	1%	◑
	71390	Dried leguminous vegetables, shelled, nes	$609	12%	12%	$421	$269	$0.98	13%	◑
	71420	Sweet potatoes, fresh or dried	$52	19%	20%	$42	$31	$0.79	10%	◑
	100190	Spelt, common wheat and meslin	$11,544	12%	3%	$7,892	$1,427	$0.35	7%	◑
	100300	Barley	$5,043	14%	2%	$3,671	$503	$0.32	7%	◑
	100590	Maize (excl. seed)	$14,006	11%	5%	$9,283	$2,873	$0.25	7%	◑
	121490	Lucerne hay; other forage products, nes	$1,727	8%	10%	$951	$668	$0.40	6%	◑
	230230	Brans, sharps and other residues of wheat	$338	15%	7%	$251	$95	$0.27	10%	◑
	230250	Brans, sharps and other leguminous	$26	18%	30%	$21	$19	$0.44	4%	◑
	230610	Oil-cake and other residues of cotton seeds	$20	1%	11%	$2	$8	$0.37	9%	◑
	230630	Oil-cake and other residues of sunflower	$123	17%	17%	$98	$68	$0.16	3%	◑
	230650	Oil-cake/other residues of coconut/copra	$213	16%	9%	$163	$74	$0.23	9%	◑

NOTE: Numbers rounded to nearest million; analysis occurs at greater level of detail (simplified for reading); some "0" may be negative (e.g. -0.1 scored as such, displayed rounded to "0"

US Southwest peers use a significant percent of their irrigated land to produce animal feed (hay, silage, etc.) and grains

US SOUTHWEST POTENTIALLY IRRIGATED AREA BY PRODUCT CATEGORY

Hectare; 000; 2012



Note: the totals given here will not match total irrigated area (given earlier) for a range of reasons, including multiple products in a year and different measures (potential vs. actual); treat as directional; Source: USDA Census of Agriculture data; Coriolis analysis

This discussion document has been reviewed by a broad based group; we thank them for their insight, feedback and corrections

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We focus on the Asia Pacific region, but look at problems with a global point-of-view. We have strong understanding of, and experience in, markets and systems in Australia, China, Japan, Malaysia, New Zealand, Singapore, South Korea, Thailand, the United Kingdom and the U.S. We regularly conduct international market evaluations and benchmarking.

WHAT WE DO

We help our clients assemble the facts needed to guide their big decisions. We develop practical, fact-based insights grounded in the real world that guide our clients decisions and actions. We make practical recommendations. We work with clients to make change happen. We assume leadership positions to implement change as necessary.

HOW WE DO IT

All of our team have worked across one-or-more parts of the wider food value chain, from farm-to-plate. As a result, our recommendations are grounded in the real world. Our style is practical and down-to-earth. We try to put ourselves in our clients' shoes and focus on actions. We listen hard, but we are suspicious of the consensus. We provide an external, objective perspective. We are happy to link our fees to results.

WHO WE WORK WITH

We only work with a select group of clients we trust. We build long term relationships with our clients and more than 80% of our work comes from existing clients. Our clients trust our experience, advice and integrity.

Coriolis advises clients on growth strategy, mergers and acquisitions, operational improvement and organisational change. Typical assignments for clients include...

FIRM STRATEGY & OPERATIONS

We help clients develop their own strategy for growing sales and profits. We have a strong bias towards growth driven by new products, new channels and new markets.

MARKET ENTRY

We help clients identify which countries are the most attractive – from a consumer, a competition and a channel point-of-view. Following this we assist in developing a plan for market entry and growth.

VALUE CREATION

We help clients create value through revenue growth and cost reduction.

TARGET IDENTIFICATION

We help clients identify high potential acquisition targets by profiling industries, screening companies and devising a plan to approach targets.

DUE DILIGENCE

We help organisations make better decisions by performing consumer and market-focused due diligence and assessing performance improvement opportunities.

EXPERT WITNESS

We provide expert witness support to clients in legal cases and insurance claims. We assist with applications under competition/fair trade laws and regulations.