



Cost-income realities and where to focus to escape the squeeze



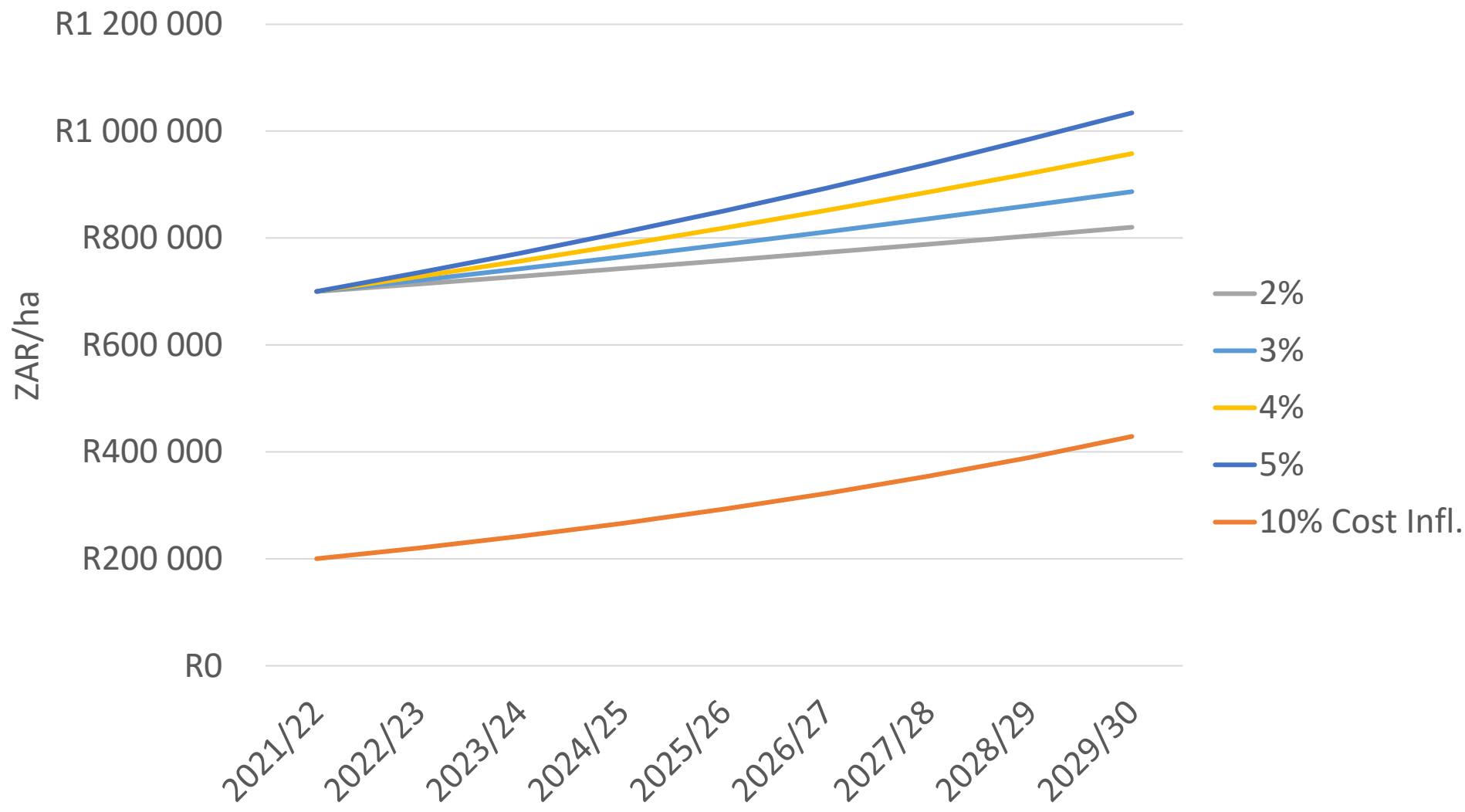
Graeme Krige
Hortgro Technical Symposium
7 June 2022



1. Introduction



Introduction: Good news orchards 😊



Introduction: No shortage of bad news

Home > News > South Africa > Farmers must brace for sharp rises in agrochemical prices

Farmers must brace for sharp rises in agrochemical prices

By Annelie Coleman | 26 May 2021 | 2:56 pm

Home > News > South Africa > SA heading for third consecutive record diesel price increase

SA heading for third consecutive record diesel price increase

By Susan Marais | 29 April 2022 | 3:01 pm

Home > News > South Africa > Electricity price hike: another blow for farmers

Electricity price hike: another blow for farmers

By Jeandré van der Walt | 18 February 2021 | 4:20 pm

Home > News > South Africa > 'Minimum wage increase could cripple smaller farmers'

'Minimum wage increase could cripple smaller farmers'

By Susan Marais | 9 February 2022 | 3:33 pm

Home > News > South Africa > No end in sight for logistical problems at Port of Cape Town

No end in sight for logistical problems at Port of Cape Town

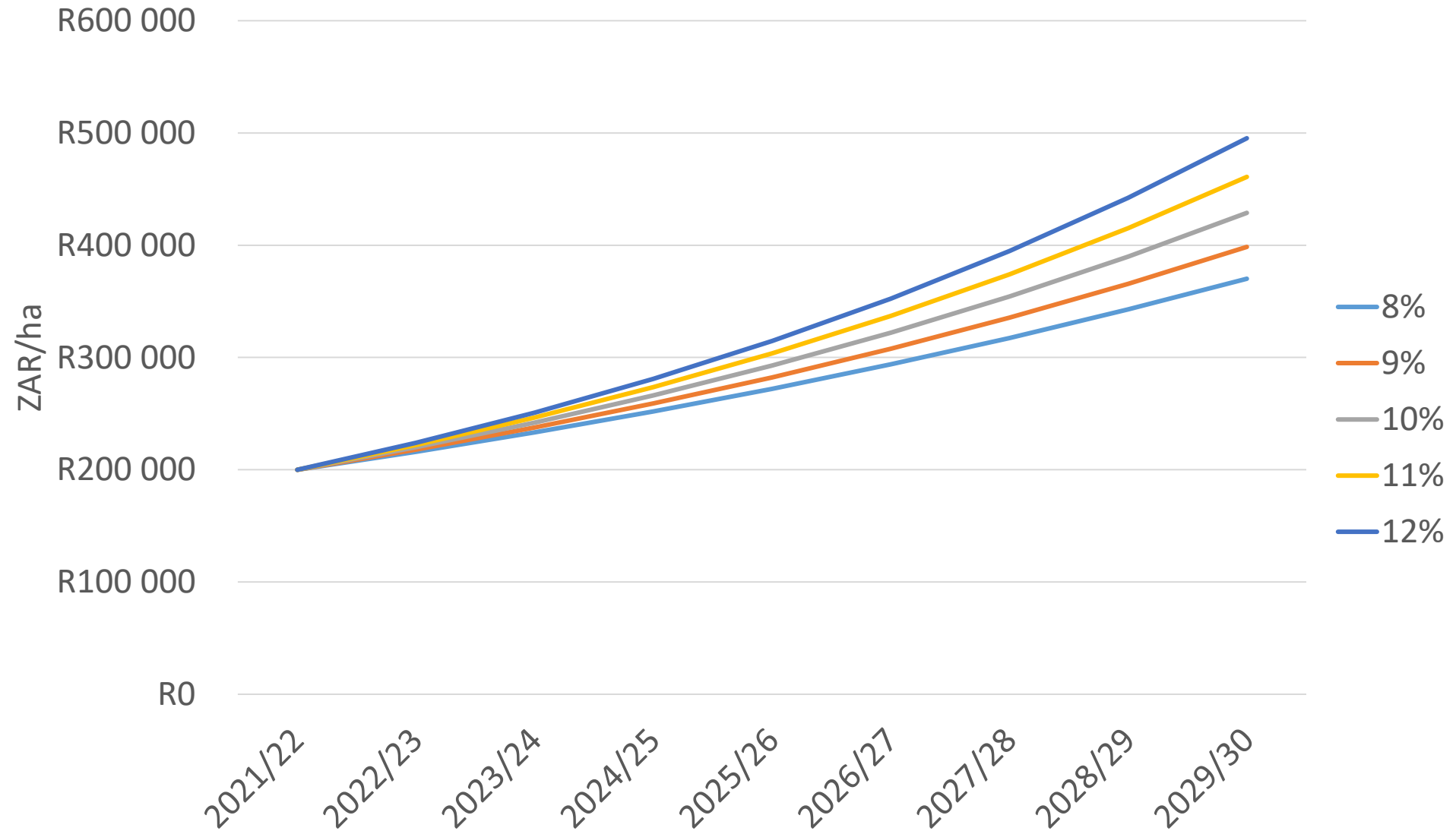
Glenneis Kriel | 8 April 2022 | 2:39 pm

Etc.

farmer's weekly

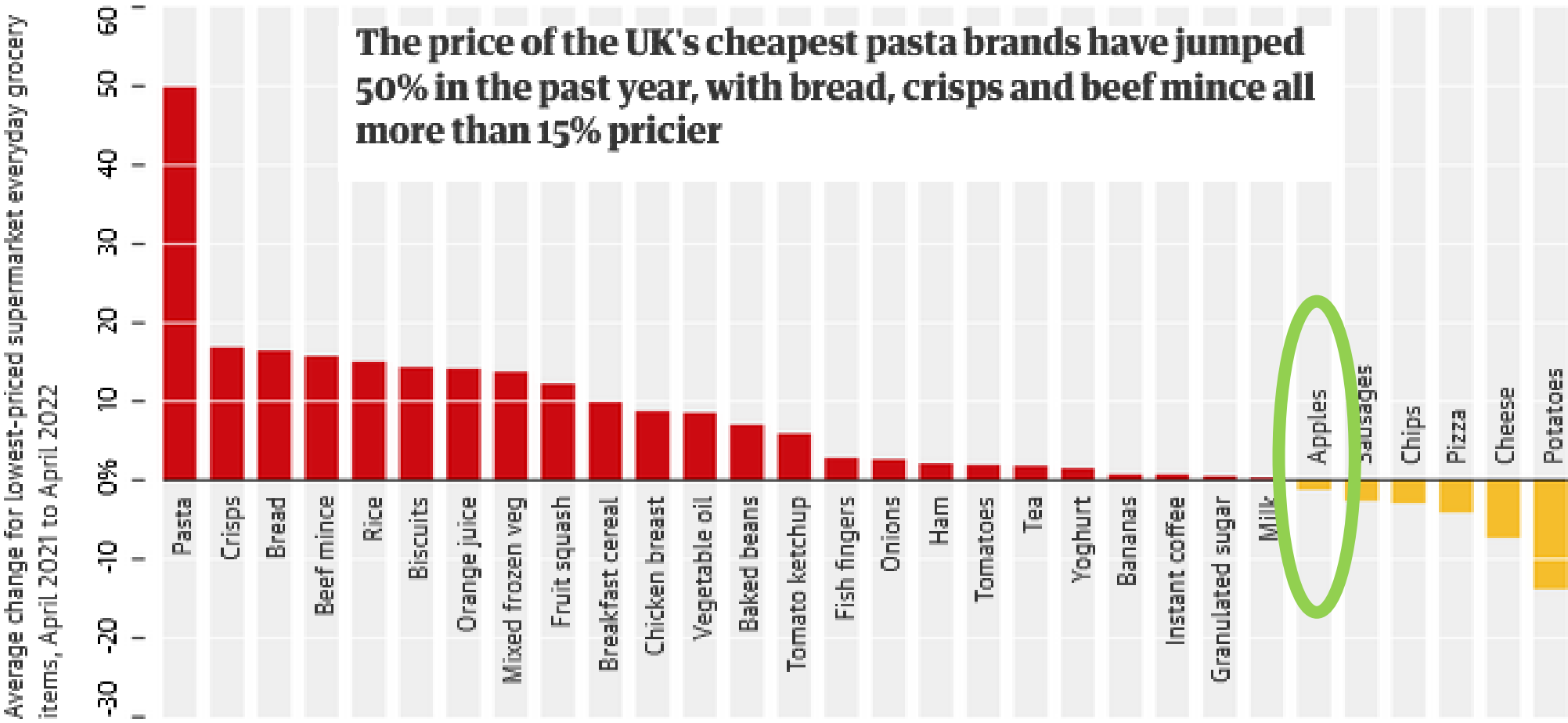


Production costs are only going one way





Income inflation is not keeping up with cost inflation



Guardian graphic. Source: ONS. Note: research is new and highly experimental

Volatile ZAR

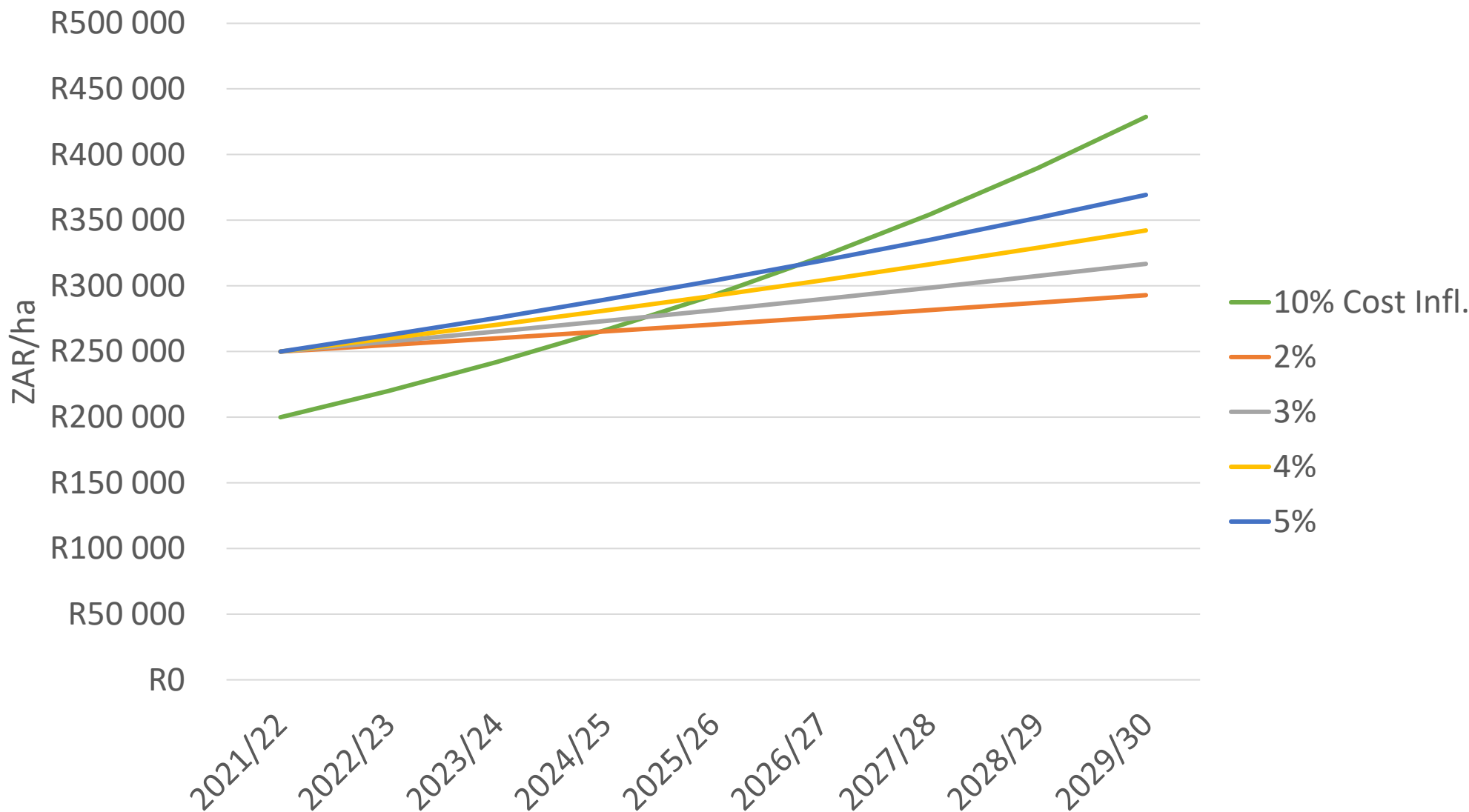
USD to ZAR Chart

US Dollar to South African Rand

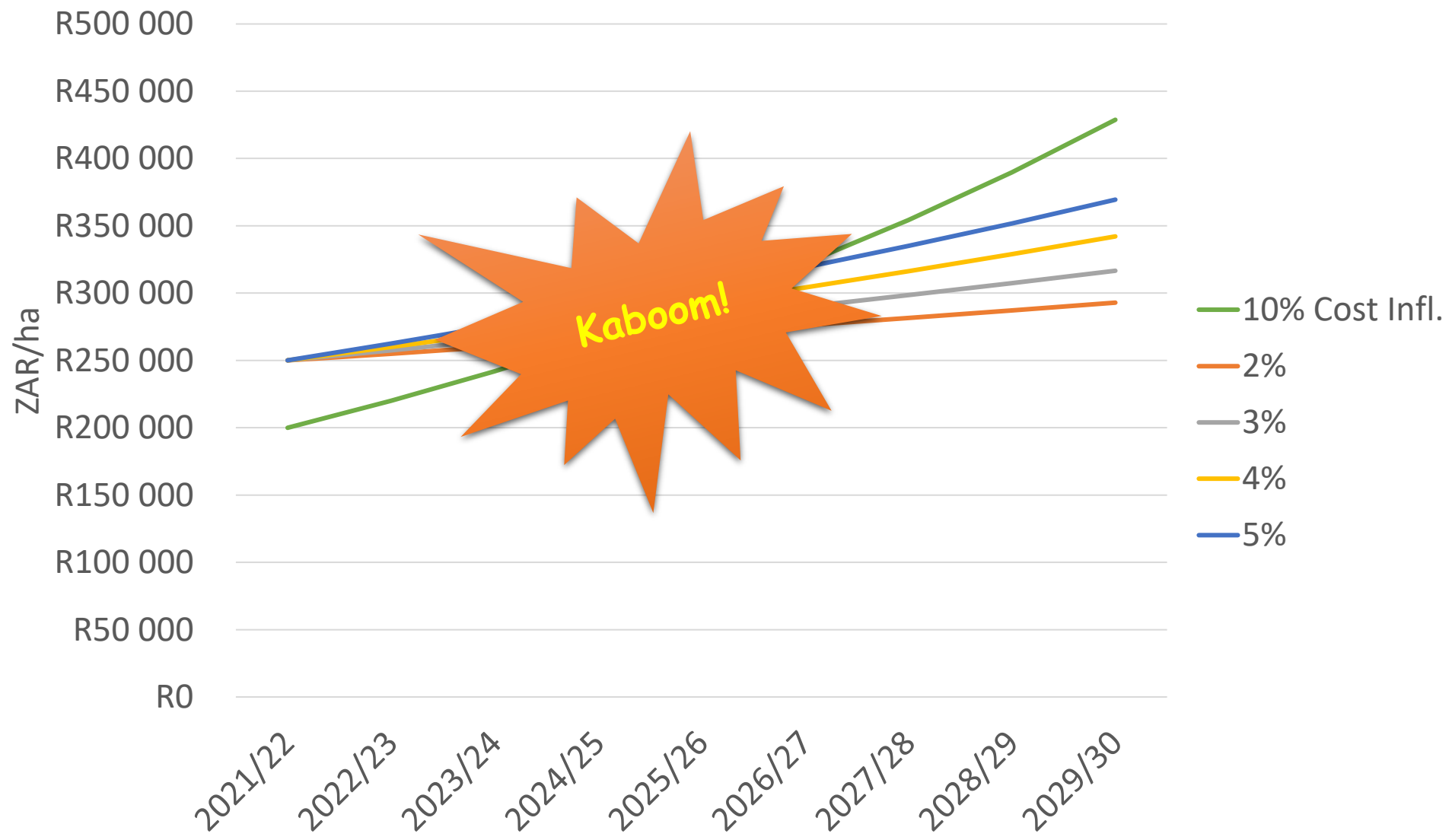
• 1 USD = 15.5027 ZAR Jun 2, 2022, 08:44 UTC



Introduction: Bad news orchards ☹️



Introduction: Bad news orchards 😞



What is the reality?

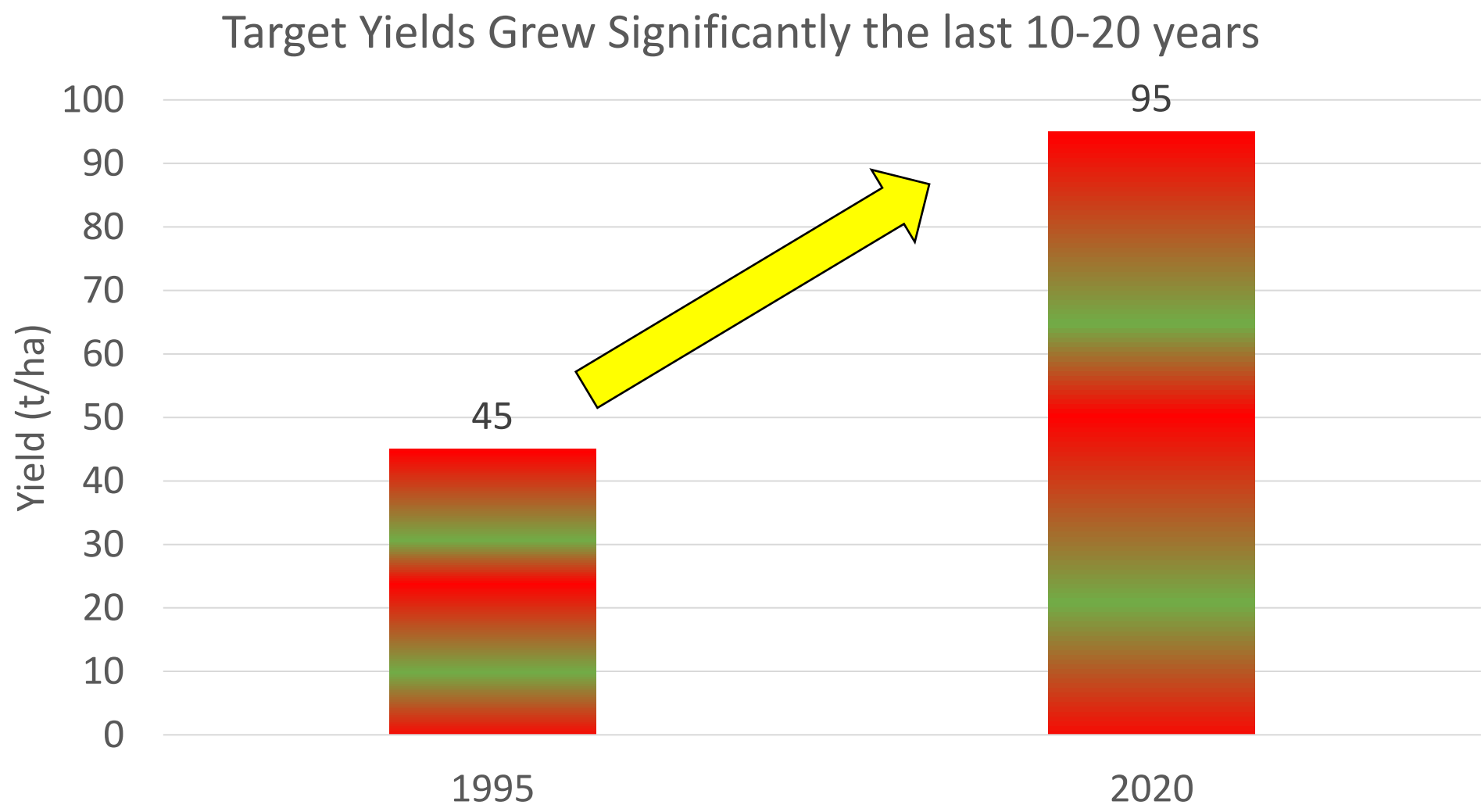
- Bad news: The cost-income wedge is a reality
 - Cost inflation expected to outstrip income-inflation for the foreseeable future
- Obvious and clear challenge to industry
 - What are the strategies to employ to prevent the lines from crossing?
- Good news: There is a way out
 - Local and international examples of extremely profitable orchards
- Rand – Dollar/Pound/Euro exchange rate provides opportunity
 - Careful: watch out for a false sense of security



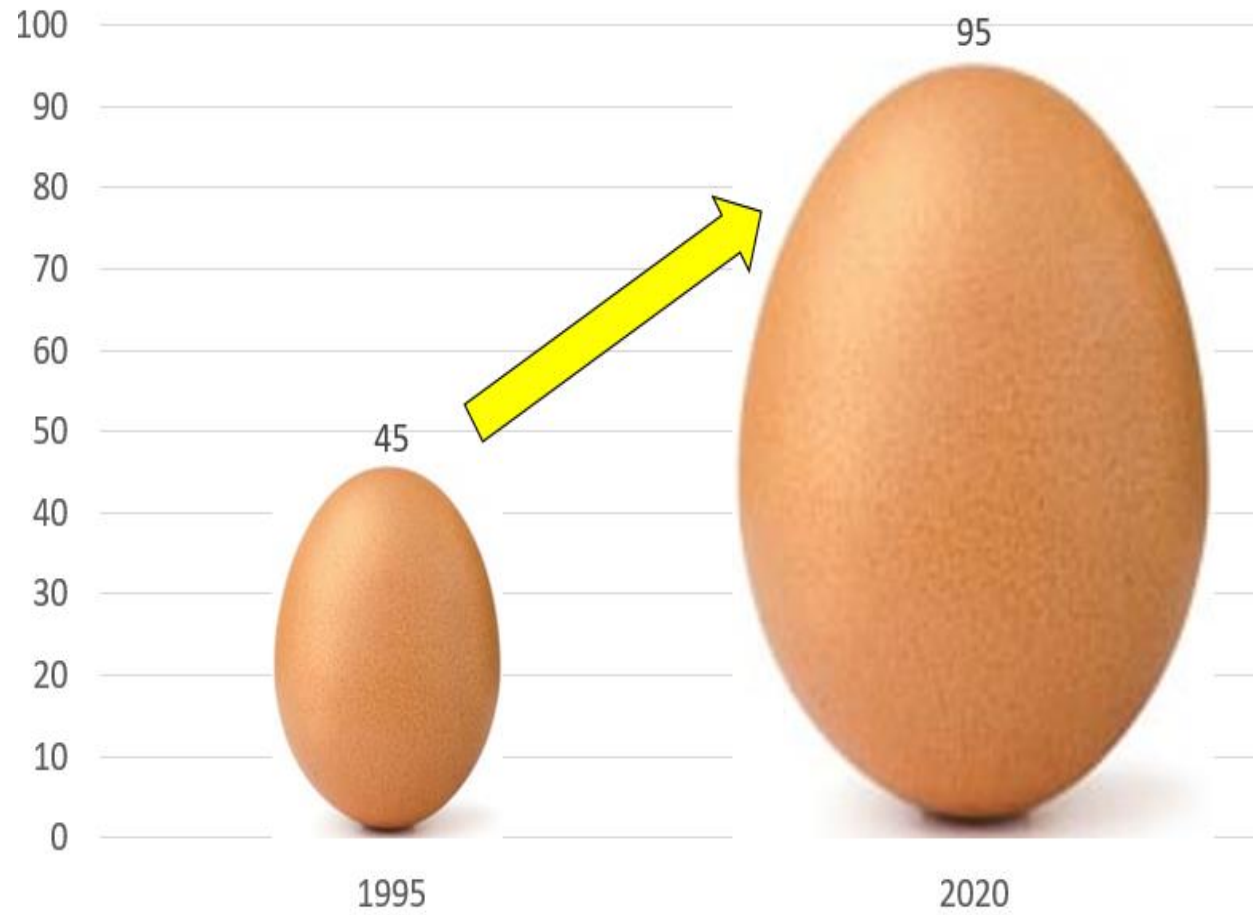
2. How did we get to this point?



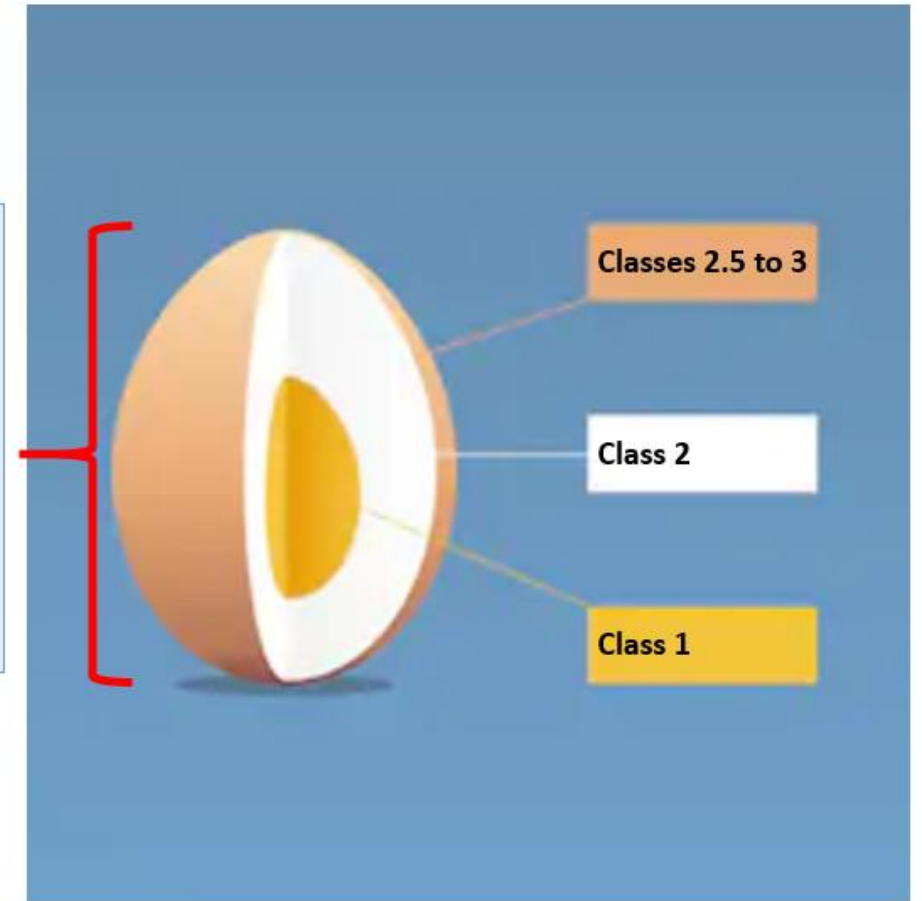
Let's look back a decade or two



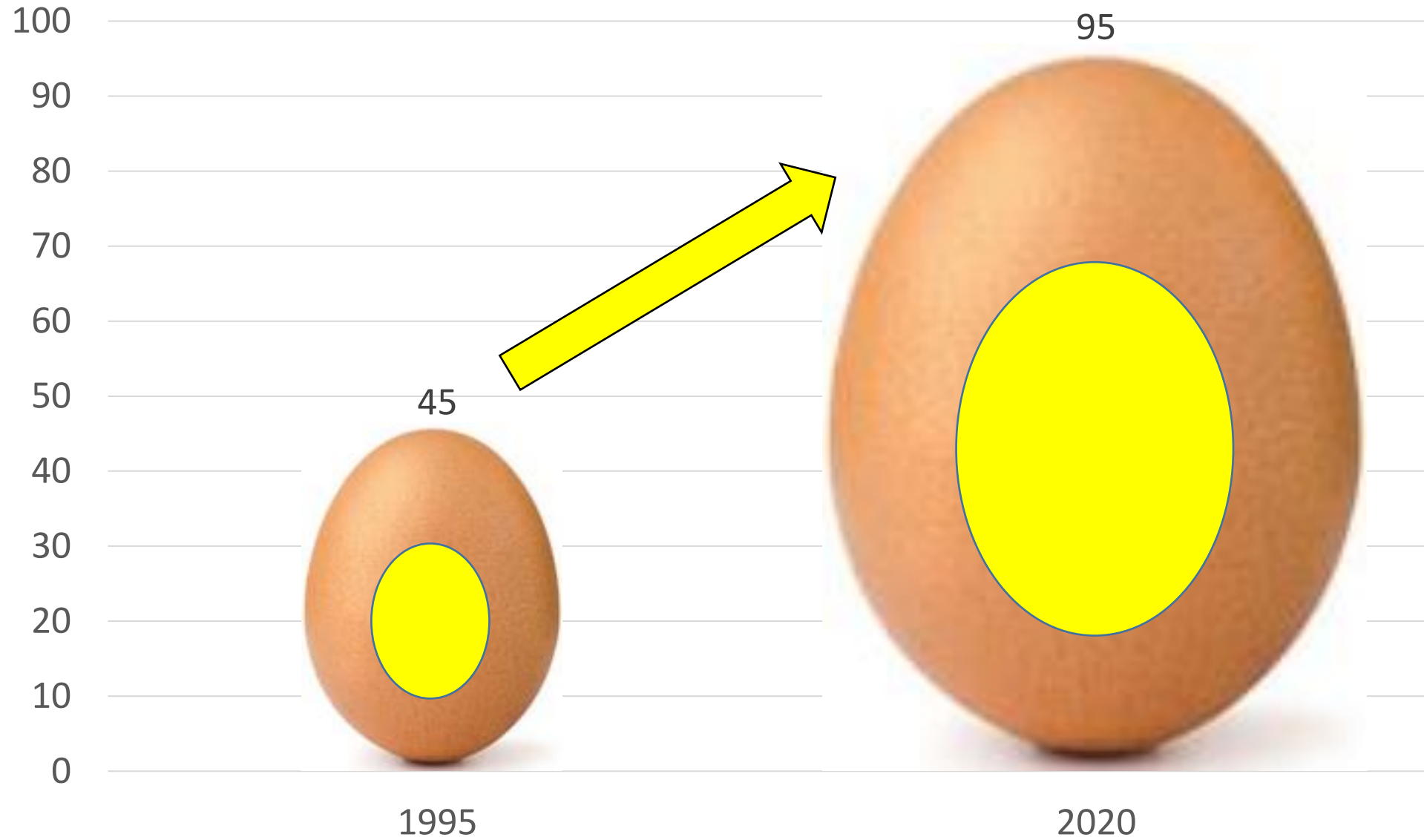
Target Yields Grew Significantly the last 10-20 years



Volume = Yield i.e.
tons/ha

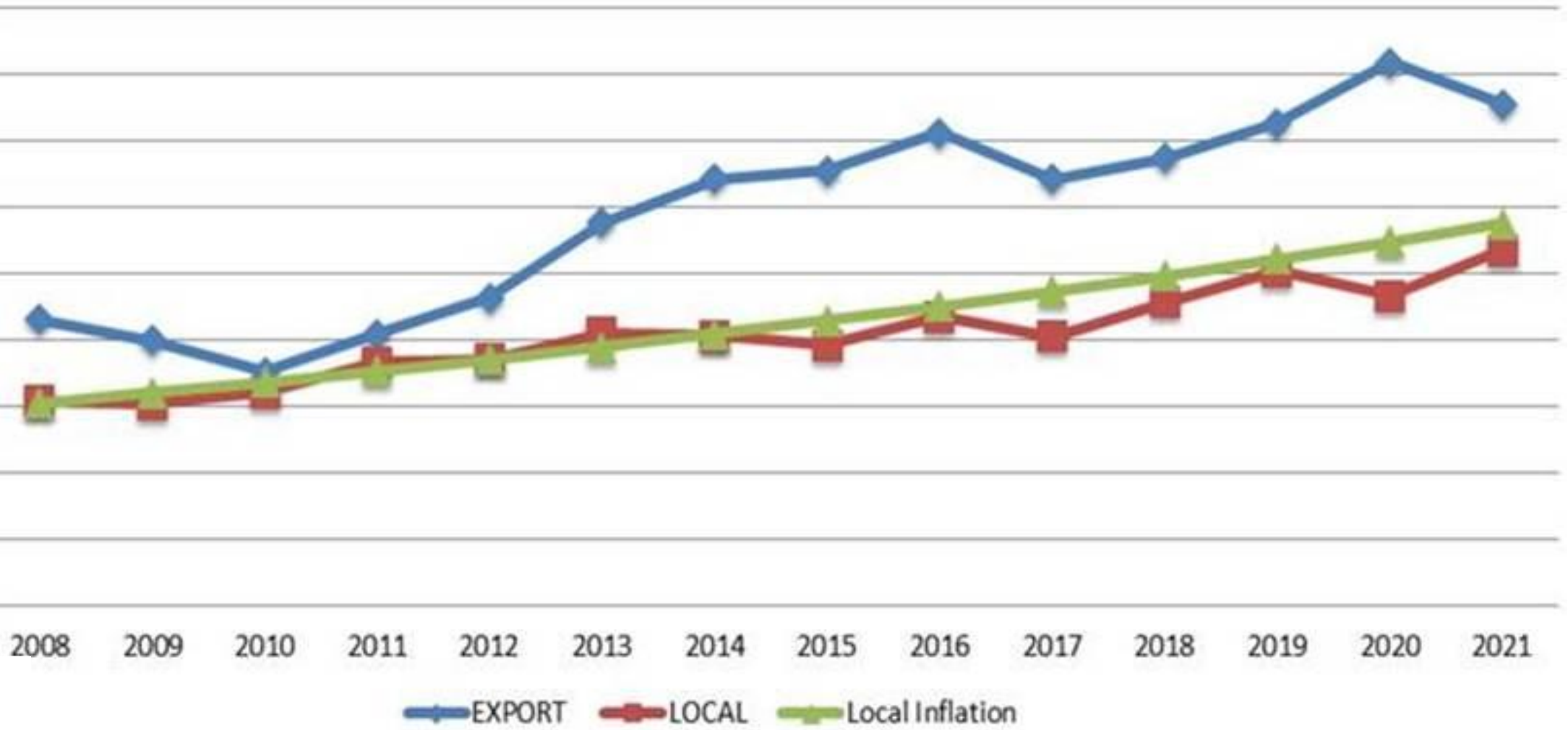


Target Yields Grew Significantly the last 10-20 years



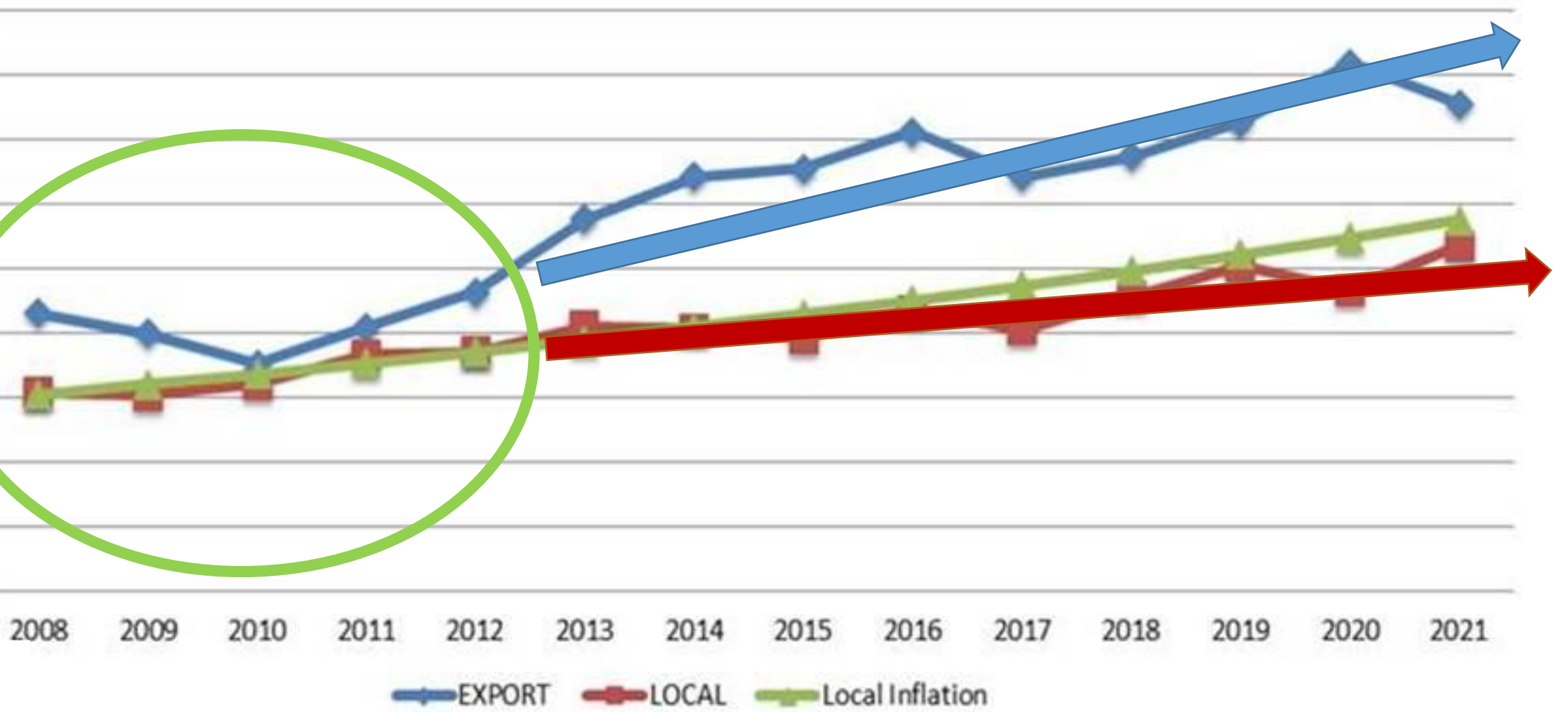
EXPORT / LOCAL / CPIX

Relative income in ZAR



EXPORT / LOCAL / CPIX

Relative income in ZAR



That's great, but the threat remains – why?

- 1. Production costs continue to rise at above inflation rates
- 2. Income Inflation is not keeping up
 - Widening of the gap in income potential between local and export quality



What does it cost you to produce one apple?

- 70t/ha
- 140g AVG fruit weight
- R200 000/ha production cost
- **500 000 fruit/ha**
- **R0.40 per apple**
- **R2 857/ton**



Apple farm gate income range

Grade	Range	Realistic Scenario
Export Grades (pref. counts)	R8000 - R12000	R 10,000
Local Grades	R2750 - R3200	R 3,000
Juice/Processing	R1700-R2100	R 1,900



3. How do we navigate
our way out of this
wedge?



3 Suggested strategies to combat the cost–income wedge

- 1. Produce MORE sellable product per unit area
 - Increase quantity - more yields/hectare
- 2. CONTROL costs
 - Steward costs wisely - SA cost-control already very good
 - Value chain investments
 - Risk: “saving yourself out of business” at production level



3 Strategies to get out of this wedge

- 3. INCREASE VALUE (quality) of what you are selling while maintaining volume
 - More Class 1 (export quality) on tree; higher packouts
 - Class 1 focussed inputs in existing orchards
 - Best strains/New varieties/Rootstocks/New Orchard Systems – The whole puzzle
 - Expose more of what we produce to our exchange rate advantage



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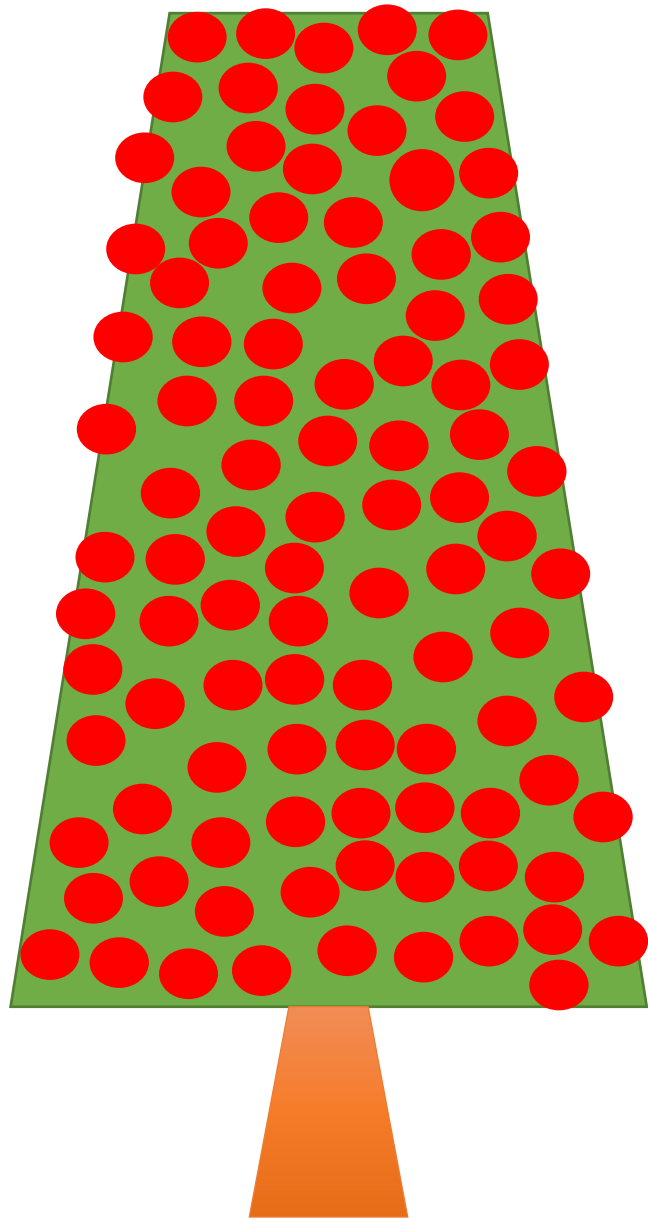
SA On-Tree Class 1

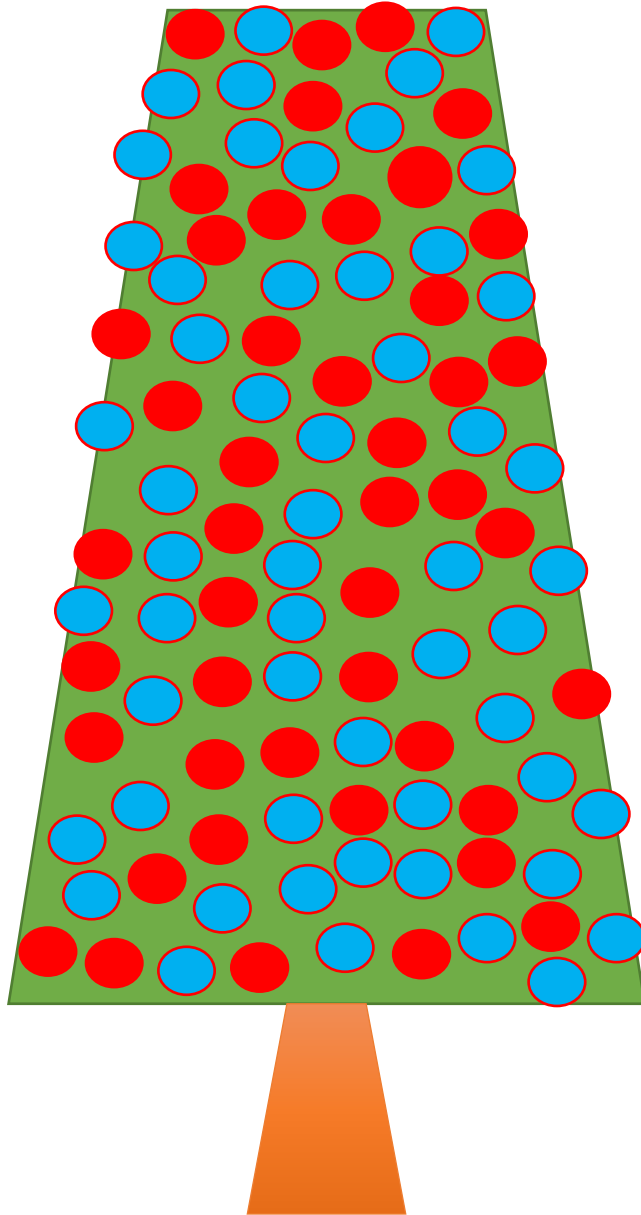
CROP DISTRIBUTION: APPLES

Year JAN-DEC	TOTAL PRODUCTION	LOCAL MARKET*	EXPORTS	PROCESSED	DRIED	CHANGE IN TOTAL PRODUCTION
	(TON)	(TON)	(TON)	(TON)	(TON)	%
2011	770 326	231 423	318 966	218 347	1 590	-
2012	815 578	206 271	358 457	249 740	1 110	6%
2013	916 761	211 871	434 248	267 682	2 960	12%
2014	783 291	204 069	339 096	236 966	3 160	-15%
2015	938 758	220 860	413 757	301 391	2 750	20%
2016	916 343	213 740	425 325	277 078	200	-2%
2017	931 198	210 674	417 794	300 560	2 170	2%
2018	832 716	190 384	393 344	245 908	3 080	-11%
2019**	898 967	198 453	423 394	275 200	1 920	8%
2020**	991 252	190 812	458 920	339 990	1 530	10%
AVERAGE CROP DISTRIBUTION (%)		24%	45%	31%	0%	

Hortgro Key Deciduous Fruit Statistics 2020

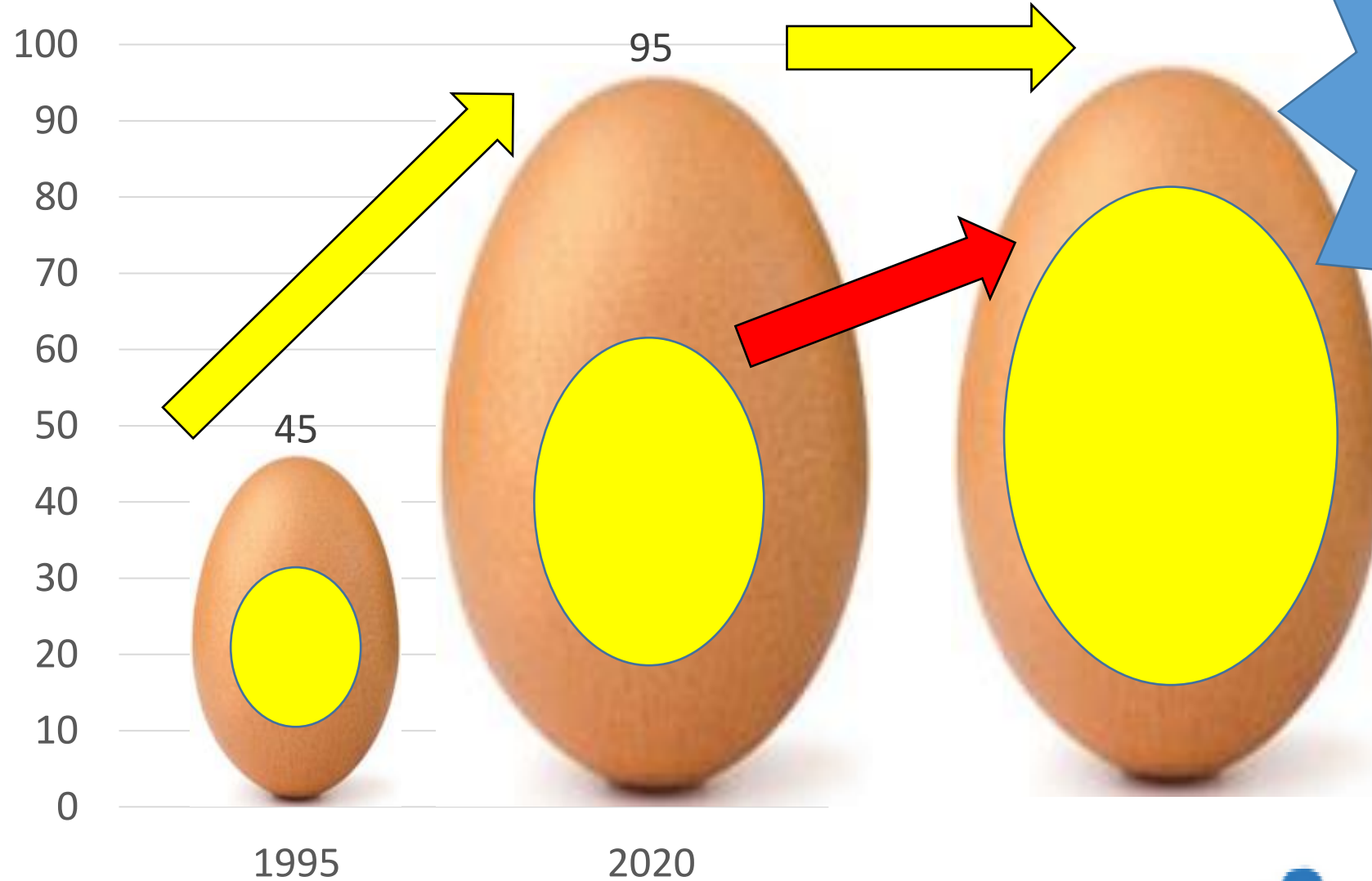






- 45% Export (red dots)
- Room for improvement

Target Yields Grew Significantly
the last 10-20 years



Maximise On-
Tree Class 1
without
significantly
compromising
yields



Alan has worked tirelessly to advocate for the apple and pear industry over the past ten years. I was fortunate enough to be Alan's first chairperson, when we set the strategy of "a billion dollars by 2022". At the time in 2012, we were a circa \$320 million industry.

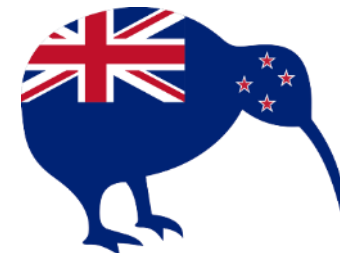
Apples and pears were the first sector to reach the Government's business growth agenda goal of doubling export value. This milestone was achieved in the 2016/17 season with \$720 million and had it not been for the hail event in Nelson on Boxing Day 2020, apples and pears would have hit the billion this season, a year ahead of target.

There have been many other achievements during Alan's tenure, including bedding in the Recognised Seasonal Employer (RSE) programme, to the envy of many other sectors.

I would like to congratulate Alan on a fantastic decade and several outstanding achievements. As the horticulture industry, we wish you all the best in your next chapter. Thank you for your service and dedication.

HortNZ looks forward to working with Terry and his team to meet the challenges of the next ten years, to ensure continued growth in returns to apple and pear growers. ●

- NZ Success Story: 2022 target
- 2012 turnover:
 - \$320m
- 2017 turnover:
 - \$720m
- 2019 turnover:
 - \$850m
- 2021 turnover:
 - Missed \$1000m only due to hail in Nelson
- Maintaining yields
- **Focus** on Quality
- Accelerated new plantings
- Not by increasing hectares





4. Revision of in basic Orchard Physiology





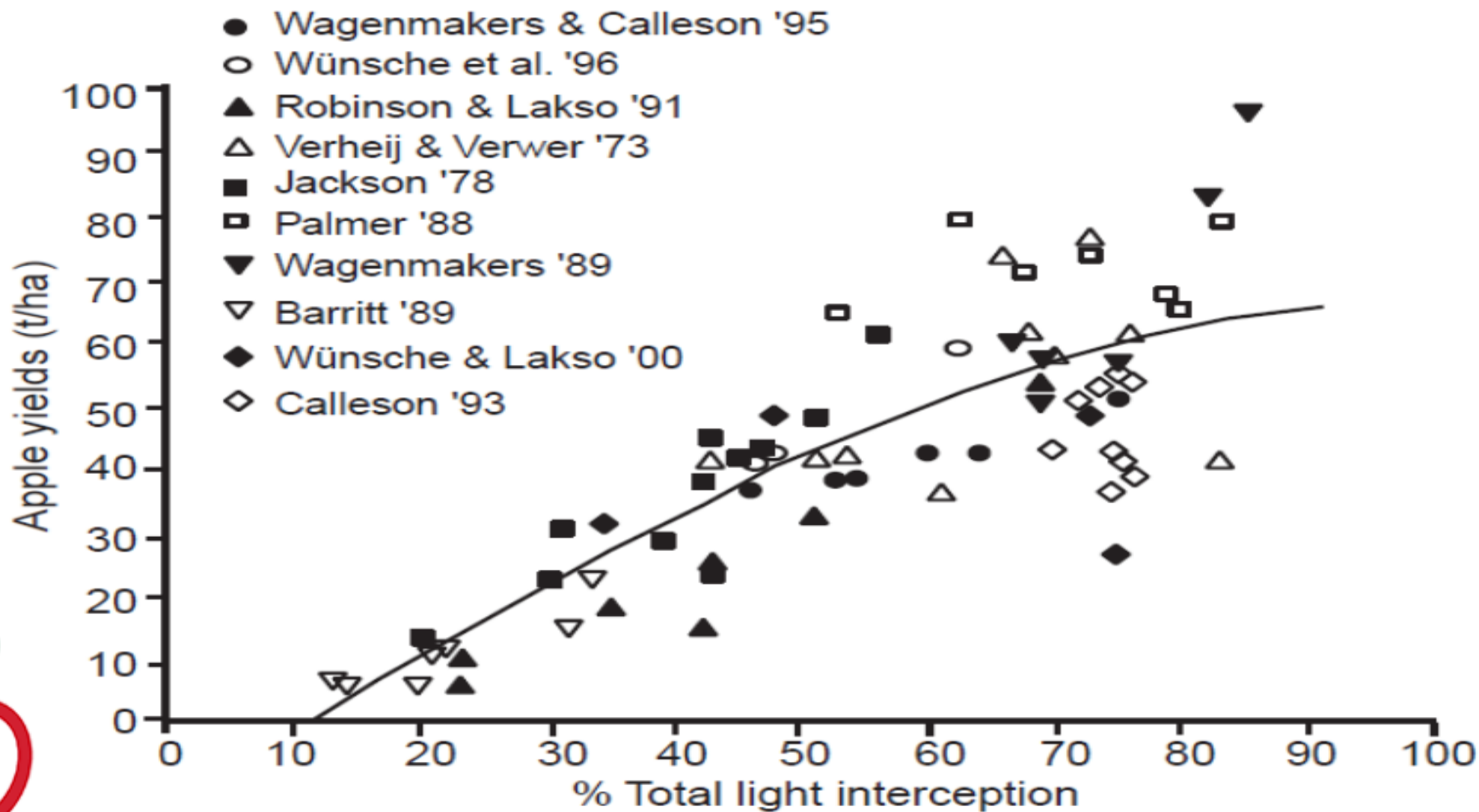
Two RULES of Orcharding

1. It is **IMPOSSIBLE** to achieve high yields without adequate light interception.
2. Light distribution is **CRITICALLY** important to achieve and maintain high fruit quality.



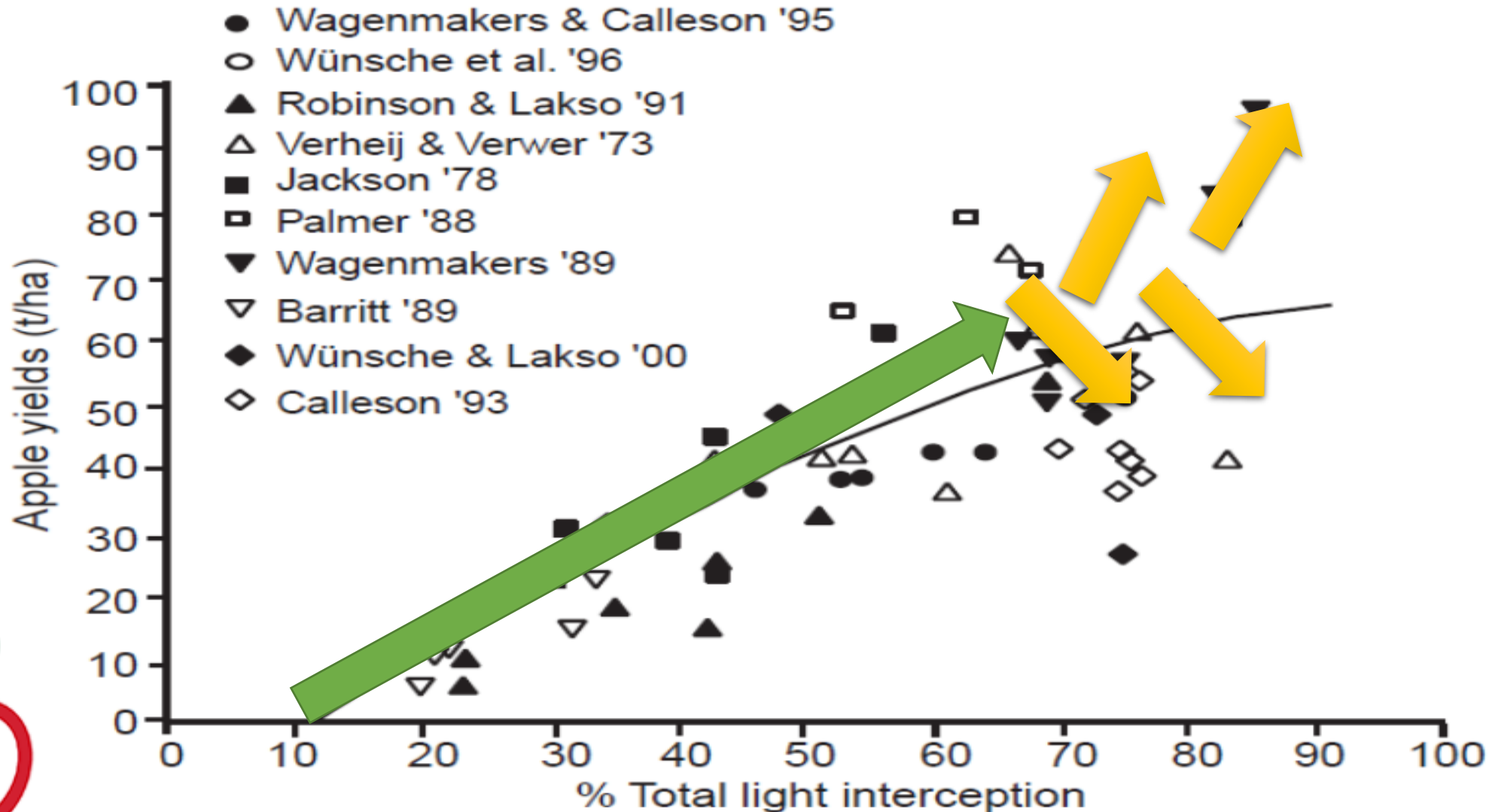
Canopy light interception vs. yield

(Wünsche and Lakso, 2000)



Canopy light interception vs. yield

(Wünsche and Lakso, 2000)



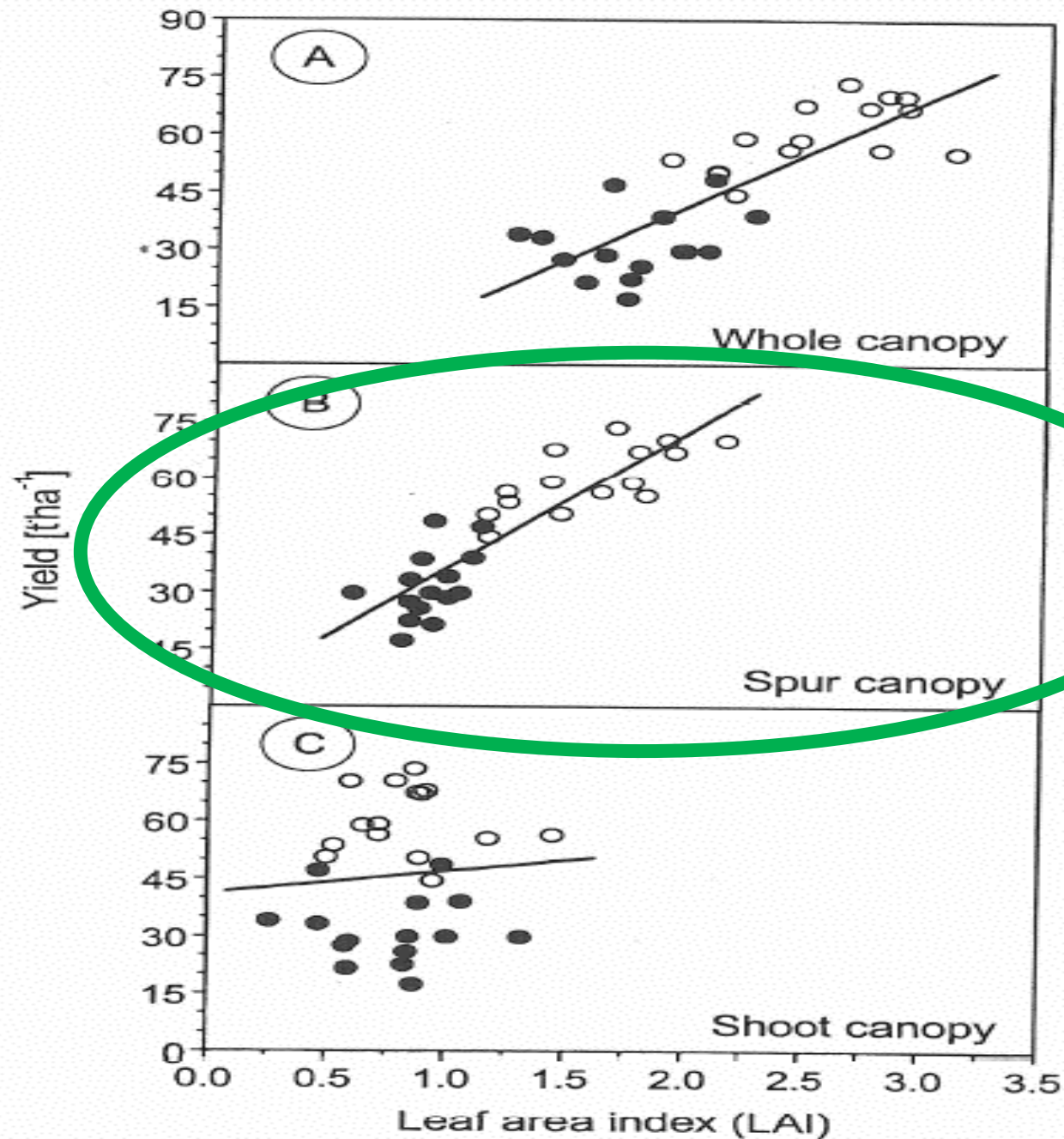


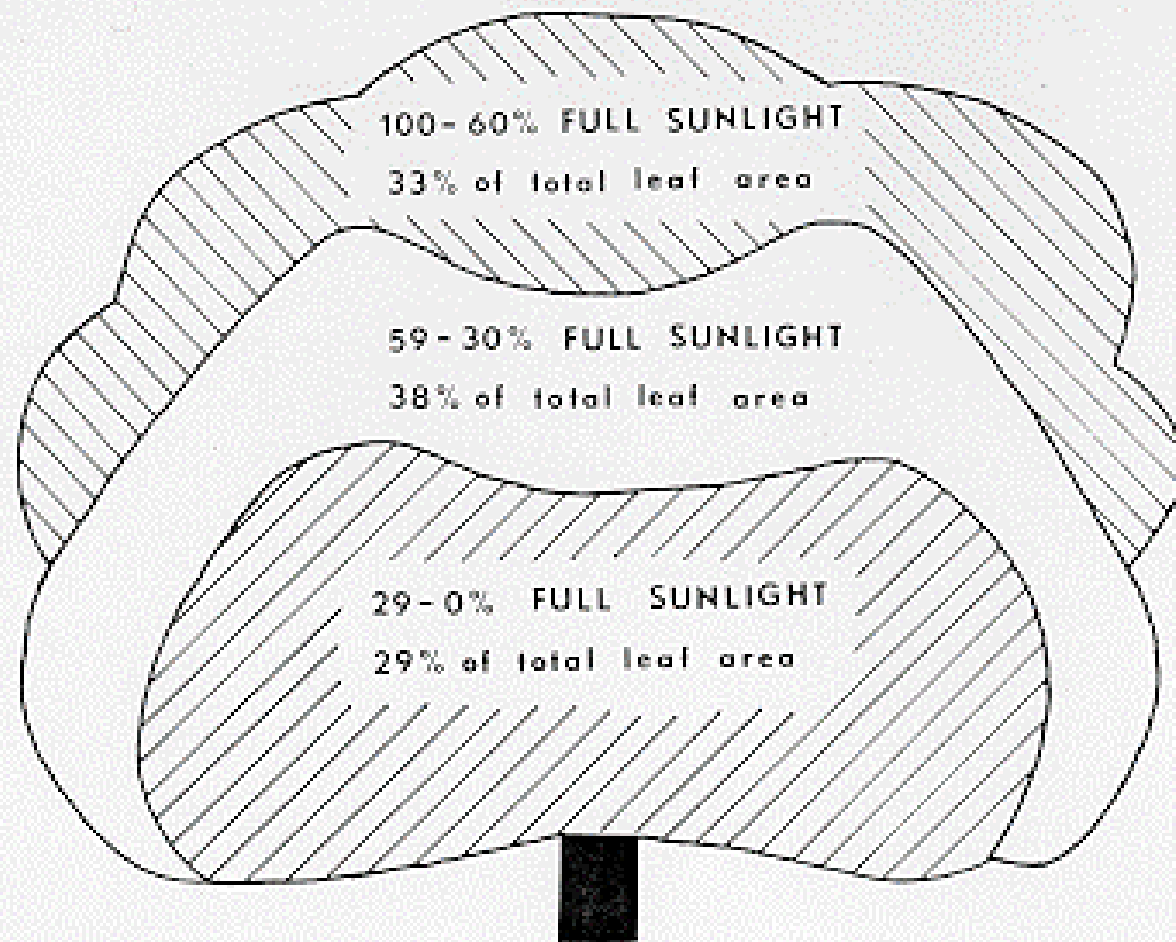
Fig. 1. The relationship between fruit yield (t·ha⁻¹) and mean whole canopy, spur canopy, and extension shoot canopy LAI (average for 3–5 and 10–12 weeks AFB) in a 4-year-old 'Jonagold'/'Mark' (●) and a 15-year-old 'Marshall McIntosh'/'M.9' (○) slender spindle apple production system in 1992. Linear regression equations (n = 30) are: (A) Yield = -12.74 + 27.37 (total LAI), $r^2 = 0.656$; $P \leq 0.0001$; (B) Yield = 1.29 + 35.63 (spur LAI), $r^2 = 0.774$; $P \leq 0.0001$; (C) Yield = 41.12 + 5.75 (shoot LAI), $r^2 = 0.008$; $P \leq 0.643$.



Two RULES of Orcharding

1. It is IMPOSSIBLE to achieve high yield without adequate light interception.
2. Light distribution is CRITICALLY important to achieve and maintain high fruit quality.





*Figure 1. Light penetration into the canopy of a large apple tree.
(From Heinicke, 1975, USDA Agri. Handbook 458).*



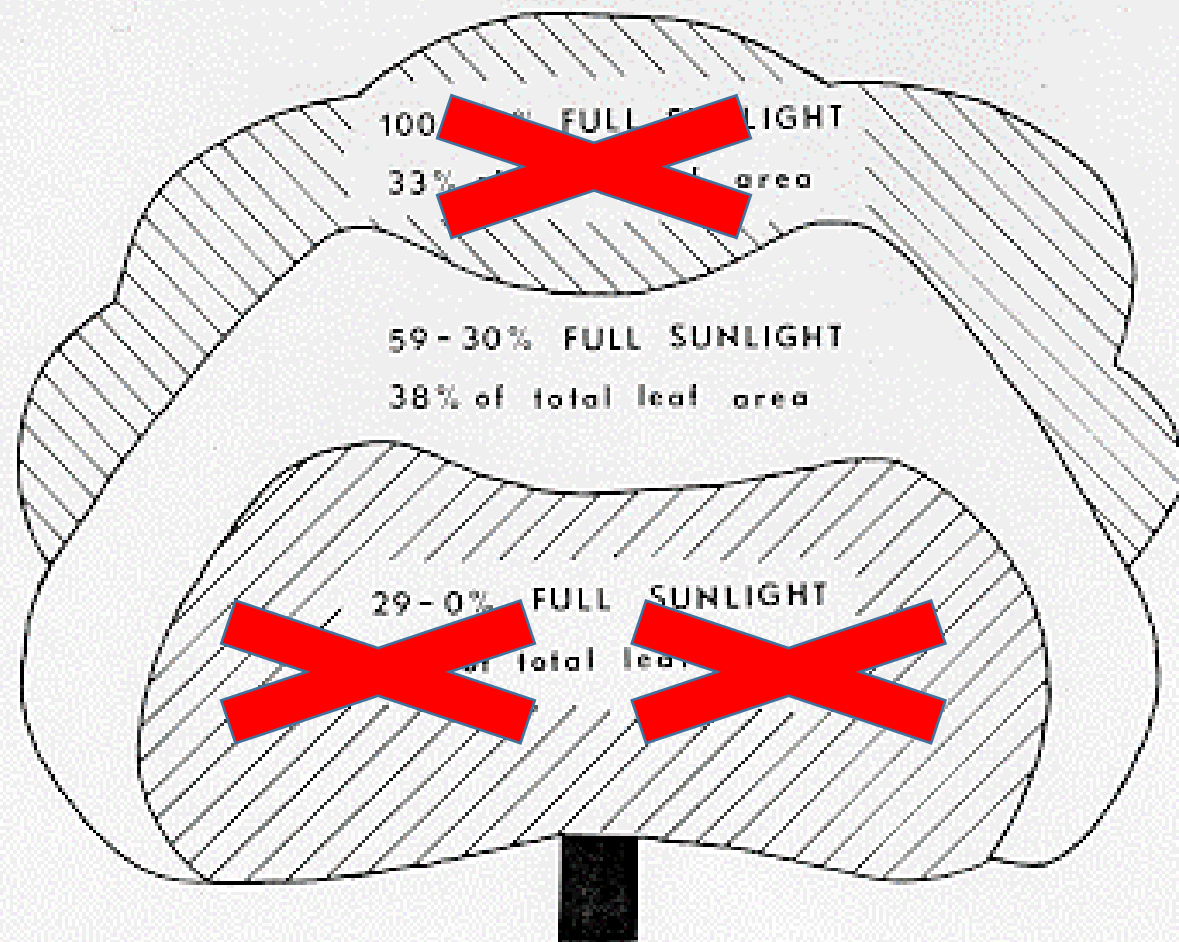


Figure 1. Light penetration into the canopy of a large apple tree.
(From Heinicke, 1975, USDA Agri. Handbook 458).





5. What does the near future hold?



What does the near future hold?

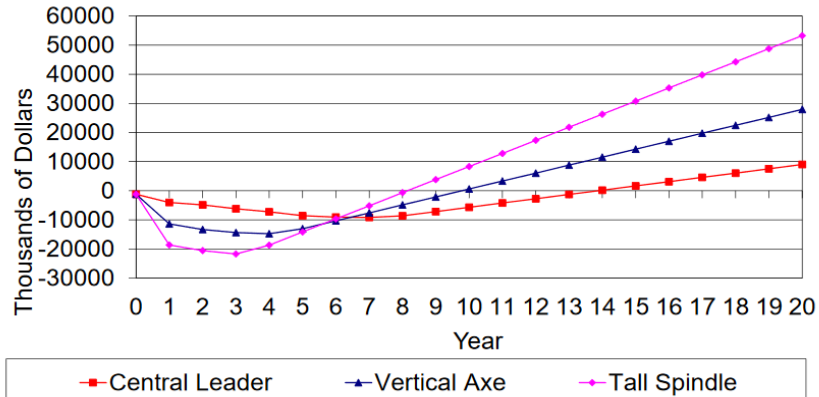
1. Increase in planting density (stems/ha vs. trees/ha)
2. Tall trees – higher than wide
3. Narrow, simple canopies
 - Light distribution = fruit+bud quality
 - Increased mechanical aid “friendliness”
4. Reproductive rootstocks
 - Yield + vigour control matched to site, system and scion
5. Increase in Nets and Reflective materials used in combination
 - “just the right amount” of light – not one size fits all
6. Multiple orchard systems aiming to achieve the above
 - Yields in early years, excellent mature yields, excellent quality



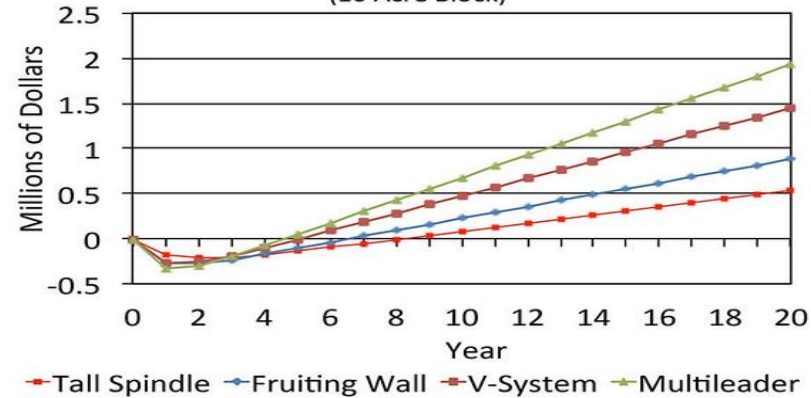
Supporting data

20 year Profit Estimate

Profit of Systems 2014

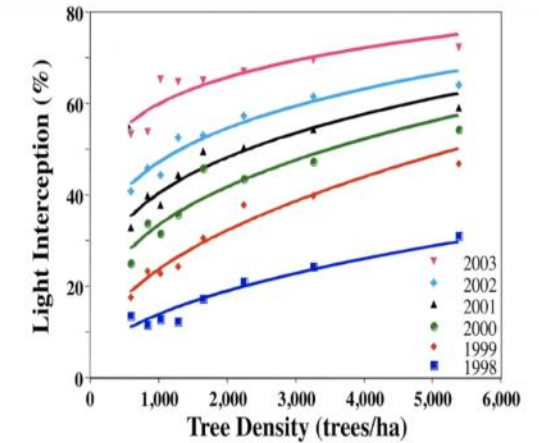


Profit of Systems (Estimated)
(10 Acre Block)



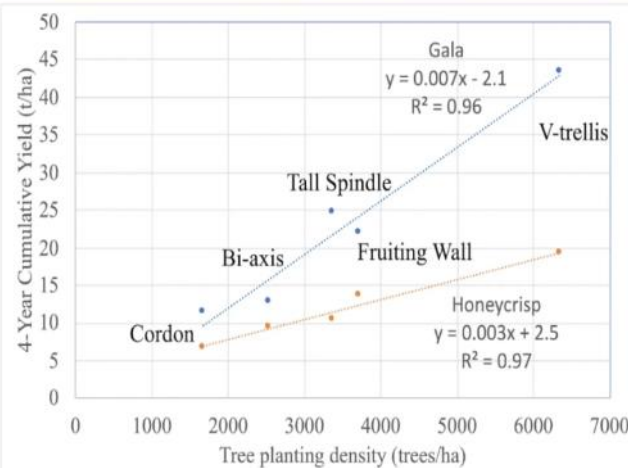
During Phil Schwallier's presentation at the Great Lakes Fruit, Vegetable and Farm Market Expo in December, he estimated the relationships between systems (shown here) and said the greater densities on two-dimensional plantings produce "the best quality, have the highest return and highest production."

Effect of Orchard Age and Tree Density on Light Interception



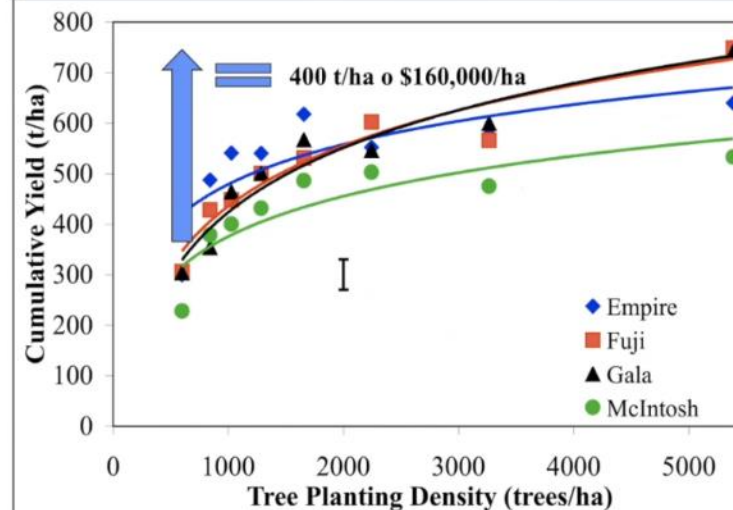
Tree density had a strong influence on light interception from year 2 through year 7. The highest tree density achieved 60% light interception by year 6 and 70% by year 7. Low density systems reached 55% light interception by year 7.

Planting density is tightly related to light interception and thus yield



Systems that start with low tree density have low light interception and low yield for the first 5 years

Lifetime yield and planting density are tightly related

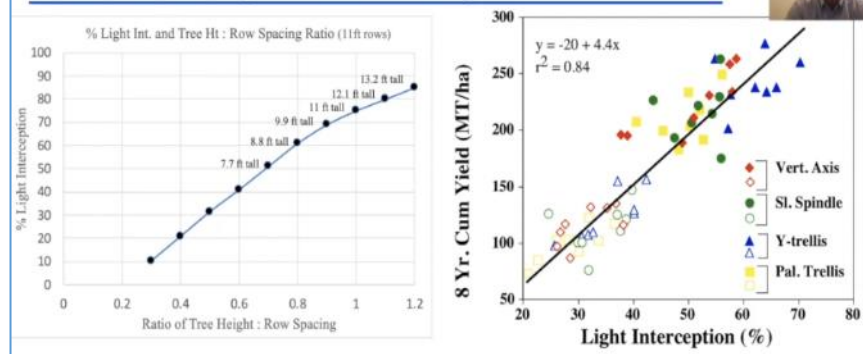


Cumulative production over the first 13 years of the highest density was 2 times that of the lowest density



....more supporting data

What is the Optimum Tree Height?

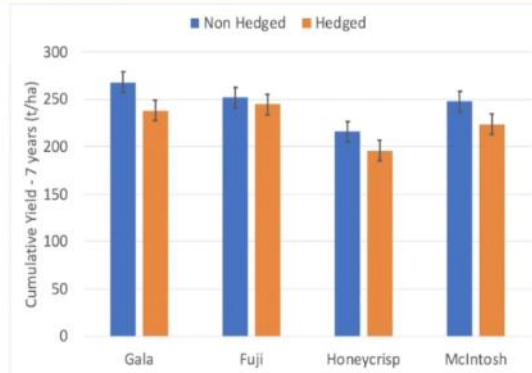


There is a penalty for short trees (pedestrian orchards)

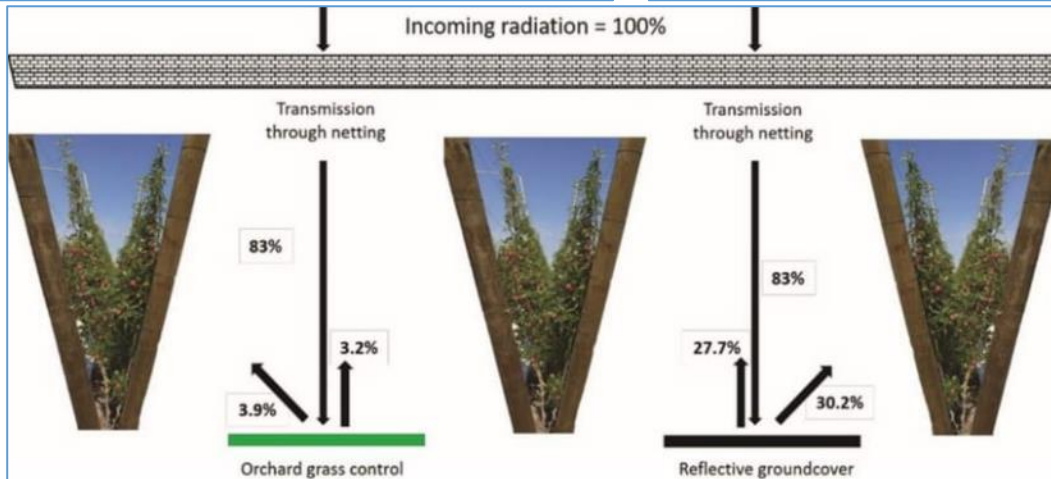
Light interception with 7.7 ft tall trees=53% = 200 t/ha over 8 years

Light interception with 11 ft tall trees=85% = 350 t/ha over 8 years or 150 t/ha or 370 bins/ha extra @ \$300/bin = \$110,000/ha extra over 8 years

Is there a yield penalty for a narrow 2-D canopy compared to a 3-D canopy at any tree height : between row spacing



- Yield penalty was about 8%.
- How to compensate for the yield penalty for a 2-D canopy compared to 3-D canopy at any given tree height : between row spacing -Narrower row spacing
- In our study fruit color and quality were not improved by the hedging



Conceptual figure showing relative light transmission through protective netting, reflected, and diffuse light from between tree rows under reflective groundcover compared with a grassed control in a 'Honeycrisp' apple orchard. The amount of light transmitted through netting was calculated from measuring incoming solar radiation with and without protective netting at solar noon. The data used in the figure represents both woven polyethylene fabric and film material.





Figure 2. Six leading orchard systems in the world: Tall Spindle (top left), V-trellis (top center), Super Spindle (top right), Solaxe (bottom left), Fruiting Wall (bottom center) and BI-axis (bottom right).

Robinson, New York Fresh Quarterly Fall 2013



6. We need to do some homework

- a.) existing orchards
- b.) trees already ordered
- c.) future orchards



a.) Existing orchards

- Older orchards wont disappear overnight
 - They largely need to finance change
- Passenger orchards have to go
 - Not contributing and no clear remedy
- Is there anything extra that you should be doing to INCREASE Class 1 per hectare without compromising yields
- Before 2022/23 - set goals per orchard and or variety
 - i.e. 50 t/ha Class 1 preferred counts for bicolours
 - Know your target fruit – counts & specs with highest income potential



a.) Existing orchards continued...

- IPM program – Clean crop; Export MRL compliant
- Set your target crop load as early as possible with the least amount of fruit required (yields 1st, then quality) – do not over crop
- Complete thinning earlier
 - Judicious Chemical thinning
 - Increase hand-thinning capacity
 - Hand thin once, do it right the 1st time. Count fruit.
- Employ tools focussed on increasing Class 1
 - Summer pruning
 - Leaf removal on bicolours ('Cripps Pink', 'Cripps Red', 'Nicoter', etc.)
 - Netting and/or Reflective material where it makes sense



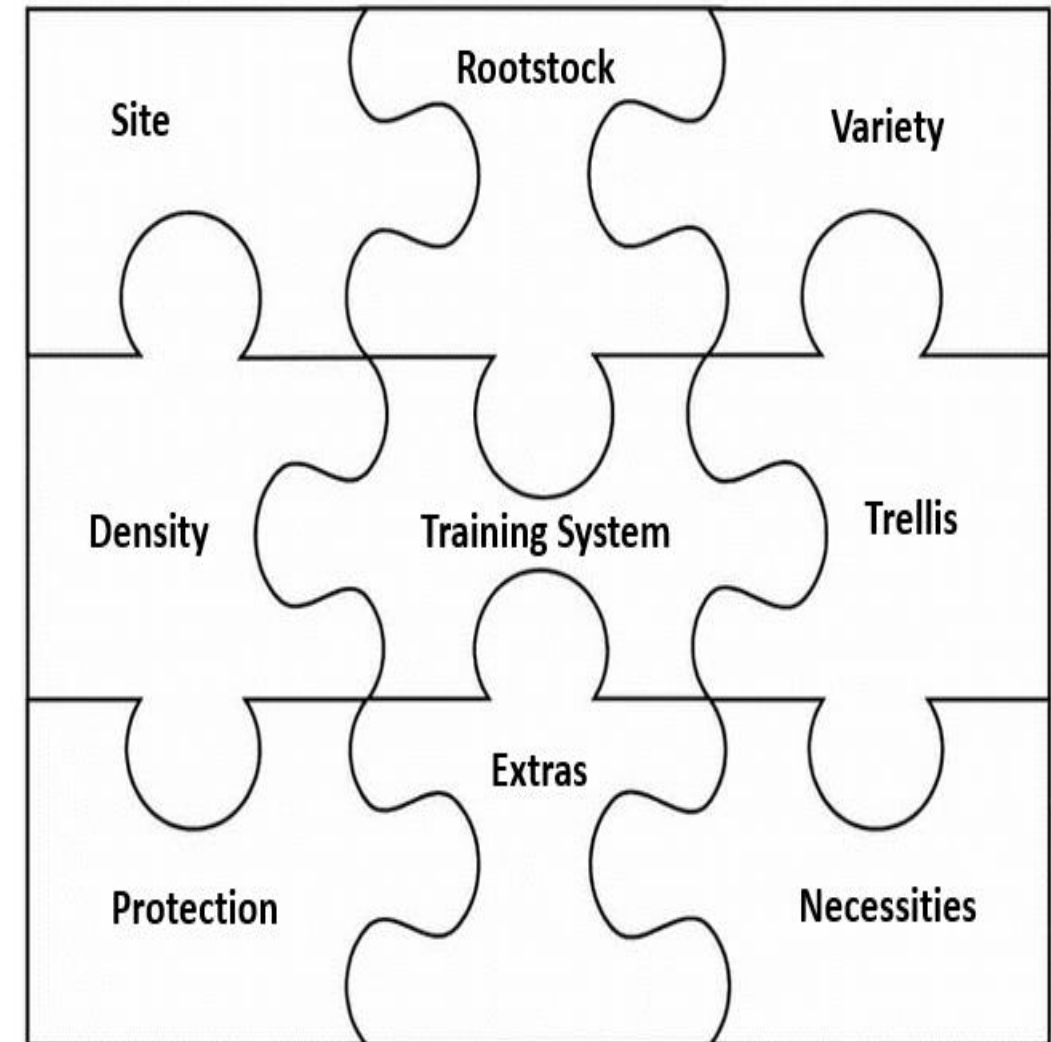
b.) Trees on Order

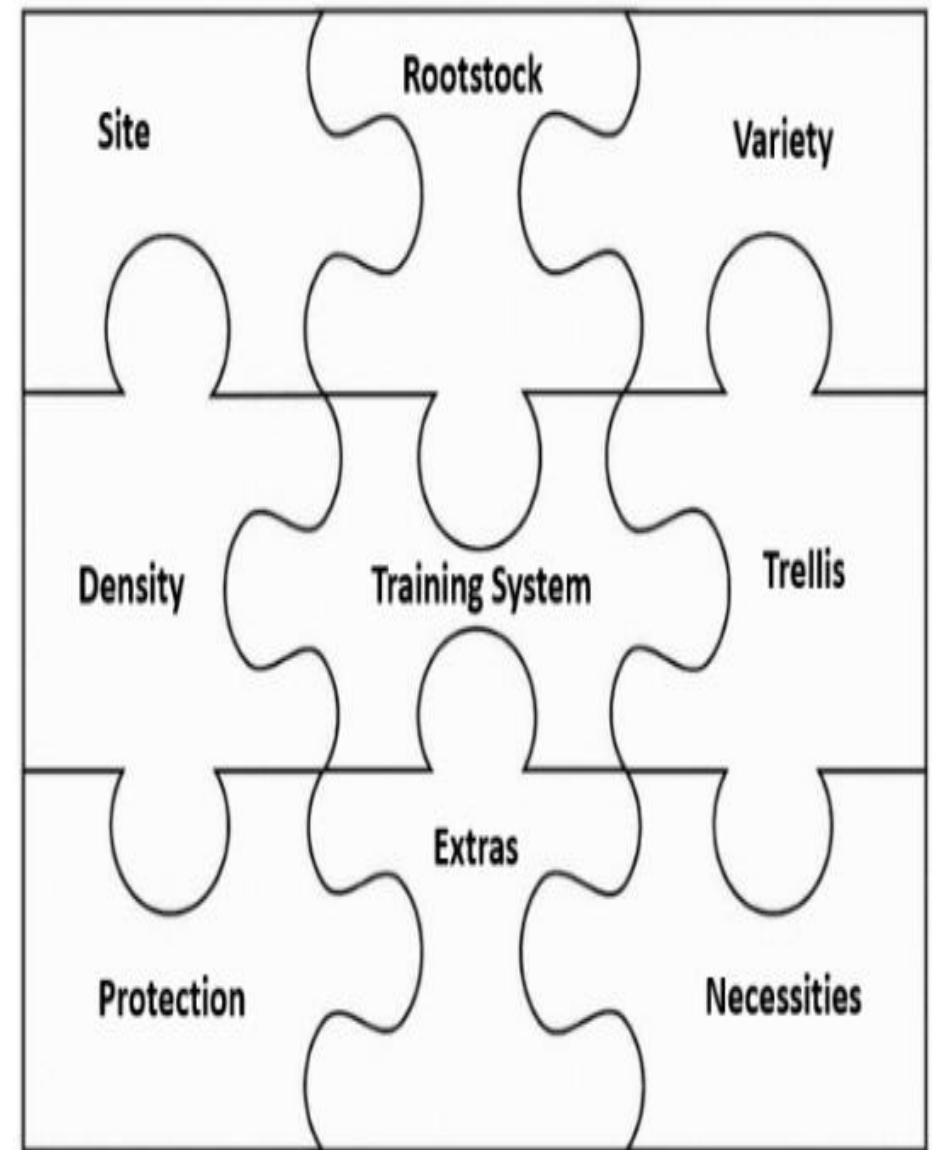
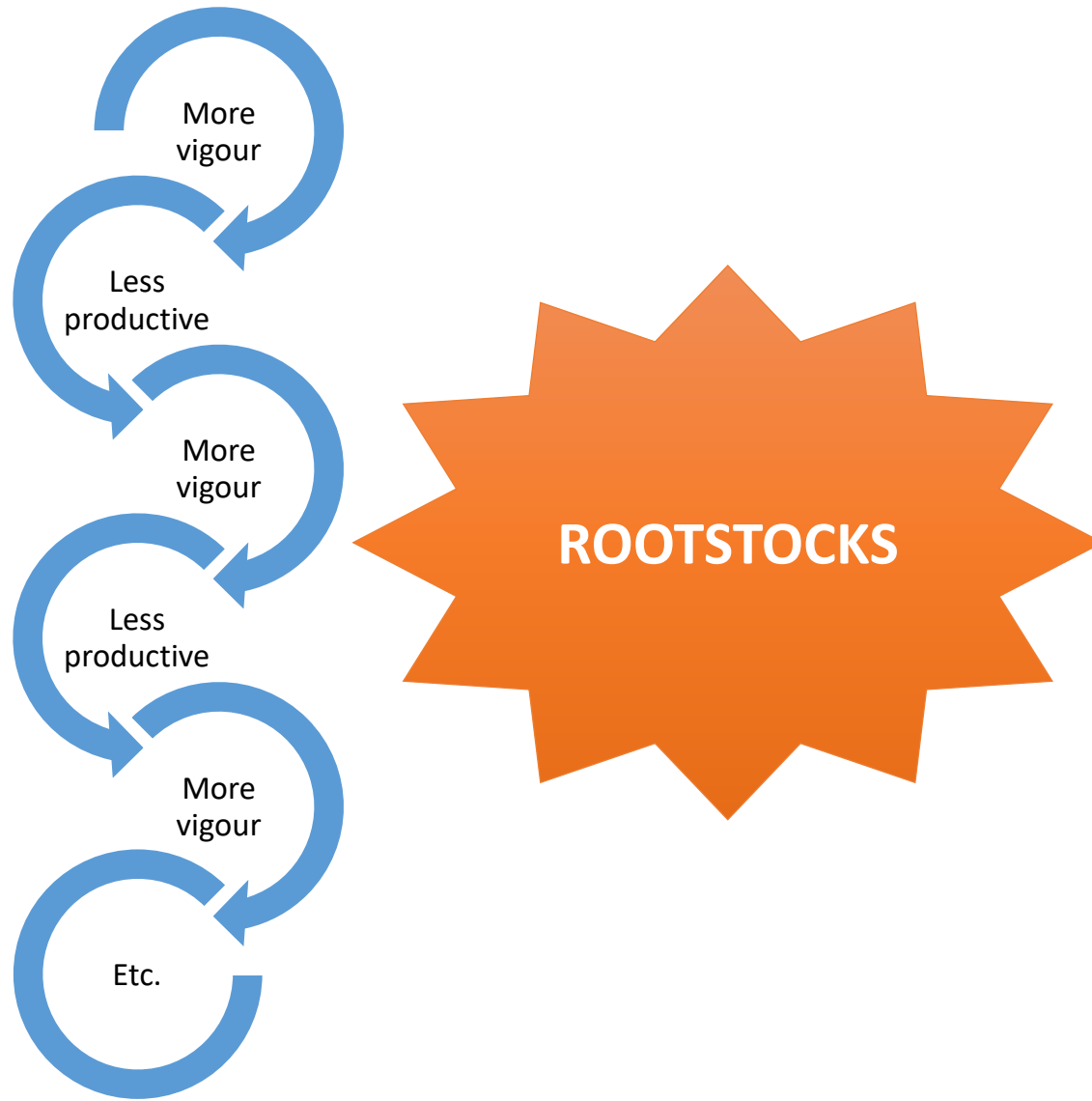
- I am planting the best available strain? If not, is there time to change the scion?
- Is the planting density and training system optimised for the rootstock and site?
 - 4.5m → 4m → 3.8mX1.25m → etc.
- Are the planned orchards geared for class 1 yields i.e. can nets be erected later? (climate change)
- No shortcuts



c.) Orchards still to be planned & planted

- Consider every part of the orchard puzzle – plan well in advance
 - Match rootstock, scion, system, site etc.
- Aim: High light interception early in orchard life **WITH** more light-friendly canopies





c.) Orchards still to be planned & planted continued

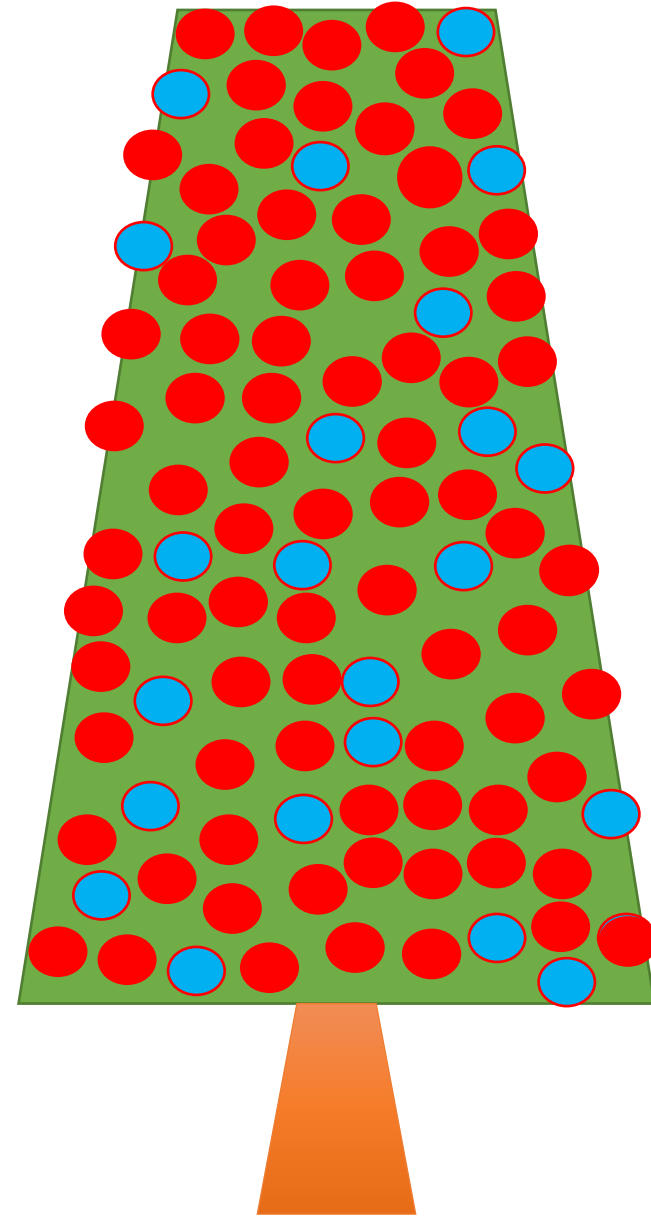
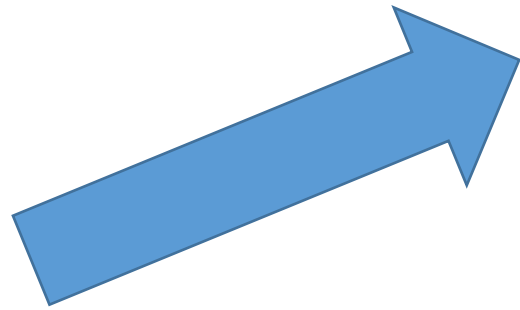
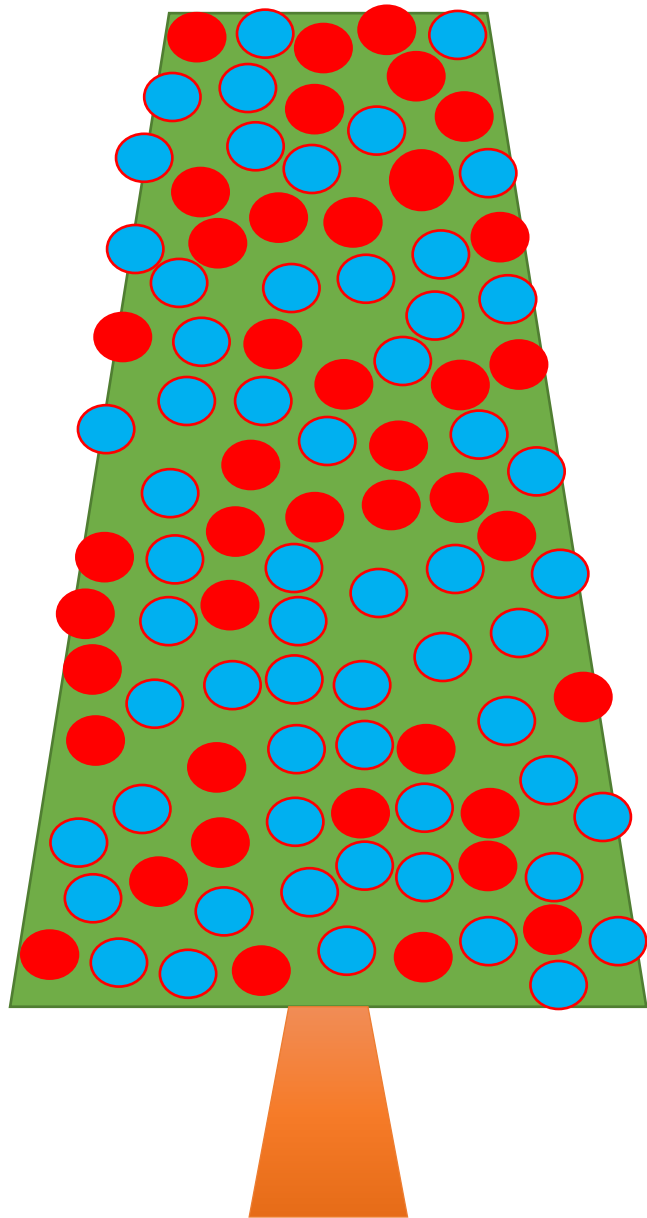
- Long term view while planning
 - What would your orchards look like at R400 000/ha production cost?
 - Climate change?
 - Most new orchards netted or net-ready
- Rather plant less hectares, no shortcuts, with more inputs focussed on:
 - Earlier production (light interception)
 - High eventual yields achieved quickly
 - Increased emphasis % Class 1 on tree (light distribution)

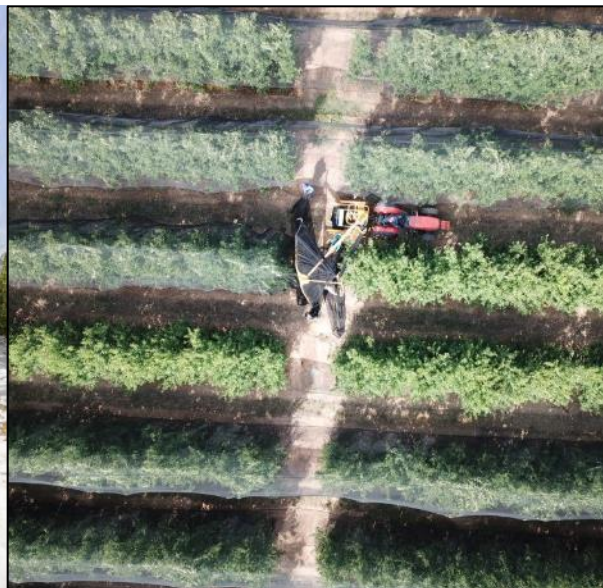


Summary

- We may one day reach a situation where we need to increase yields even more (make the egg bigger again)
 - NZ example – Ken Breen talk
 - Hortgro Concept Orchards Programme
 - Grower trials
- We need to maintain high yields WITH a pronounced increase in focus on export quality.
 - We have the tools
 - Not only to remain viable., but there's an opportunity cost
 - Current examples of R700 000 – R1mil./ha orchards
- Not the first, only or last challenge to our industry, but in terms of what can come out of it, it may well prove to be the most exciting and rewarding.







Conclusion:

Correct focus on yield AND
quality: Pome fruit Farming in
South Africa is not only VIABLE,
but can be highly PROFITABLE





Thank you



Graeme Krige
Hortgro Technical Symposium
7 June 2022

