

The Fairies at the Bottom of the  
Lab: or Aotearoa New Zealand Food-  
Industry Imaginaries of a Cellular-Agriculture  
Future

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Figure 1: Science Focus: The artificial meat factory - the science of your synthetic supper





# Cellular Agriculture

- ◆ Two key technologies
  - ◆ Cell culturing (above) for meat
  - ◆ Precision fermentation (below) for liquid and powders (e.g. dairy, eggs, oils, and flours)



Fig. 2: NY Times: Building a \$ 325,000 Burger

Fig. 3: Remilk: Remilk to Build the World's Largest Precision Fermentation Factory



## Aotearoa New Zealand Food Industry

- ◆ Agriculture accounts for:
  - ◆ 100,000 FTE jobs
  - ◆ 48 % of land-use cover
  - ◆ Rural communities
  - ◆ 60 % of export goods, including:
    - ◆ 80 % of milk
    - ◆ 92 % of sheep meat
    - ◆ 83 % of beef

Figure 3: The Spinoff - NZ's pig-headed rejection of GM is putting our agricultural future at risk



# Protein Futures NZ: A National Science Challenge Theme – Members below

- ◆ 23 Interviews with food industry bodies, to produce:
- ◆ Economic modelling
- ◆ Scenario planning
- ◆ Reflexive thematic analysis...





# Research Aim and Theoretical Approach

- ◆ To consider the implications of Aotearoa New Zealand food industry imaginaries for land-use change within the context of a cellular agriculture future.
- ◆ Critical Science and Technology Studies
  - ◆ Technology as:  
“situated and open to inquiry, rather than fixed tools that can be put to good or bad uses”



Fig. 6: The Economist - Meat no longer requires animal slaughter

# Sociotechnical Imaginaries

- ◇ Imaginary: A narrative of the future used to prioritise certain actions in the present that correspond to, and legitimate, a given *sociotechnical network*.

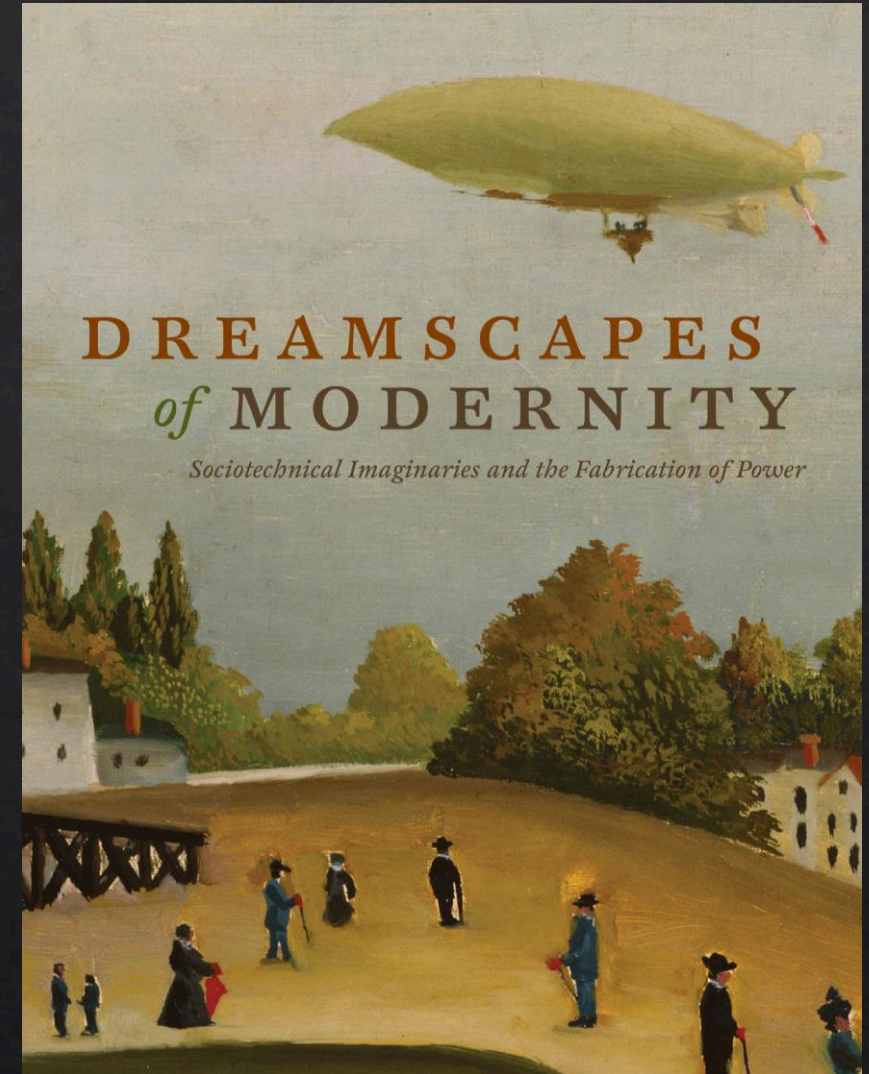


Fig. 7: Jasanoff, S. and Kim, S.-H. (2015) *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*.



# A Growing Sociotechnical Network

- ◆ From science fiction and radical vegans, cellular agriculture's network has expanded to include,
  - ◆ Celebrity investors



Fig. 8: News18: Bill Gates Wants you to Switch to Synthetic Meat to Save the Environment



# A Growing Sociotechnical Network

- ◆ From science fiction and radical vegans, cellular agriculture's network has expanded to include,
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  - ◆ International governance



Fig. 9: green queen: Dairy in the Desert, Change Foods to Bring the First Precision Fermentation Facility to the UAE

# A Growing Sociotechnical Network

- ◆ From science fiction and radical vegans, cellular agriculture's network has expanded to include,
  - ◆ Celebrity investors
  - ◆ International governance
  - ◆ Food industry establishment



Fig. 9: Fonterra: Fonterra to explore opportunities in complementary nutrition





Cellular  
Agriculture  
Society

## Cellular Imaginaries

- ◆ Radical: Revolutionizing the human-food-land relationship
- ◆ Conventional: Mitigating inefficiencies in industrial agriculture
- ◆ Critical: Decoupling people and land

Fig. 10: Cellular Agriculture Society



# Results: Aotearoa New Zealand Imaginaries

- ◇ Selling a pastoral idyll in a sea of feedlots
- ◇ + Countermovements: The New Zealand narrative comes under increased scrutiny
  - ◇ Dirty Dairying Campaign
  - ◇ SAFE: Feedlot Awareness
- ◇ = Uncertain futures
  - ◇ Premium-scape
  - ◇ Multi-scape
  - ◇ STEM-scape



Fig. 11: Beef and Lamb NZ: Taste Pure Nature Origin Brand  
Fig. 12: RNZ: Canterbury ANZO Feedlot Faces Inspection



# Premium-scape

- ◇ “So, we’re a pretty small percentage of global supply so there will be some value for our traditional production systems for people who don’t want to eat these alternative proteins, for whatever reason. It could be irrational reasons as well. [Cellular agriculture] could be ... quite a bit better for people, but for whatever reason, they’ll want [animal-grown food] ... I think the terroir of land, the tastes of land, is more challenging to replicate than, say, beef proteins or chicken proteins, or milk proteins.”

# Premium-scape

- ◆ Selling Stories: The aestheticisation of agriculture
  - ◆ Consumer authentication
  - ◆ Agri-tourism
- ◆ The green farm as the efficient farm
  - ◆ Digital ag

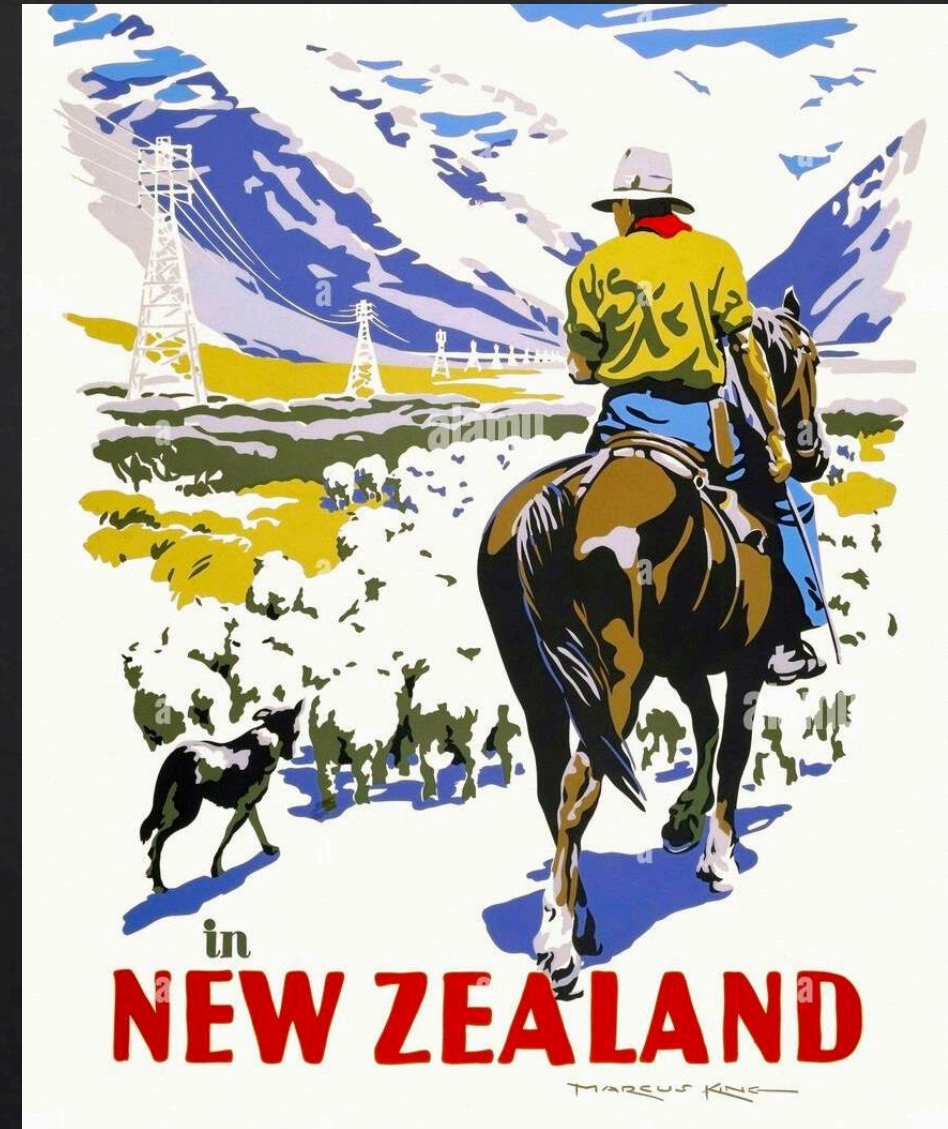


Fig. 13: Sheep Droving in New Zealand by Marcus King



# Multi-scape

- ◇ “I think it (Aotearoa NZ land-use) has the potential for greater diversification and not just at an aggregate national level but within farming systems. I think the basic economics around the costs that were imposing on livestock production to externalise some of their environmental impacts are discouraging further investments in that space and tipping it more towards non-livestock production systems that don't have those costs, so I think overtime farmers will look at, is there a proportion of my property that I can put into maybe a crop that's growing for alternative proteins.”

# Multi-scape



- ◇ Growing for Alt. Proteins
  - ◇ Leaf & Intercropping
  - ◇ Plant-based
- ◇ Growing Carbon Credits
  - ◇ ETS and the role of forestry

Fig. 14: Stuff NZ: New Zealand's Horticulture Industry Adapting to Meet Climate Change Challenges

Fig. 15: Pure Advantage: The Pure Advantages of Native Forests



# STEM-scape

- ◇ “the technology that we’ve developed for the dairy sector over God knows how many years was adapted extremely efficiently for our wine sector, and that’s one of the reasons why we have such a strong wine sector today. There’s no reason why we can’t take those learnings and put those into [the] processing of [precision] fermentation or processing of plant-based foods ...

# STEM-scape

- ◇ Regulation
- ◇ Infrastructure



# Daisy Lab

**Rethinking Dairy**



# Discussion: Silences

- ◇ Overarching Trends
  - ◇ Export-based land-use
  - ◇ Centralised decision making
  - ◇ Timescales set by technology and investment cycles