



# Drought Scenarios: Western Cape – Preliminary results

25 October 2017



**MANAGING AGRICULTURE'S  
FOOTPRINT IN AN UNCERTAIN  
ENVIRONMENT**

# Context: Current issues

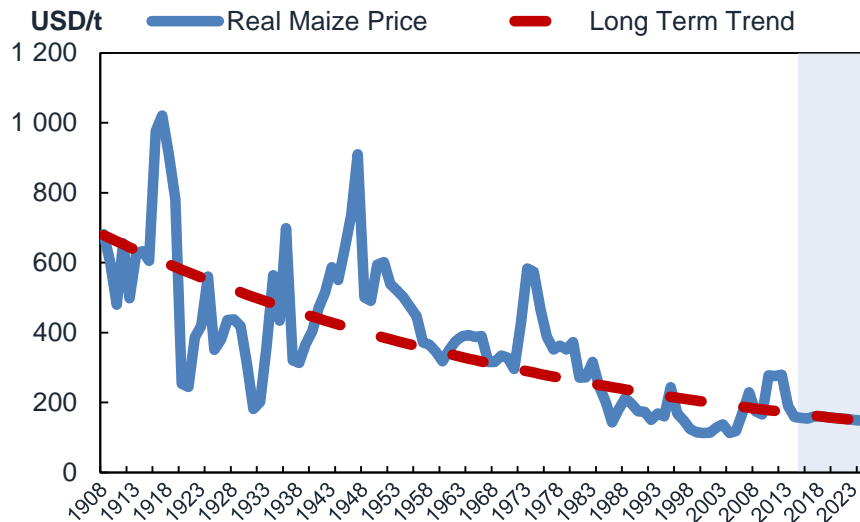
## South African Agricultural sector

- Slow productivity growth and lack of competitiveness for some industries
- Slow bureaucratic processes (permits, SPS etc.) key bottleneck for exports to grow faster
- Policy uncertainty and slow progress with land reform
  - Lack of investment due to uncertainty
- Availability of water
  - major losses in irrigation canals (between 35% and 55%) and lack of maintenance and new investments
- Trading (EXPORTS) competitively (quality, consistency, continuity) and impacting factors

# Producer and consumer problem

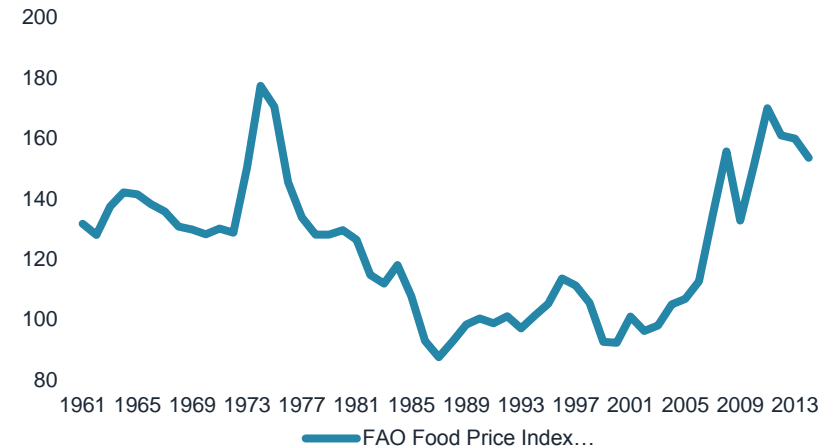
Decreasing real product prices and increased food prices

## Producer problem



- Price cost squeeze
- Pressure on profitability
- Long term impact – cash crops vs long term horticultural crops
- Doing more with less for less

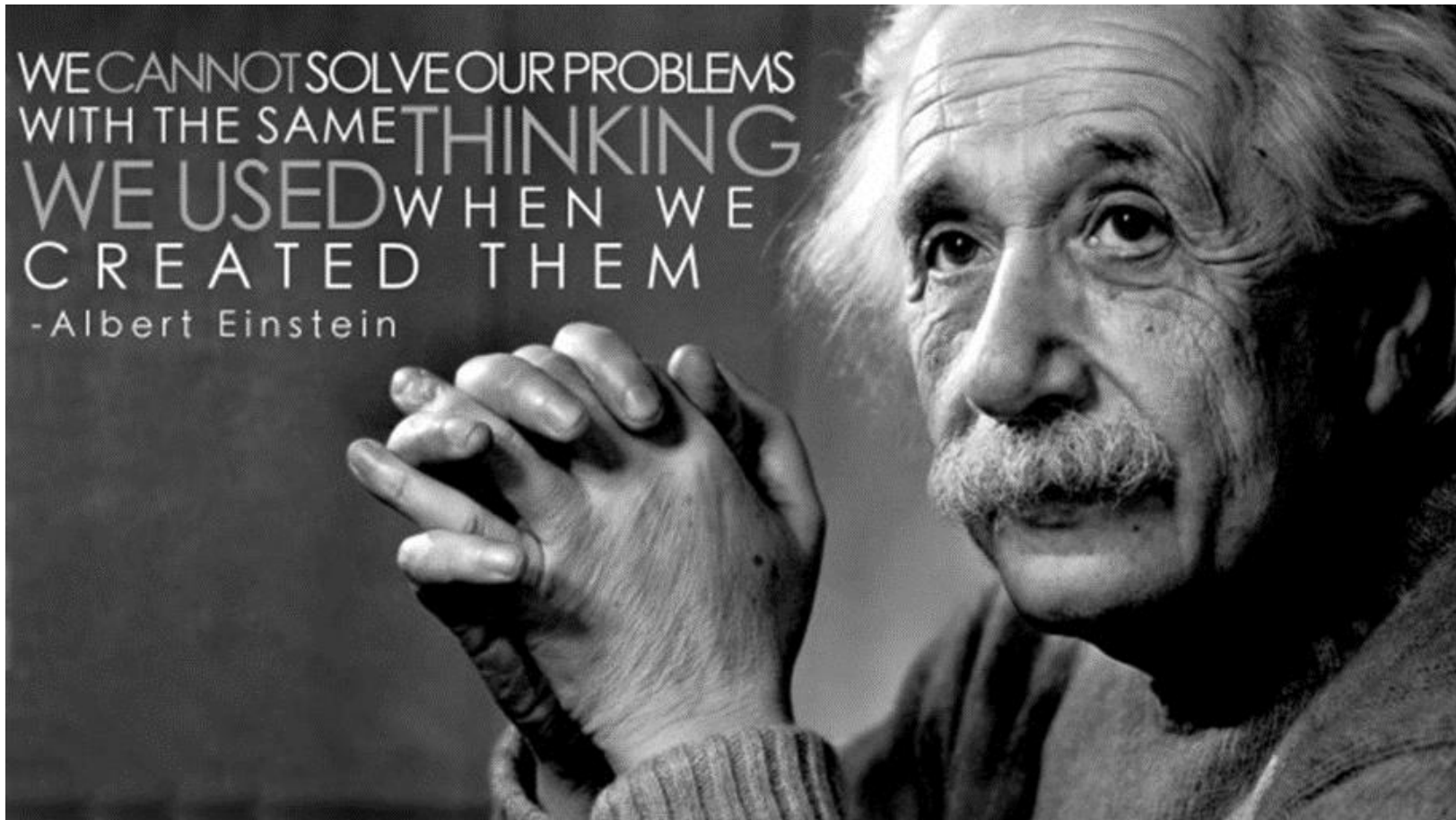
## Consumer problem



- Vulnerable households
- LSM groupings
- Staple food crops affected
- Fruit & wine luxury goods
- Link to Arab spring
- Concern for policy makers

# Context and overview

Drought implications and industry actions

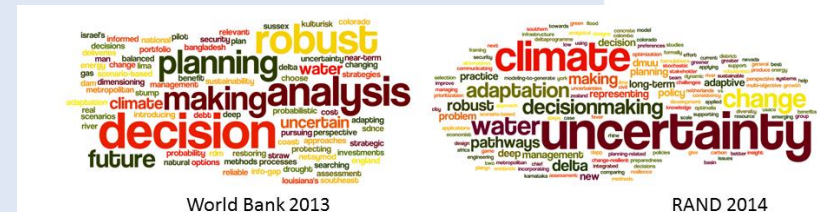
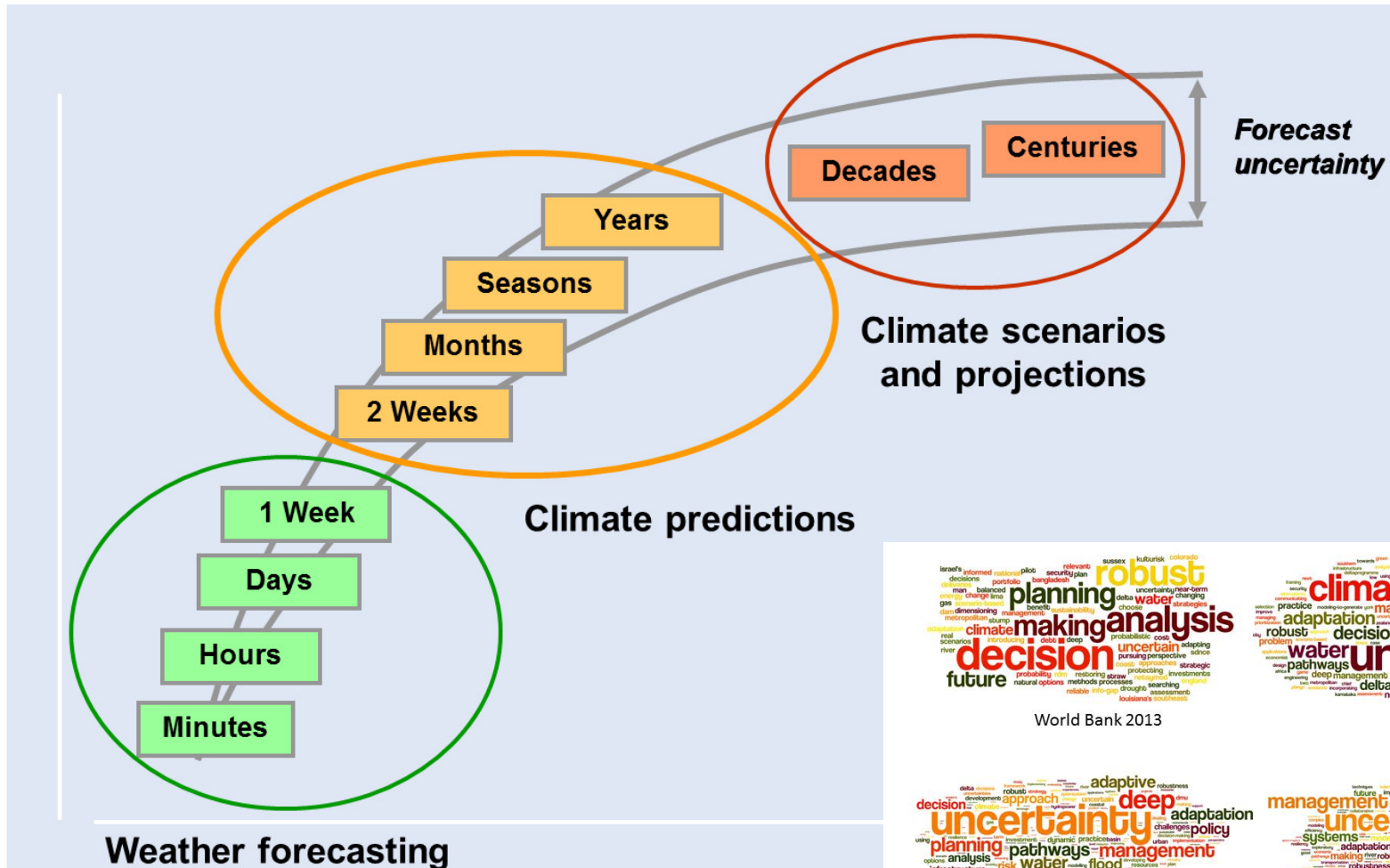


**MANAGING AGRICULTURE'S  
FOOTPRINT IN AN UNCERTAIN  
ENVIRONMENT**



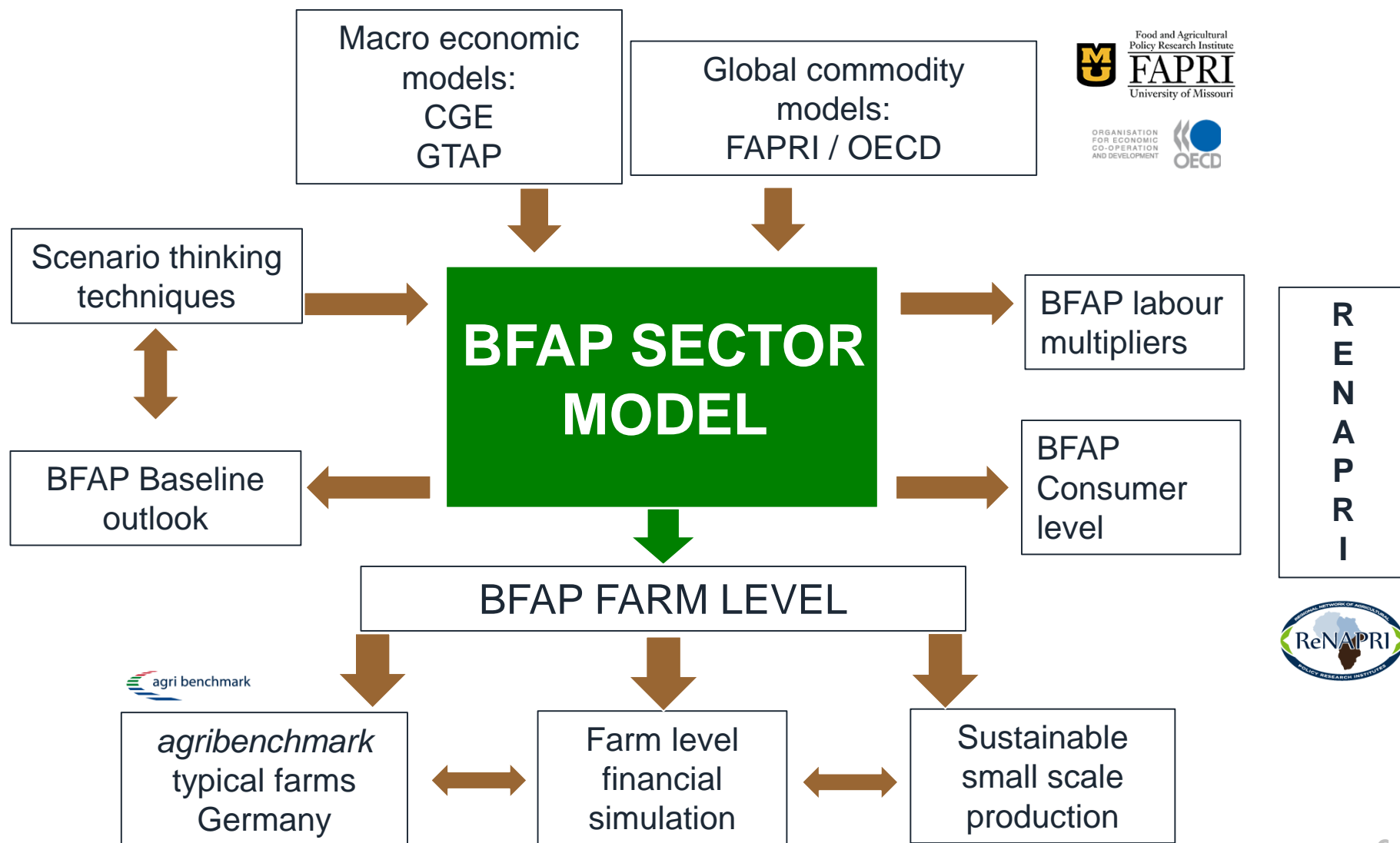
# Climate prediction

Seamless framework



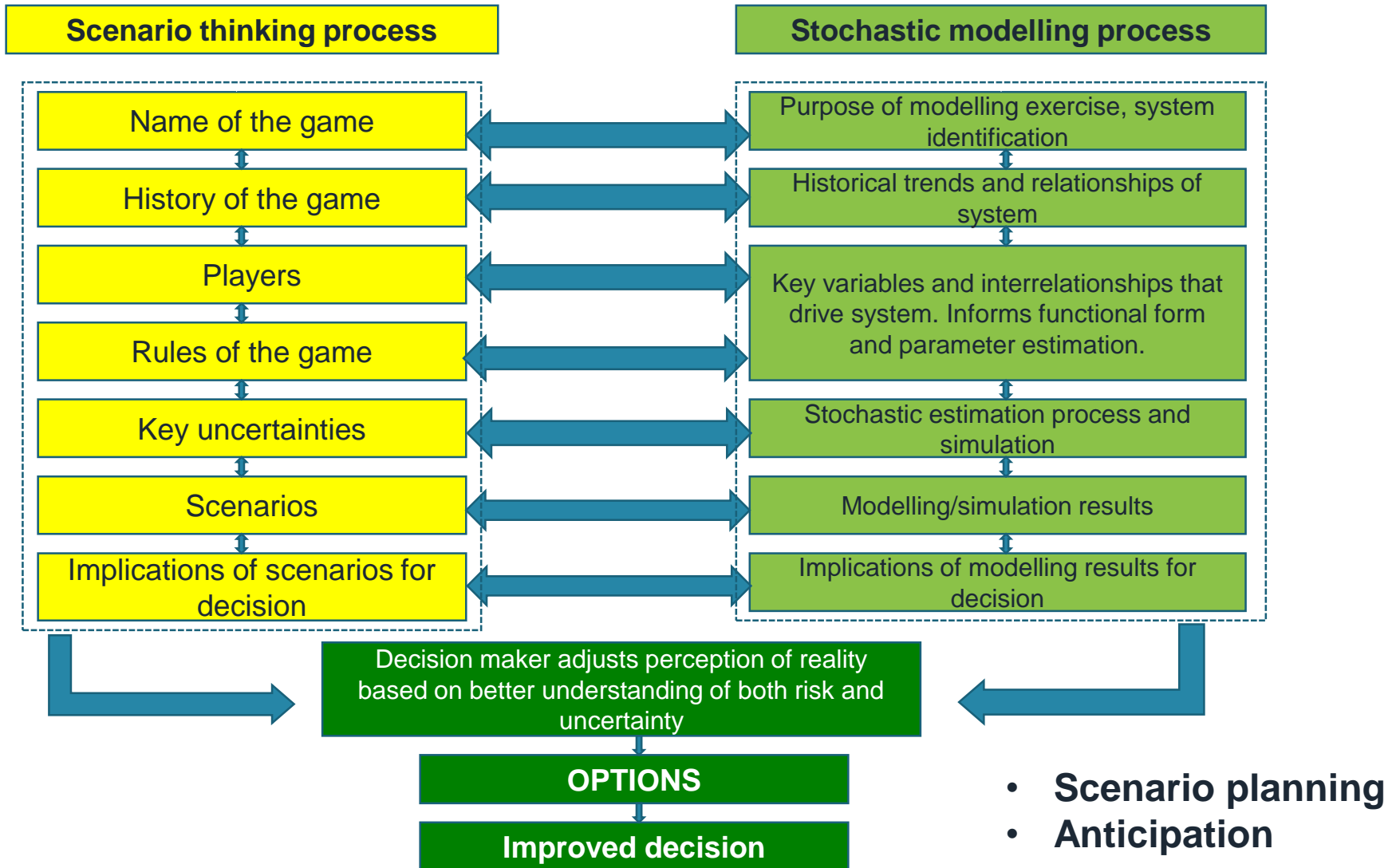
# BFAP System of models

An integrated approach



# Agricultural Outlook

Projections... Fore sighting.... Forecasts



# South African Fruit Sector

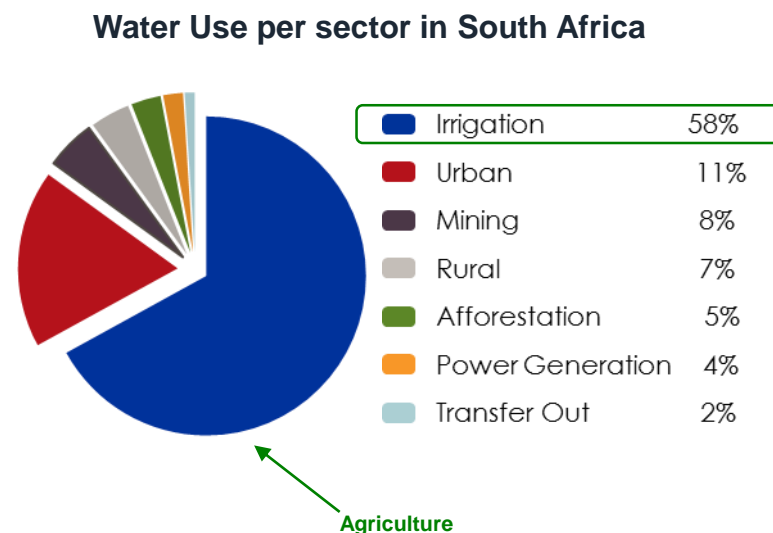
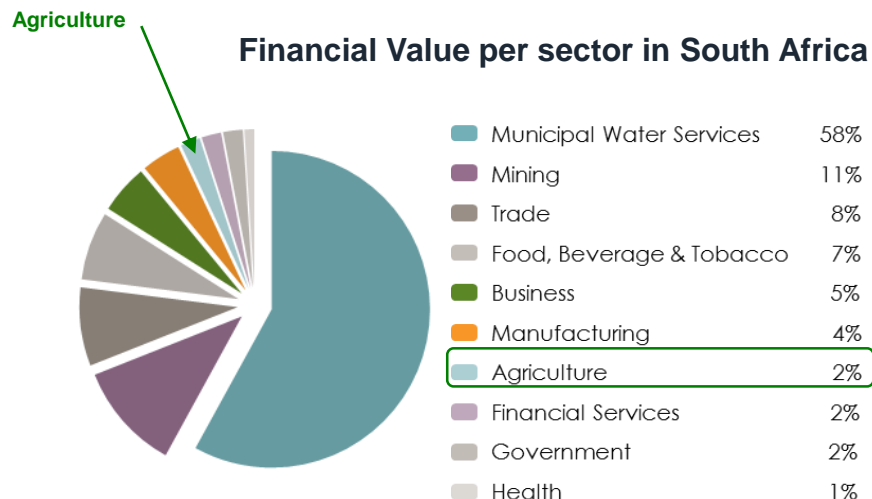
## Horticulture and Wine

- Export orientated and not likely to change significantly
- Increased competition globally:
  - Southern hemisphere role-players (Argentina, Chile, Peru)
  - Expansion of pome fruit in former Eastern European countries and Russia
- Sufficient opportunities remain - quality and consistency paramount
- **Increased competition** for scarce resources (land, **water**, capital)
- **Increased** focus on water management practices –need to improve **efficiency and productivity of water**



# Water use in South Africa

## Water use vs Financial value



Source: Greencape (2016) & WCDA (2017)

**This juncture between the financial value and water use is a result of the nature of water utilisation throughout the economy**

- Water is used for intermediate consumption (as in input)
- Water is a final product for consumers who buy it
- Opportunity cost of water
- **Role of agricultural in rural economic activities throughout the value chain**

# View on the Western Cape

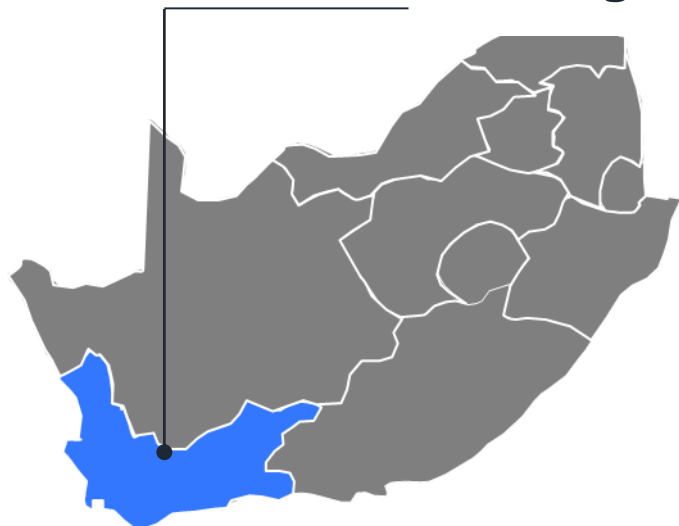


**MANAGING AGRICULTURE'S  
FOOTPRINT IN AN UNCERTAIN  
ENVIRONMENT**

# Fruit Industry Outlook

View on drought: Western Cape

## Agriculture in the Western Cape Economy



- GVA of R18.6 billion (22% of RSA Agriculture's share)
- Employment
  - 216 000 – Primary Agriculture
  - 251 000 - Agri Processing
- Total Irrigation Farming area of 239 519 ha
- Horticulture makes more 50% of total crop production
- Export revenue of more than R40 billion

Source: WCDoA & BFAP (2017)



**MANAGING AGRICULTURE'S  
FOOTPRINT IN AN UNCERTAIN  
ENVIRONMENT**

# Agricultural Census: Flyover data

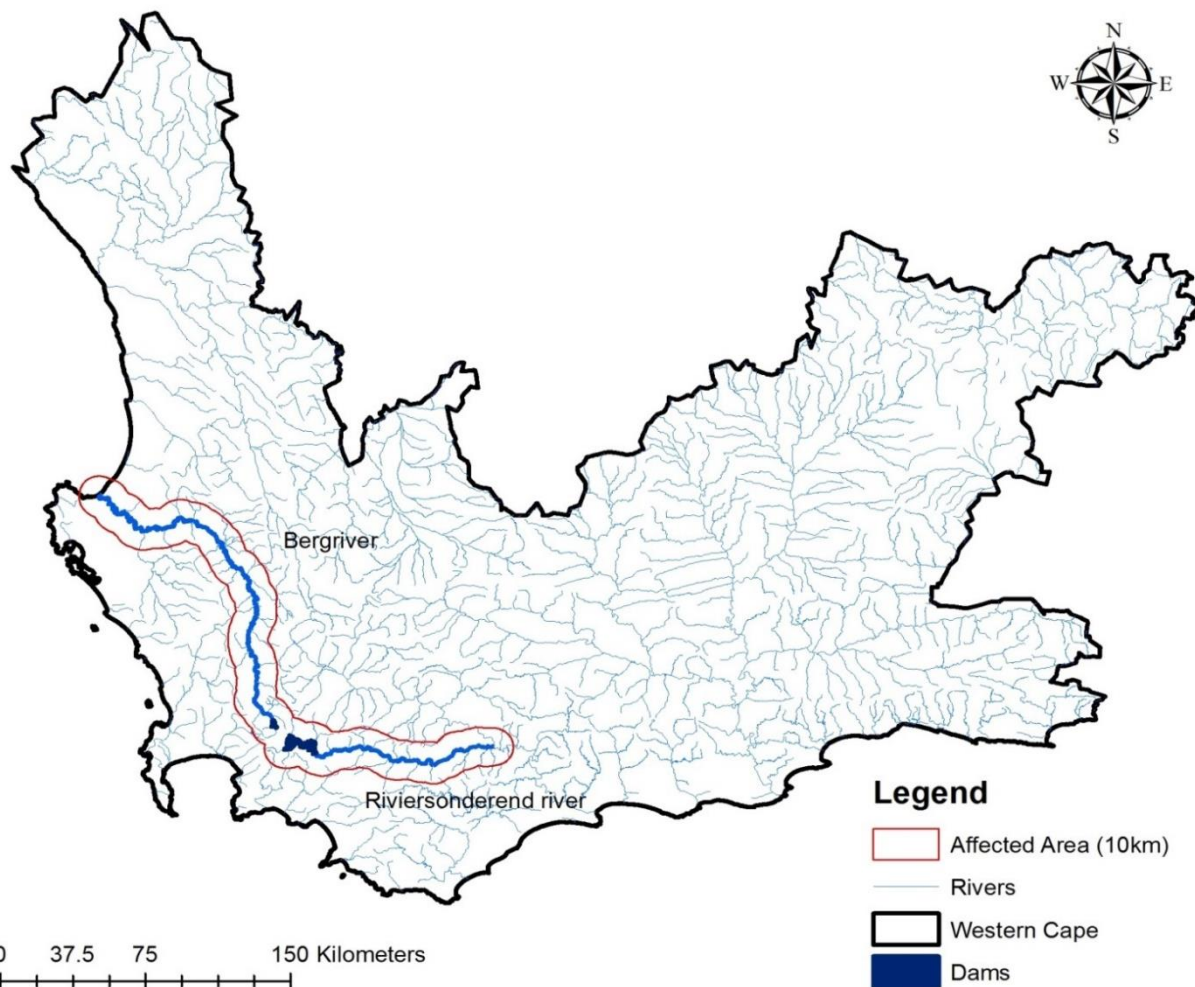
## Breede Valley Pilot: Crop disinvestment and re-investment

Crop	Current Pilot (2017) – Ha	Previous Census (2013/14) – Ha	% change
Proteas	5	7	-38%
Figs	39	18	+115%
Lemons	57	29	+98%
Naartjies	324	34	+860%
Oranges	164	201	-18%
Wine Grapes	15 849	17 189	-8%

Source: WC DoA, SIQ (2017)

# Fruit Industry Outlook

View on drought: Western Cape – Scenarios and affected areas



- The affected areas are calculated using conservative boundary 10km radius
- We utilise various different approaches to estimate the economic contribution of farming
- A scenario were introduced to measure the impact of redirecting water away from irrigated agriculture

Source: WCDoA & BFAP (2017)



# Fruit Industry Outlook

View on drought: Western Cape – Commodity specific analyses

Industry	GVA Affected Area (millions)	Employment Affected Area	Total irrigation hectares	Average Direct Cost (R million)	Average Establishment Cost (R million)
1 Table Grapes	579	7792	4 305	753	1 098
2 Naartjies	330	557	742	59	113
3 Apples	278	6400	5 664	1 897	1 558
4 Lemon	187	293	390	27	59
5 Wine Grapes	132	8401	21 002	882	3 402
6 Pomegranate	57	179	276	28	33
7 Guava	53	322	362	20	26
8 Pears	37	1822	1 703	490	438
9 Oranges	21	178	237	17	36
10 Plums	19	2365	1 862	521	460
Other	755	7 846	8 566	-	-
<b>Total</b>	<b>2 449</b>	<b>36 155</b>	<b>45 109</b>	<b>4 696</b>	<b>7 222</b>

Source: WCDoA & BFAP (2017)

# Berg – and Riversonderend river scheme

Scenario in collaboration with WCDA

**Scenario: 30% reduction in water allocation in the Affected Area leading to for the entire summer:**

- a) Fruit quality decline moving 15% of exported fruit into the local market (Apples, Table Grapes, Plums, Pears)
- b) Wine grapes are harvested early, forcing 10% of grape volumes away from wine towards juicing or distilling

## **A: Fruit Industry**

Industry GVA decline | (*Job losses*)

Apple: R82.7 million (427)

Grapes: R63.8 million (251)

Plums: R40.8 million (210)

Pear: R 30.5 million (157)

Total GVA: R 217 million

Total Jobs: 1047

## **B: Wine Industry Impact**

- Possible lower price: R786/ton vs R3244/ton
- Industry loses R91.3 million in GVA
- Employment: 681 Job losses

# Fruit Industry Outlook

View on drought: Western Cape – Concluding remarks

- Irrigation agriculture in the Western Cape is a key driver for economic growth and jobs in the Province
- Analysing the economic impact of possible water reallocation away from agriculture could result in 6500 jobs and a industry loss of R1 billion in value added.
- The longer-term impact on plant health, orchard replacement and quality of fruits could will significantly damage the industry for the next 5-10 years.
- More research is required to understand the full impact of water allocation to agriculture and its impact on the economy

# View on the SA Fruit industry

## Pome fruit scenarios



**MANAGING AGRICULTURE'S  
FOOTPRINT IN AN UNCERTAIN  
ENVIRONMENT**

# Fruit Industry Outlook

View on drought questionnaire: Fruit and wine producers

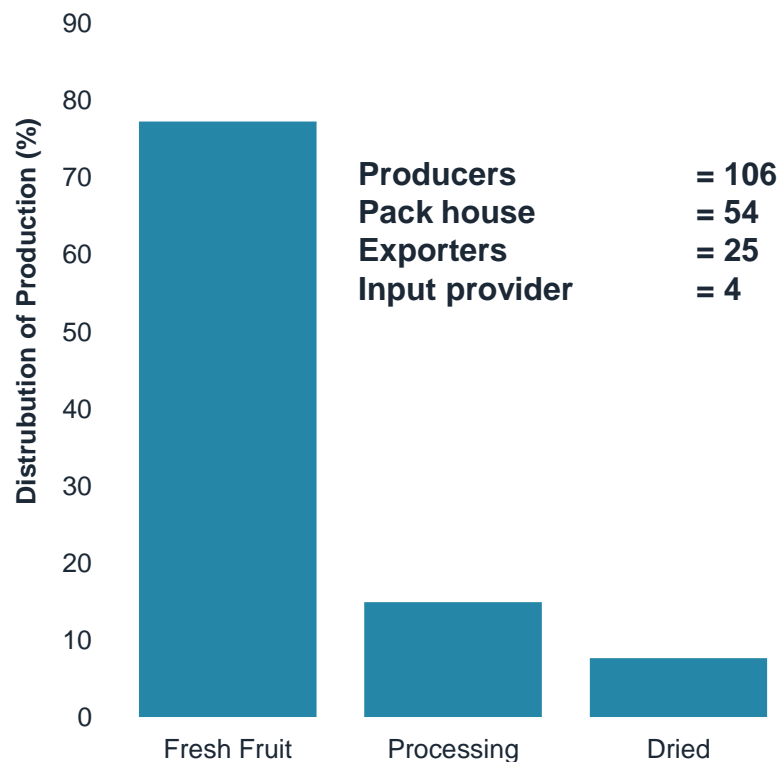
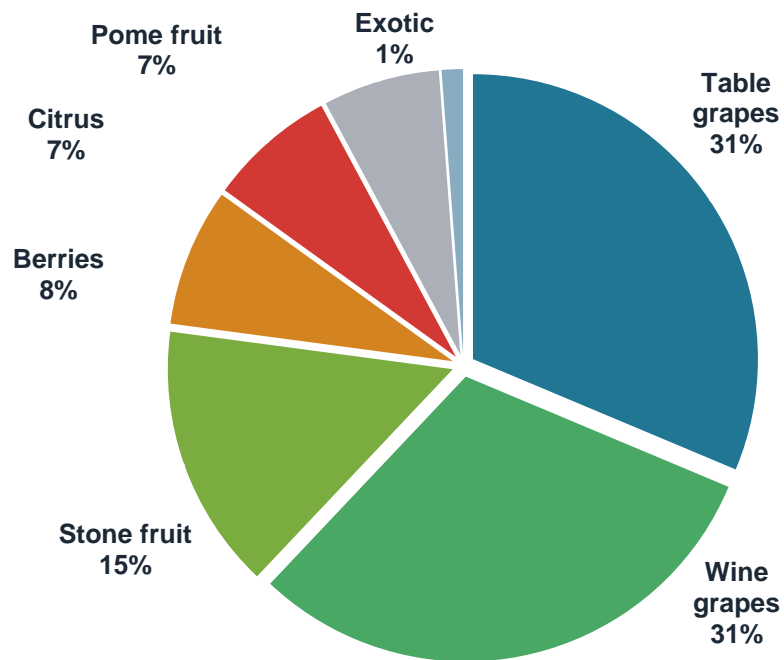
Drought Study: Producer perspective questionnaire (very negative = 1, very positive = 5)	
1) Availability to fulfil irrigation demand of 2015 was:	4.12
2) Availability to fulfil irrigation demand of 2016 was:	3.60
3) Availability to fulfil irrigation demand of 2017 is expected to be:	2.27
4) Availability to fulfil irrigation demand of 2018 is expected to be:	2.16
5) Dependence on departmental irrigation scheme for water allocation:	2.55
6) Access to departmental irrigation scheme water to sustain current on-farm demand is:	2.07
7) Current efficiency of on-farm irrigation systems are:	2.16
8) Updating and maintenance of irrigation systems to improve efficiency:	4.23
9) Should the months of September 2017 to December 2018 be substantially dry, will on-farm water storage capacity be:	1.85
10) Should the months of December 2017 to March 2018 be substantially dry, will on-farm water storage capacity be:	1.67
11) Number of irrigation cycles which could be serviced by current on-farm storage capacity (2017/2018 season): Less than 3, 3 - 6 cycles, 7 - 13 cycles, 13-21 cycles, more than 21 cycles	>7 cycles
12) The 2017/2018 crop (anticipated yield) is already affected:	3.19
13) The 2018/2019 crop (bearing units/wood) is already affected:	3.35
14) The production loss/decrease for the 2016/2017 season were:	3.41
15) Drought mitigation strategies followed in the past/previous seasons:	3.52
16) Productivity and efficiency of irrigated water improved over the past two seasons:	3.42
17) On-farm activities/investments to minimize severity of drought: Irrigation pulsing, Moisture level monitoring, Irrigation system upgrade, Additional storage capacity, Shade netting	
18) The ability to expand hectares has been impacted	2.13
19) The business has had to reduce existing planted hectares in response:	3.18
20) The impact of SA climate/weather variation (unpredicted conditions) in the past affected your business:	2.84
21) Crop distribution (Export : Local : Processed) were negatively impacted due to decreased quality:	3.22
22) Potential crop yield (oes lading - fruit/tree bunches/vine) for the 2017/2018 season will be:	2.72
23) Long term average yield were affected during the drought with: More than 50%, between 26% and 50%, between 11% and 25%, between 5% and 10%, less than 5%	10%-25%
24) The water shortage situation of the previous season resulted in: Improved water productivity, Better water allocation, Decrease export %, Decreasing yield, Quality decrease	

Note: Preliminary result of study



# Possible drought impact

Survey of 106 fruit producers

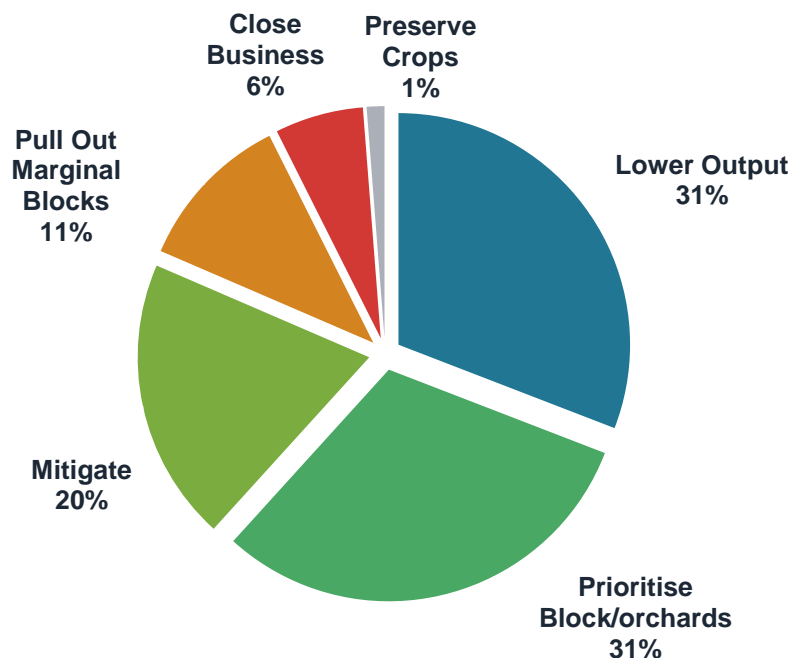


N=108  
Total Ha = 6723.5 (estimate)

# Possible drought impact: Scenario

60% Less water allocated

Producers were asked their strategy in the following scenario regarding 2017/18 water availability for the next summer (60% Less water allocated)



- The average decline in production is expected to be 36.9%
- **This will translates to**
  - R4.96 billion GVA decline for 2017/8 (27% of the WC Agri industry)
  - 35 634 potential job losses
  - The sector is set to lose valuable market share in fruit exports
  - Some farming operations insolvent

# South African fruit production: 321 289 ha

Pome fruit view: 36 491 ha



Western Cape > 97% of pome fruit production

## Pome fruit (36 491 ha)

- Apples (24212 ha)
- Pears (12279 ha)

## Grapes (115 579 ha)

- Table grapes
- Wine grapes

## Stone fruit (17 921 ha)

- Apricots
- Cherries
- Peaches & Nectarines
- Plums and prunes

## Citrus (72 711 ha)

- Oranges
- Lemons & limes
- Grapefruit
- Soft citrus

## Subtropical fruit & nuts (73 387 ha)

- Avocados
- Bananas
- Mangoes
- Litchis
- Macadamias

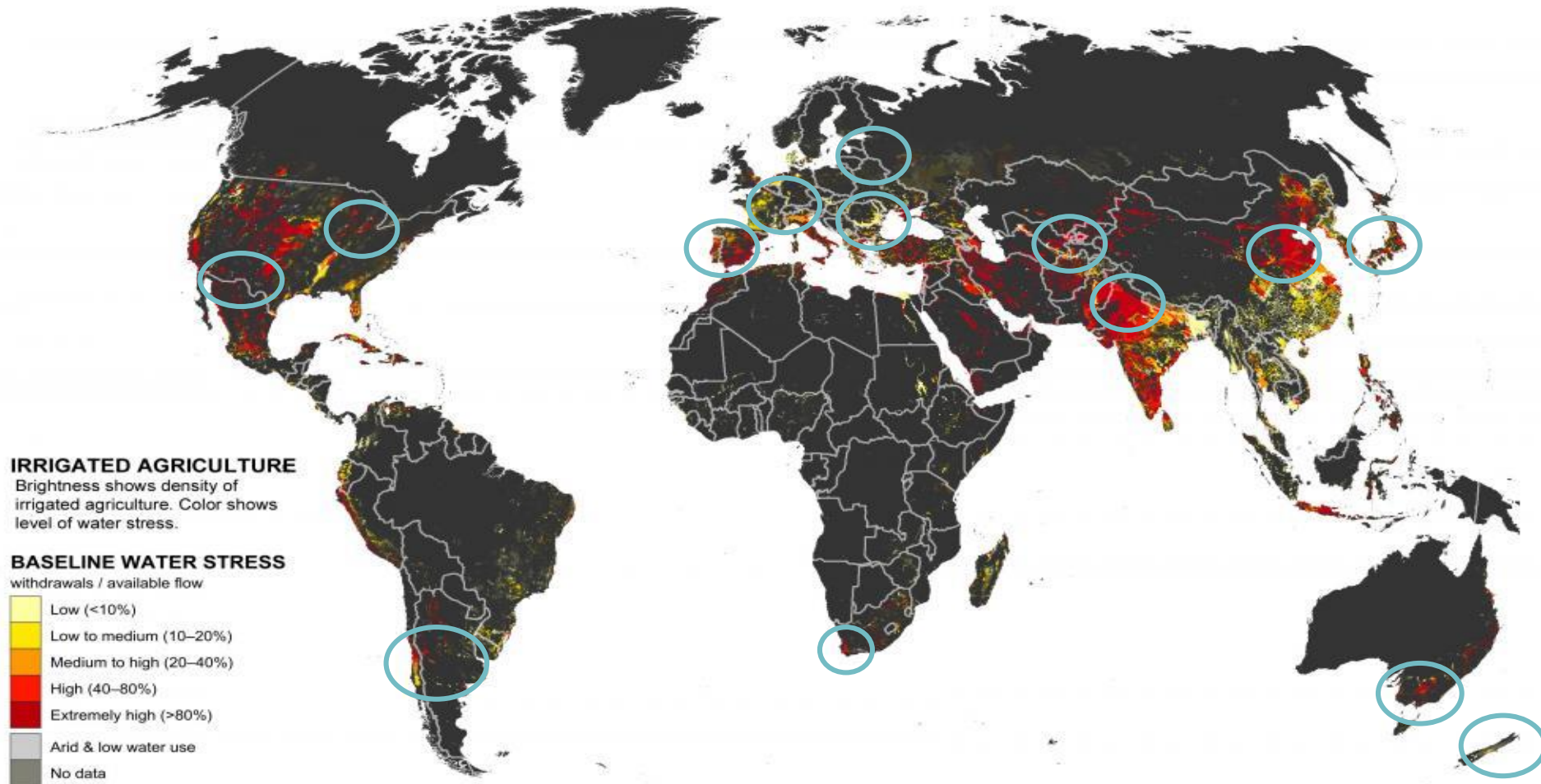
## Exotic fruit (4 937 ha)

- Berries
- Figs
- Pomegranates



# Baseline water stress

Overlay: Global apple production

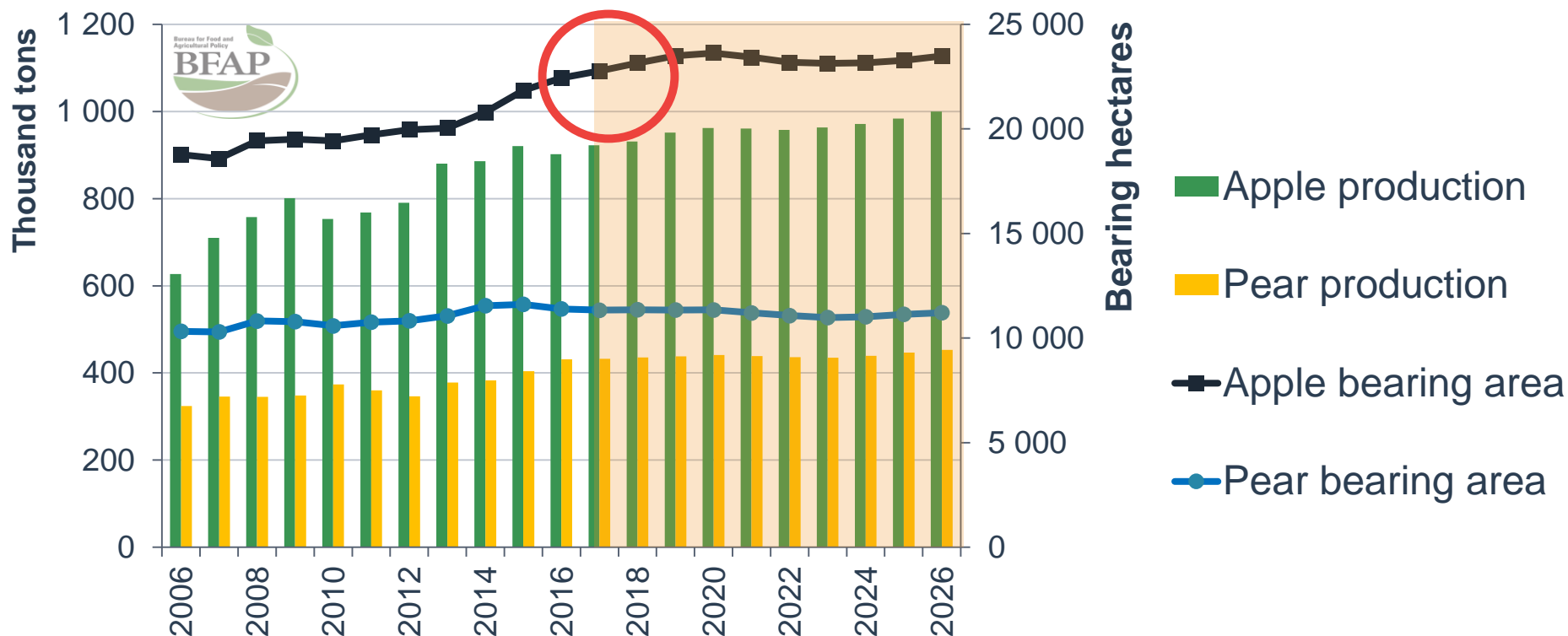


Source: WRI Aqueduct, Siebert et al. 2007

Overlay: Global apple production

# Pome Fruit Industry Outlook

Sectoral approach: Optimistic view (Analyses in May 2017 with “recovering rainfall patterns”)



- Apple bearing area expanded 1.7% p.a. over past decade – slows in Outlook
- Pear bearing area expanded 1.1% p.a. over past decade – stagnant in Outlook
- Productivity gains drive production growth



# Pome Fruit industry: Drought Scenario

## Water shortage impact

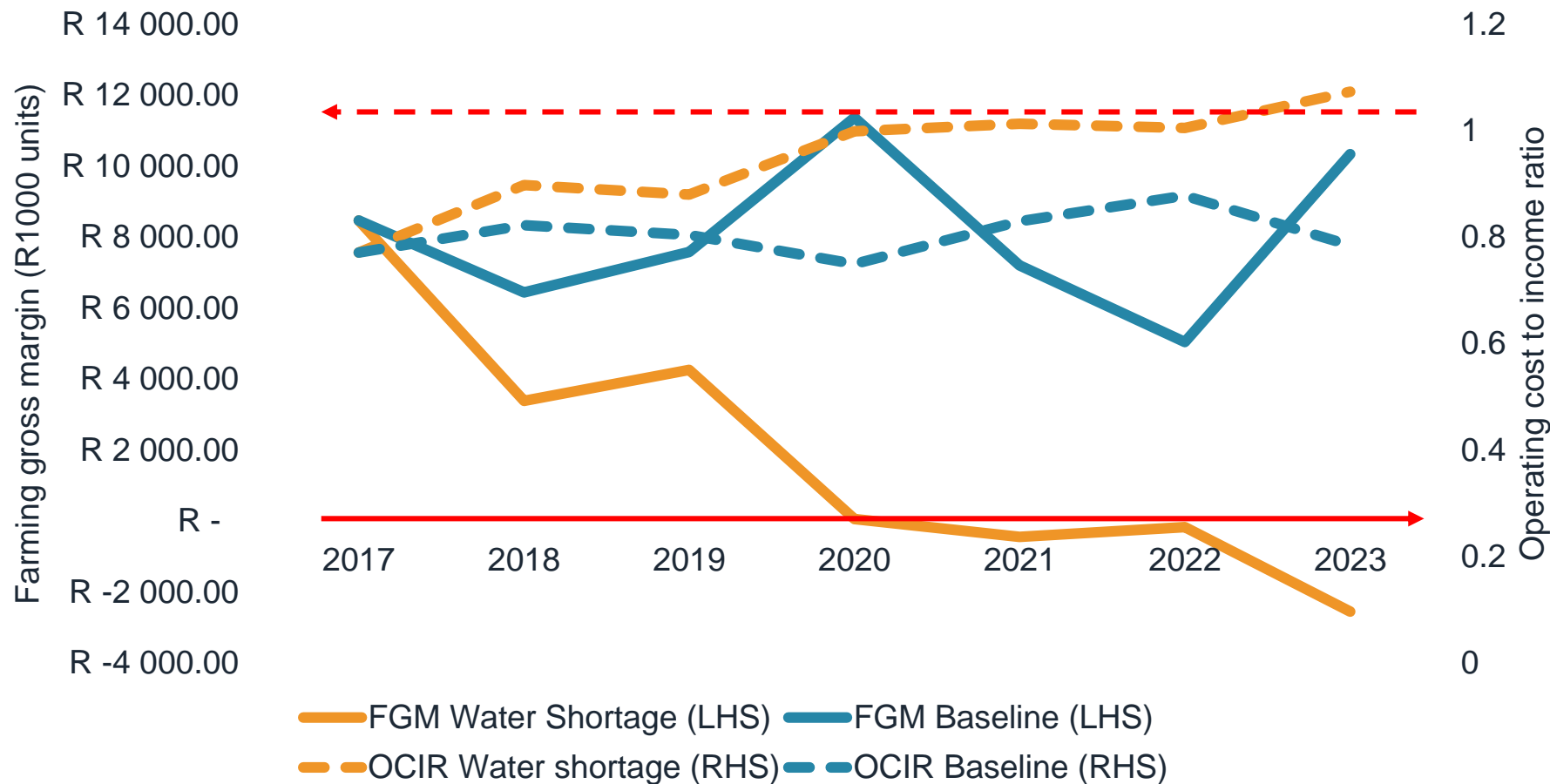
	APPLES			PEARS		
	Baseline		Baseline vs. Scenario	Baseline		Baseline vs. Scenario
	2016	2026	% change in 2026	2016	2026	% change in 2026
<b>Production (Tons)</b>	902129	999777	-24.17%	431535	453161	-30.98%
<b>Exports (Tons)</b>	425325	445015	-28.88%	222192	222636	-30.20%
<b>Export Price (R/Ton)</b>	10815	15574	4.22%	11157	15257	6.75%
<b>Domestic Price (R/Ton)</b>	5556	8113	18.19%	5605	8209	14.71%

- Alternative scenario of prolonged water shortages
- Aggregate industry estimated yield impact: 50% - 80% “normal” water requirement for Outlook
- Impact of improved water productivity?

# Farm Gross Margins

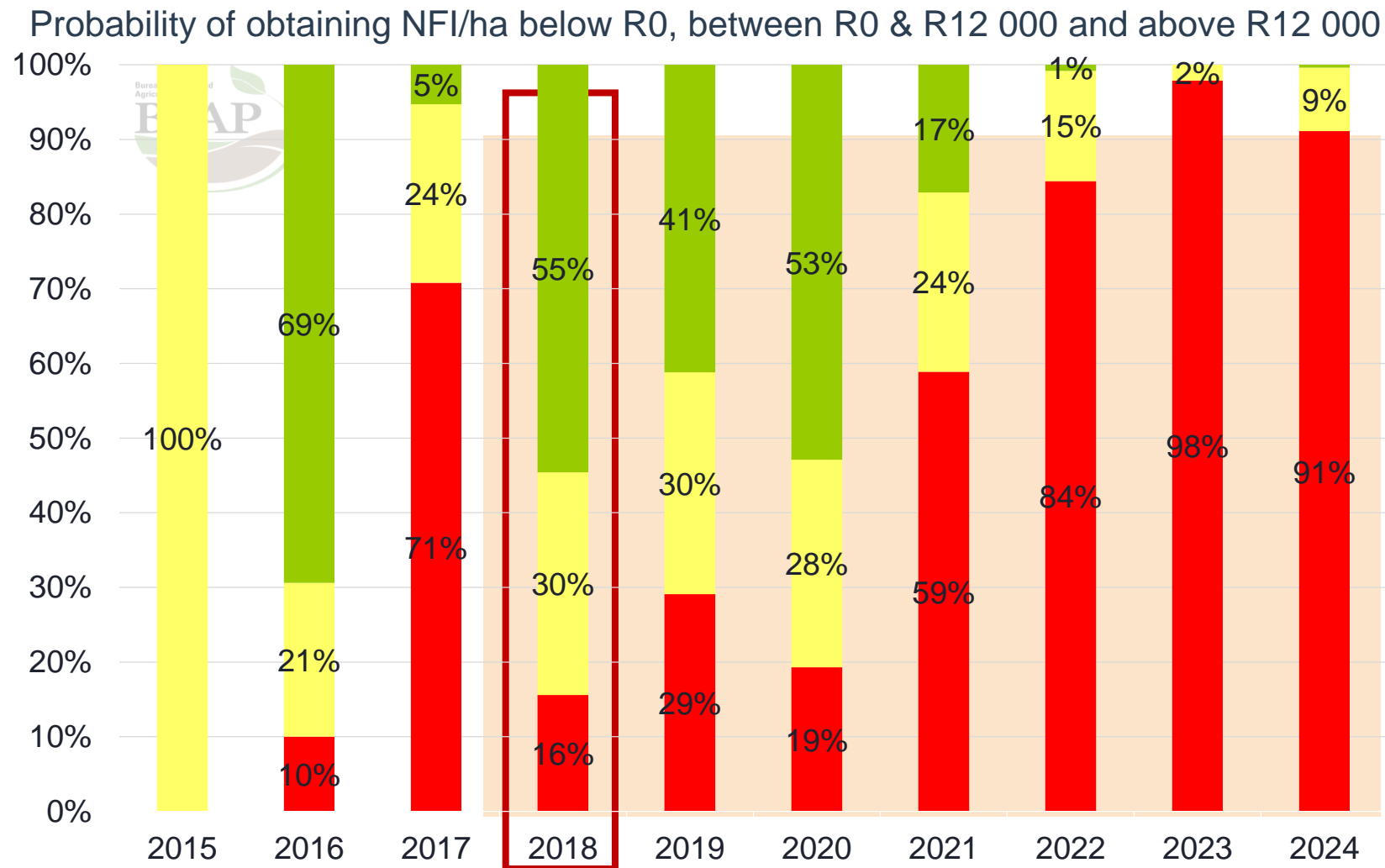
Typical farm – FinSim farm level modelling: 120 Ceres/Koue Bokkeveld production unit

Drought Scenario vs Baseline



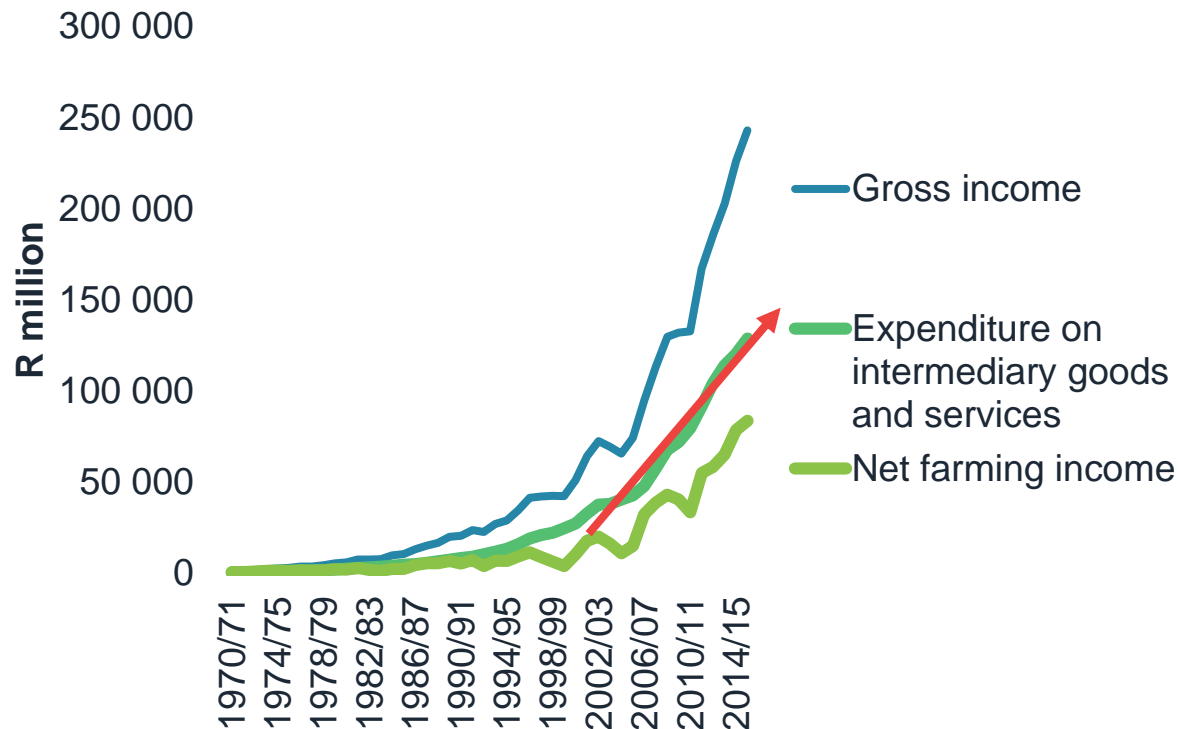
# Stoplights: Water shortage scenario

Drought gross margin not sufficient for positive Net Farm Income



# South African Agriculture: expenses vs income

Producer perspective



- Production costs – smooth curve (upwards)
- Price volatile and sensitive
- **Production = key driver**

↑  $productivity = \frac{output}{input}$  ↑

$= \frac{P_y Q_y}{P_i Q_i}$  ↓

Source: DAFF (2017)

# Typical farm outlook: Drought scenario

Groenland (Grabouw, Elgin) scenario

## Assumptions and scenario planning

- Yield is linked to available water for irrigation purposes
  - 50% available water = 10% production decrease
  - 40% available water = 30% production decrease
  - 30% available water = 50% production decrease
- Labour cost component for EGVV study group:
  - R337.08 million for 5044 ha
  - R66282 per ha = R58 656.63 annual salary per labourer
  - BDK auditors EGVV Economic study group 2016 results

Water availability	Production decrease	Category	Groenland	Vyeboom Villiersdorp
50% available water	10%	On-farm labour losses	661	422
		Downstream labour losses	955	613
		Dependants affected	6466	4139
40% available water	30%	On-farm labour losses	2290	1459
		Downstream labour losses	2230	1426
		Dependants affected	18081	11541
30% available water	50%	On-farm labour losses	4340	2765
		Downstream labour losses	3465	2213
		Dependants affected	31218	19910

Cost increase illustration	A	B
GPW (Yield X Price)	1 000 000	1 000 000
Direct allocatable costs	500 000	550 000 (10% increase)
Gross margin	500 000	450 000
Fixed costs	300 000	300 000
Net Farming Income	200 000	150 000 (25% decrease)

- 10% cost increase = 25% decrease in NFI
- Price and yield key drivers
- Decreased yield – only variable costs decrease whilst overhead investment structure remains unchanged

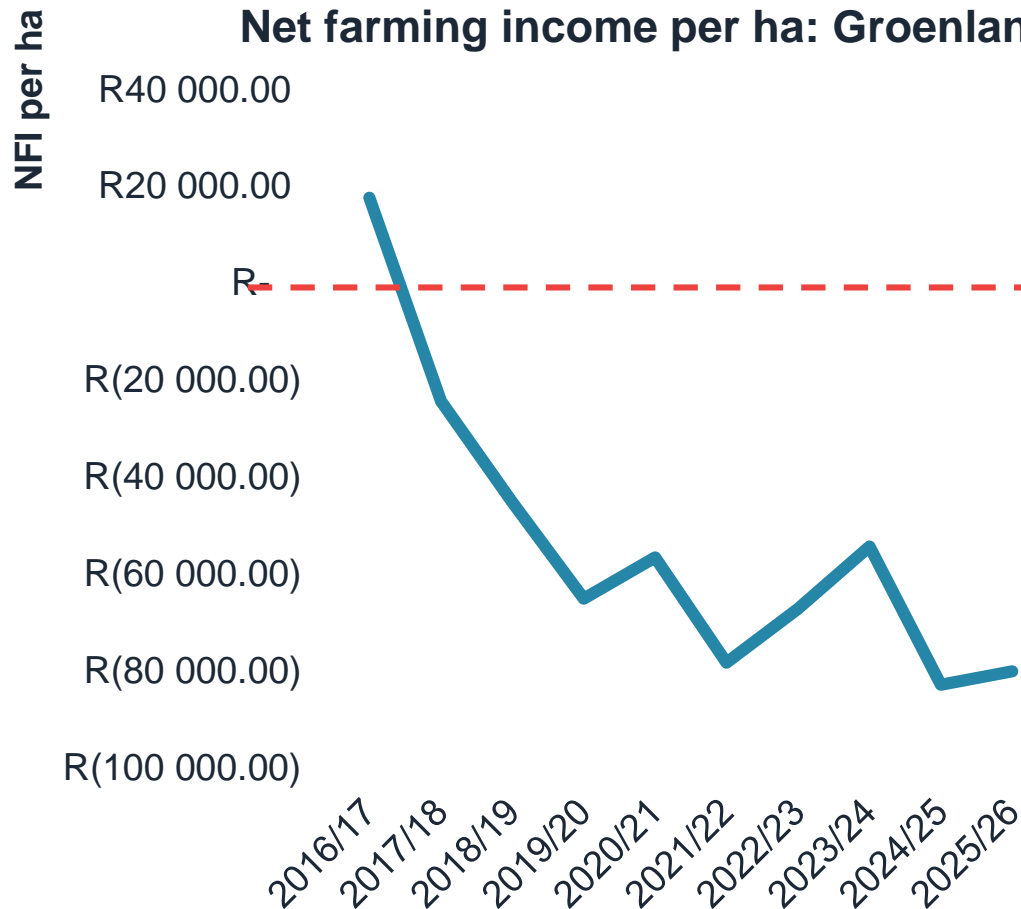
- R 457 814 997,15**
- Potential wages and salaries loss in one season**



# Typical farm outlook: Drought scenarios

Groenland scenario: 40% - 30% available water for 2017/2018

## Net farming income per ha: Groenland



- Setup within BFAP FinSim model
- Scenario assumption: 30% - 50% available water
- Production decrease ranging from 30% to 50% decrease depending on variety
- No recovery projected
- **Decrease of R 42 020.12 NFI/ha from 2016/17 – 2017/18**
  - Extrapolated area (7834 ha)
- **R 329 185 623.43 decrease in revenue in one season**
- **R 464 389 422 Potential export revenue decrease in one season**

# Mitigation actions: Farm level

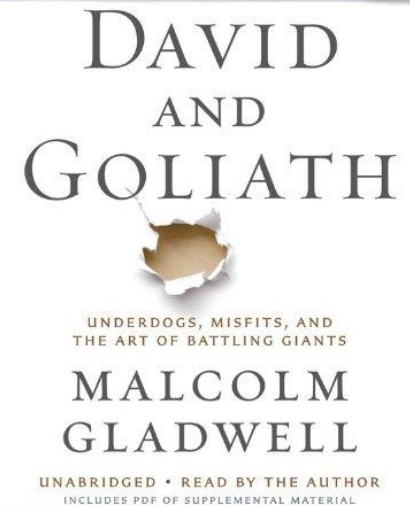
## Collective approach

### On-farm actions

- Mulching
- Irrigation management (probes, moisture level monitoring)
- Cover crops
- Netting structures (tunnels – expensive)
- Irrigation system upgrade
- Water diversification
- Replacement strategies (cultivar/crop choice)
- Extended full-bearing age
- Stumping (cutting back and starting again)
- Yield monitoring
- Cultivar development and breeding – long horizon

### Key thoughts

- Farmers Resilience
- Groundwater Substitution
- Preserve most valuable crops
- Data for better decision-making
- Dryer areas will be dryer; wet areas wetter and increased frequency of natural disasters



# Conclusions

## Key points on drought for fruit industries

- Effect of water shortages in a farming setup – unique for every enterprise
- Collective approach to improve water productivity & management
- Competition for resources among fruit industries and enterprises
- “Small – enterprises” – in hectares, but ever increasing in value of output and ROI
- Prices serving as proxy for investments
- Diversification strategies depending on resilience and economies of scale

# Thank you

