

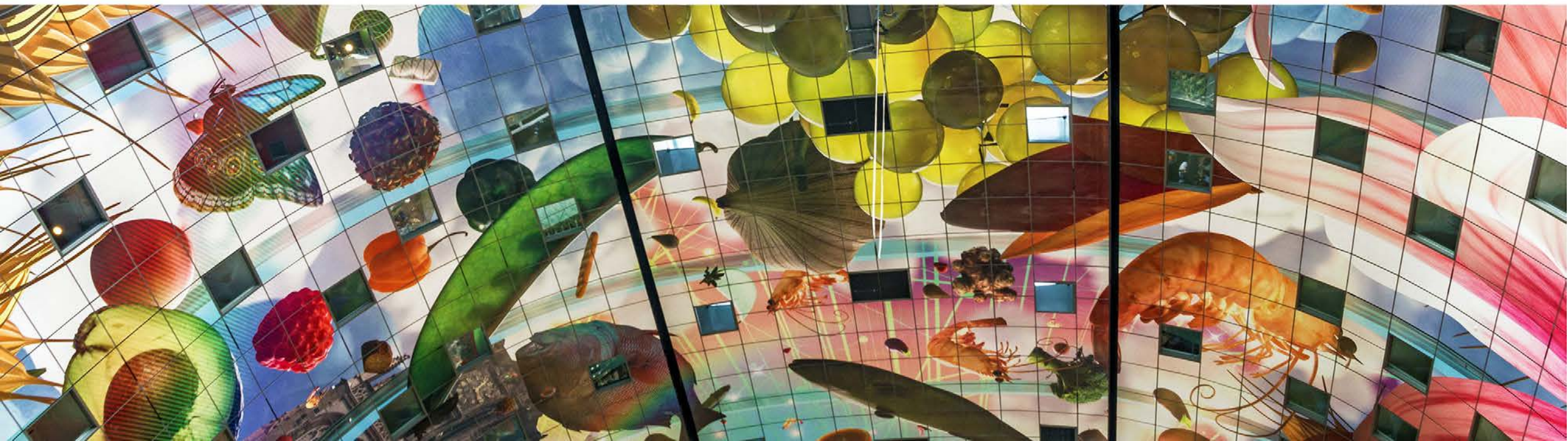


# Rethinking / Reimagine Dairy

SASDT Conference, Stellenbosch, SOUTH AFRICA

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# South Africa vs New Zealand

## *Industrial vs Commercial dairy farming?*

NZ:

Population: 5 million people  
5 million cows  
Farms: 11,000 (corporates)  
Average Herd: 435 / 153 ha  
Dairy Exports: > 95%  
Products: Industrial

SA:

Population: 58 million  
1,2 million cows  
Dairy farmers: 1,200 (private)\*  
Average Herd: 459 (2nd world)  
Dairy Exports: ~ 30 %  
Products: Commercial



# Maslow's Hierarchy of Needs

## *Theory of motivation*

### Physiological:

- Homeostatic
  - Food
  - Water
  - Air
  - Warmth
- Sleep / Shelter / Clothes
- Sanitation
- Reproduction



# Maslow's Hierarchy of Needs

## *Theory of motivation*

- Humanist & American psychologist, Abraham Maslow; 'our actions motivated by physiological needs'
- Maslow, Abraham Harold. "A Theory of Human Motivation." *Psychological Review* 50.4 (1943): 370-396.
- 5 categories of needs; ranged from concrete needs - self-fulfillment
- Journey to Mars; NASA - what would we need to survive?



**Key - Food important, however, challenges faced in various sectors, i.e. energy sector, socio economic etc. Clean water, air, sanitation, energy, housing?**





# Africa Outlook

1. Quality Nutrition
2. Affordability
3. Availability
4. Sustainability

# Africa Outlook

## *Quality, Affordability, Availability, Sustainability*

### 1. Quality Nutrition - Protein

- Not compromising nutritional value; role of nutrient 'density'?
- Animal source food products plays important role diets worldwide. Ave 17% energy and 35% of protein intake globally; higher developed countries.
- Role of dairy in disruptive market; in time a more premium rather than commoditised product?
- Role of dairy as a complete protein; plant based does not deliver the same nutritional quality. Possible to combine sources, i.e. dairy, plant, insects, 'precision fermented', cell-based?

### 2. Affordability and Availability

- Shorten the Supply Chain
- Localisation vs Globalisation
- Disruptive technologies (next slide)

### 3. Sustainability

- Less GHGE emissions; Less energy
- Dairy, need to improve on general metrics to improve sustainability; reduction GHG emissions
- Reduction of waste through recovery
- Alternative Processing promoting sustainability - measuring impact unbiased and comparatively
- Hurdle technology (Infrared, Millisecond – MST, sonic waves, HPP)
- Packaging – more Sustainable
- Localization vs Globalization

# Milk without the cow?

## *May be closer than you think*

\* *Hoard's Dairymen*, 17 October 2019

<https://hoards.com/article-26573-milk-without-the-cow-it-may-be-closer-than-you-think.html>

Disruptive technologies:

- Cell based Meat
- Chemical Synthesis (Synthetic products)
- Computational Biology (Computer based modelling - structures of life)
- Enzyme technology
- Fermentation
- “Food-as-software”
- Form factor (The size, shape, and functionality of a food, or other, product.)
- Fortification
- Genetic engineering / Recombinant DNA technology
- High Throughput Screening (analyses large computer data sets during simultaneous testing - robotics, sensors automation)
- Industrial Agriculture (centralized, scale of economy)



# Milk without the cow?

## *May be closer than you think*

- RethinkX; An independent think tank that analyzes and forecasts the speed and scale of technology-driven disruption
- “The Second Domestication of Plants and Animals, the Disruption of the Cow, and the Collapse of Industrial Livestock Farming” – Sep 2019
- We are on the cusp of the deepest, fastest, most consequential disruption in food and agricultural production since the first domestication of plants and animals ten thousand years ago. This is primarily a protein disruption driven by economics.
- The cost of proteins will be five times cheaper by 2030 and 10 times cheaper by 2035 than existing animal proteins, before ultimately approaching the cost of sugar. They will also be superior in every key attribute – more nutritious, healthier, better tasting, and more convenient, with almost unimaginable variety. This means that, by 2030, modern food products will be higher quality and cost less than half as much to produce as the animal-derived products they replace.



# Milk without the cow?

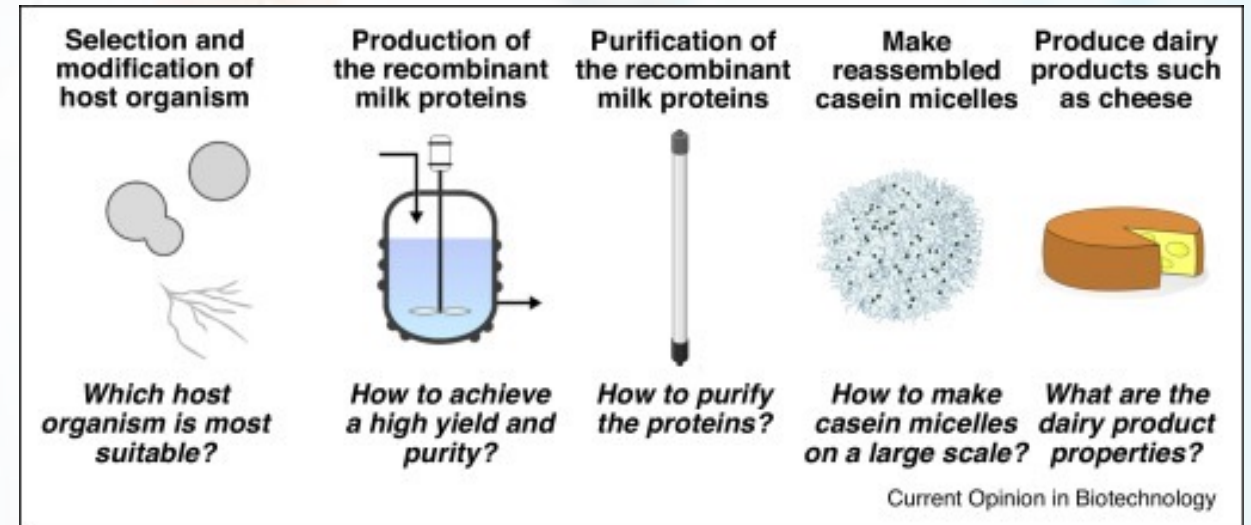
## *May be closer than you think*

2 main questions:

1. Legislation and Consumer acceptance as recombinant seen as novel food
2. Lower cost and lower ecological footprint?

Perspective...

- Evaluate objectively without bias (i.e. Silicon Valley, VC and PE)
- Consider Quality vs Cost
- Consumer acceptability, i.e. Organoleptic quality; Functionality; Customer appeal and regulatory approvals



**Key – Each Step presents a challenge as well?**  
**Precision Fermentation = Recombinant DNA Technology?**



What's next?

*Disrupt*

*Innovate - Optionality*

*Adapt*



# What's next?

*Disrupt*  
*Innovate - Optionality*  
*Adapt*

$$\begin{array}{ccccccc} \text{Value} = & \underline{\text{Input}} & = & \underline{\text{Benefits}} & = & \underline{\text{Worth}} & = & \underline{\text{Function}} \\ & \text{Output} & & \text{Resources} & & \text{Cost} & & \text{Cost} \\ \uparrow \text{Value} = & \frac{E}{C} & \uparrow & = & \frac{E}{C} & \uparrow & = & \frac{E}{C} \rightarrow = & \frac{E}{C} & \uparrow \uparrow \\ & C & \downarrow & & C & \rightarrow & & C & \downarrow & C & \uparrow \end{array}$$

## Disrupt

- Is a reality, it has already been done? Challenges disruption in Africa - Quality, Affordability, Availability and Sustainability

## Innovate

- Innovate to deliver Optionality
- Bold organisational leadership and senior management buy-in are needed to innovate, reduce organisational resistance, and harness resources to allow for such value growth - in simpler terms, the innovation investment strategy needs to deliver optionality.
- Value = Function / Cost

## Adapt:

- Consumer driven, what do they want
- Will dairy cease to exist; no, probably opportunity for repositioning.
- Effect greater on primary industry. Secondary industry well-positioned to adapt processes to embrace new manufacturing technologies (with investment)





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thank you



**Dr. Tertius Cilliers**  
SASDT Conference  
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