

# **Developing Sustainable Business**

## **The TS Farming Solutions Case**

Dr Henk Roodt

Centre for Transdisciplinary Research and Innovation  
[henk.roodt@wintec.ac.nz](mailto:henk.roodt@wintec.ac.nz)

# This Talk

- The Wintec approach and technology
- The TS Farming Solutions Requirement
- The initial stages of a co-created solution



# Design Approach

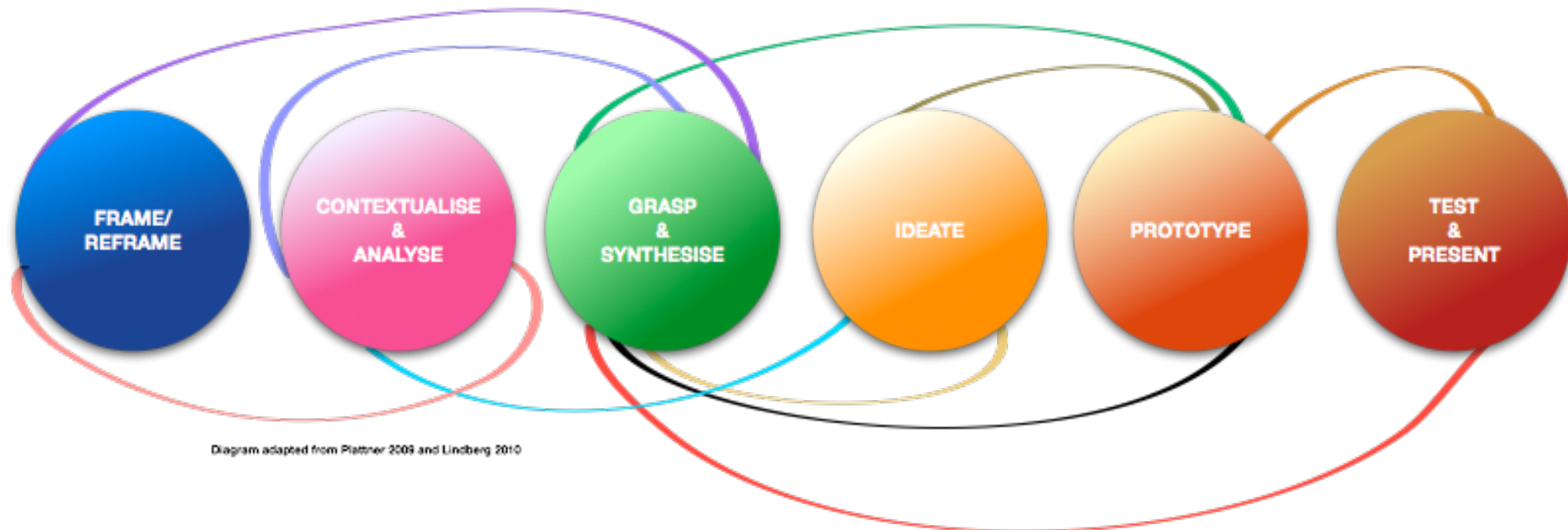


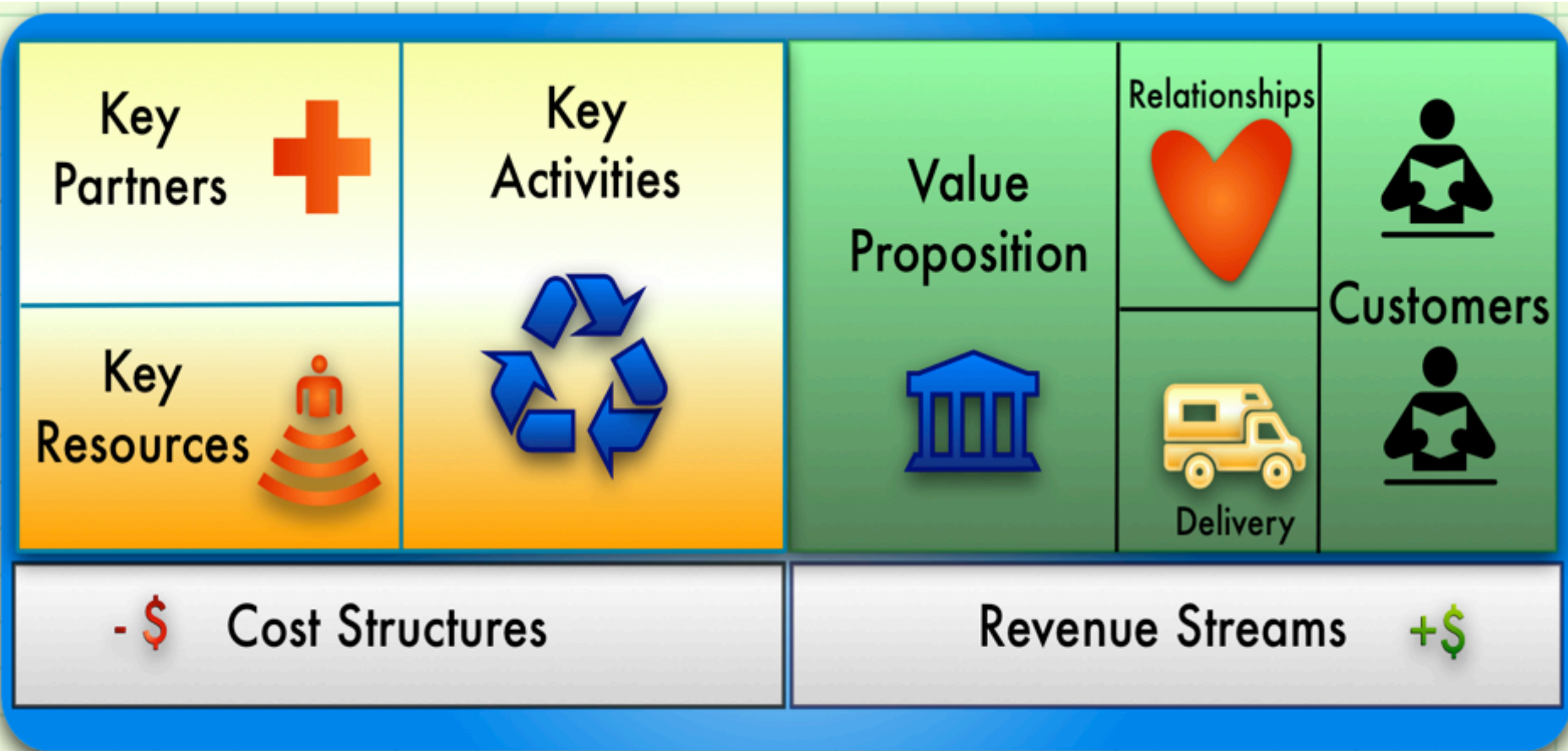
Diagram adapted from Plattner 2009 and Lindberg 2010

We know how to solve problems →

We know how to design solutions →

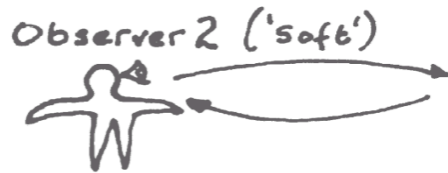
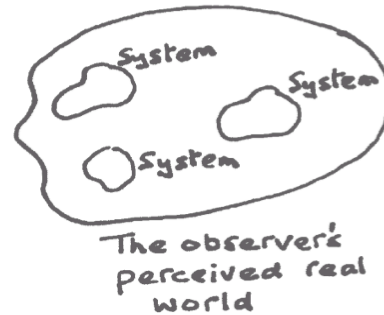
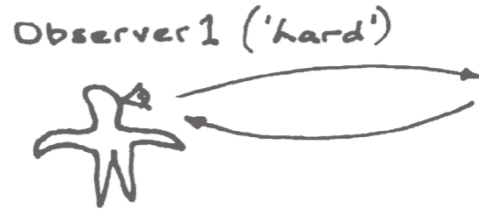
Integrative solutions

# Focused on Real Business Problems



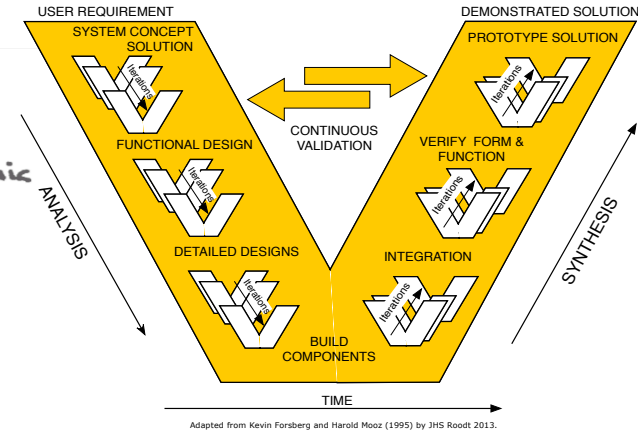
"Business Model Canvas"  
- Osterwalder

# Systems Thinking Approach



Observer 1 'I spy systems which I can engineer.'

Observer 2 'I spy complexity and confusion; but I can organize exploration of it as a learning system.'



Components AND networks



Science AND society



Abstract AND case knowledge

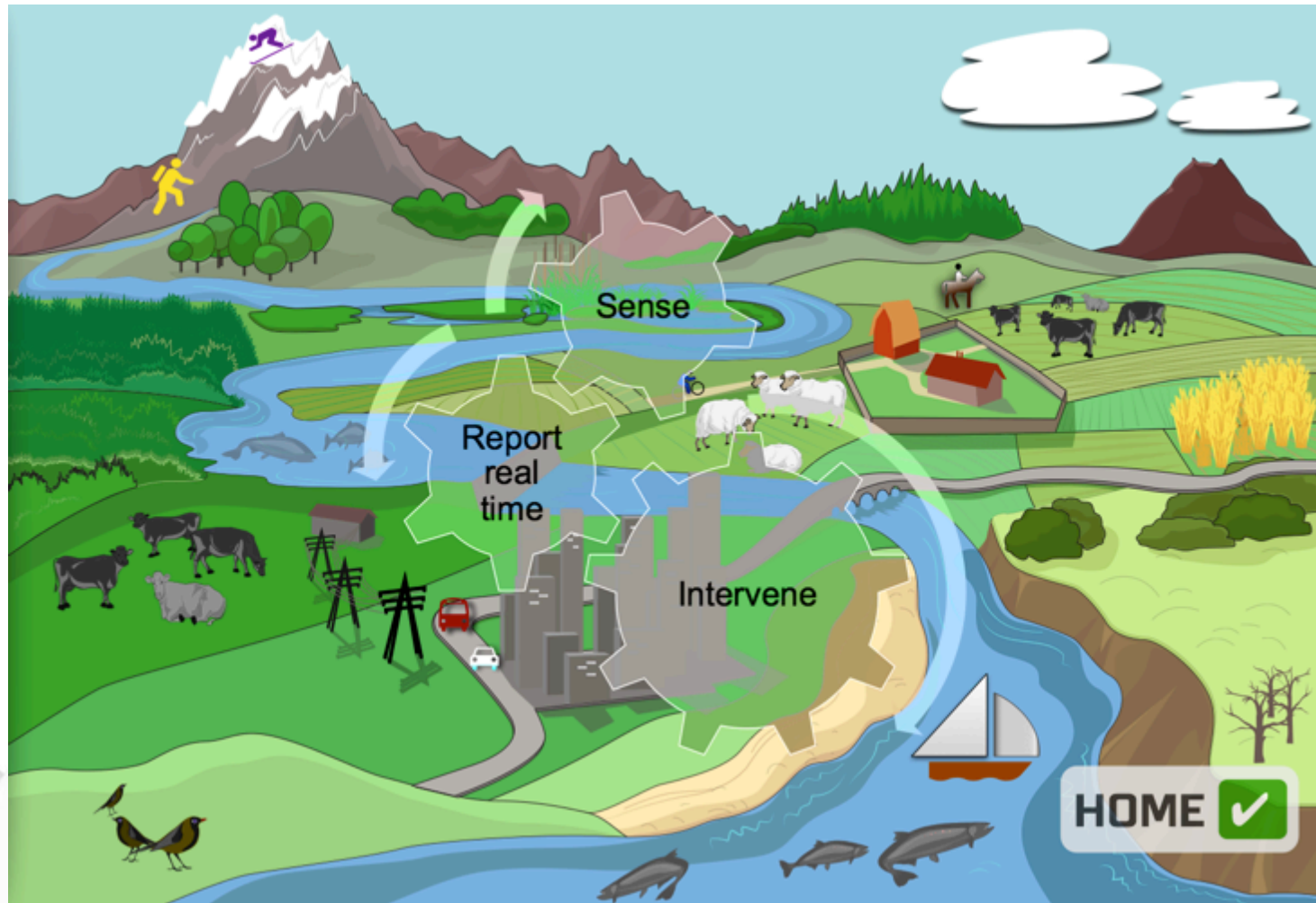


Synthesise new knowledge focused on the **problem in the real world**



For the common good

# Sustainable Farming Approach



# Sustainable Farming – Day 1

CAN YOU HELP US DESIGN A REVOLUTIONARY FARM,  
A CLOSED LOOP TYPE FARM, ONE WITH ZERO INPUT/WASTE?



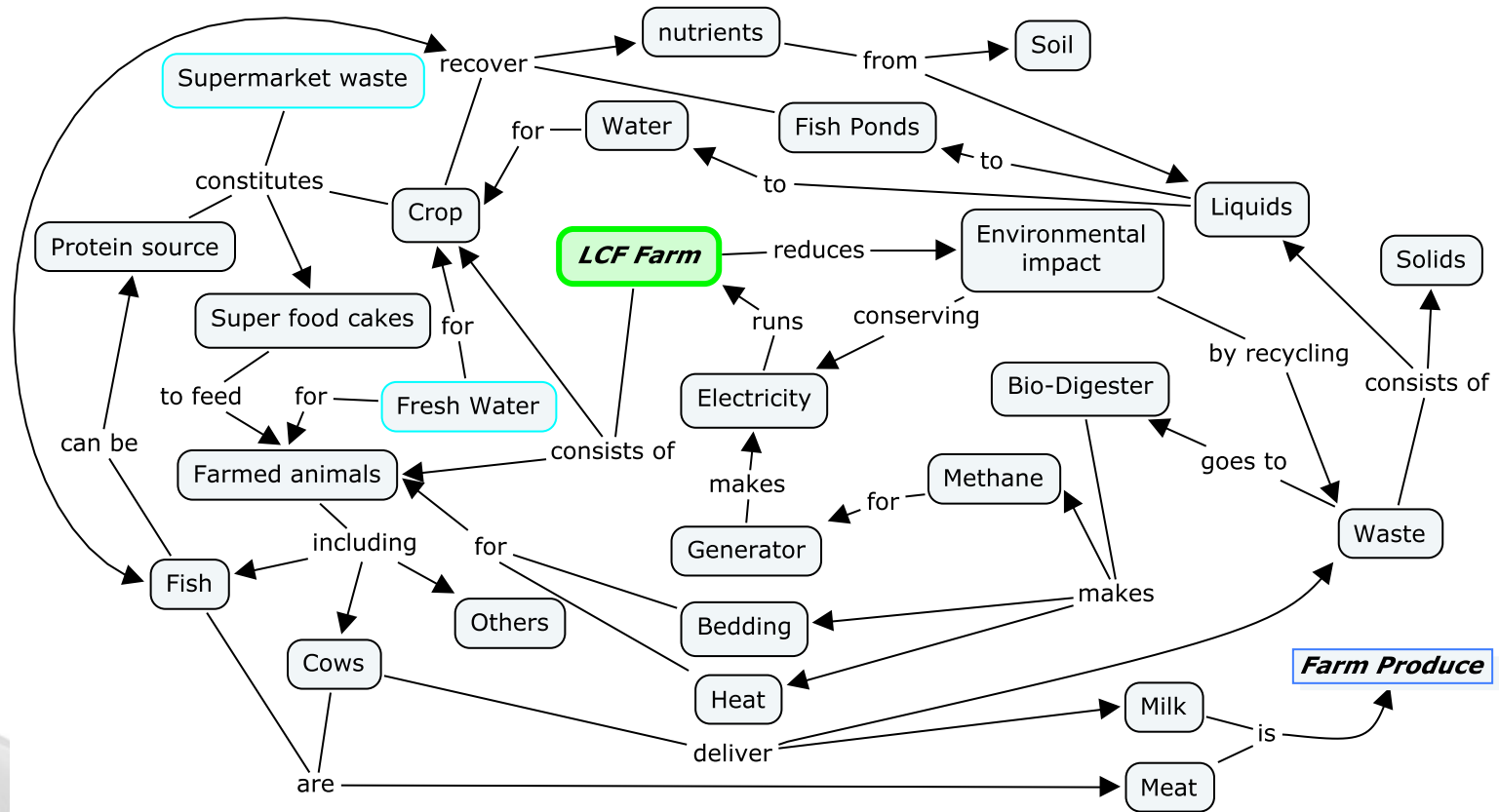
Perpetual Motion?  
Third law of thermodynamics?





# Sustainable Farming

## *Low Carbon Footprint Farm Concept*



Concept Map of a Low Carbon Footprint Farm (C) 2014 TS Farming Solutions



- TSFS has developed a farming system which will dramatically increase farm revenue while significantly reducing ground water and atmospheric pollution.
- The system is based on a sustainable farming model where waste is utilised throughout the system to provide a valuable reusable resource.

- Richard Tyree: TSFS



The site plan illustrates a proposed development layout. It features a central road network and several distinct zones. A legend at the bottom right identifies the colors used for different types of development: Green for Open Space, Blue for Residential, Orange for Commercial, and Purple for Industrial. The plan also includes labels for 'Proposed Development', 'Existing Development', and 'Future Development'.



**TS Farming Solutions Limited**

## Advantages of a “closed loop” dairy system

### ➤ Multiple Income streams

milk, fish, vegetables, crops

### ➤ Significantly reduced environmental impact

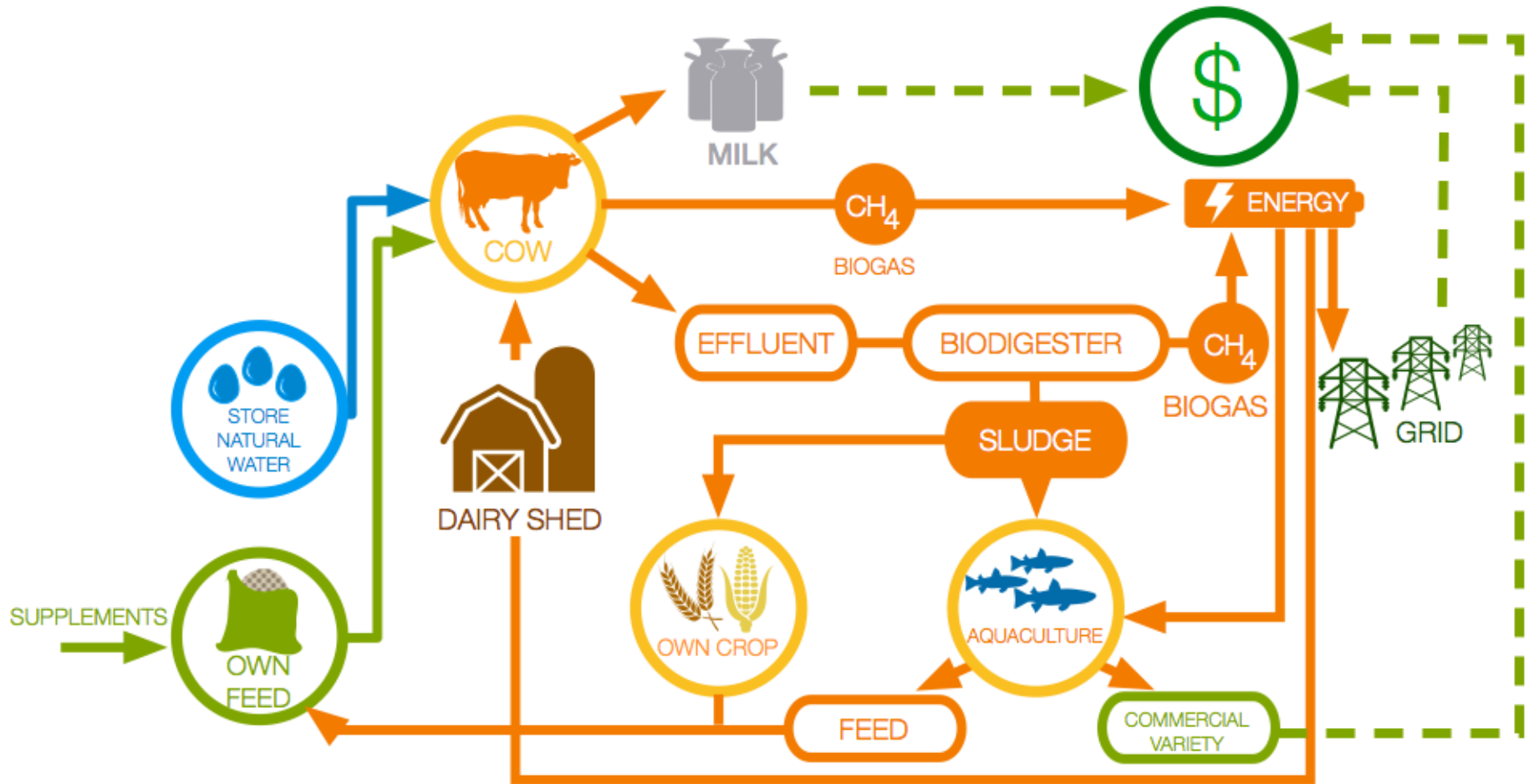
60% less green house gas  
less Nitrification of waterways

### ➤ Range of potential locations

almost any country, almost anywhere

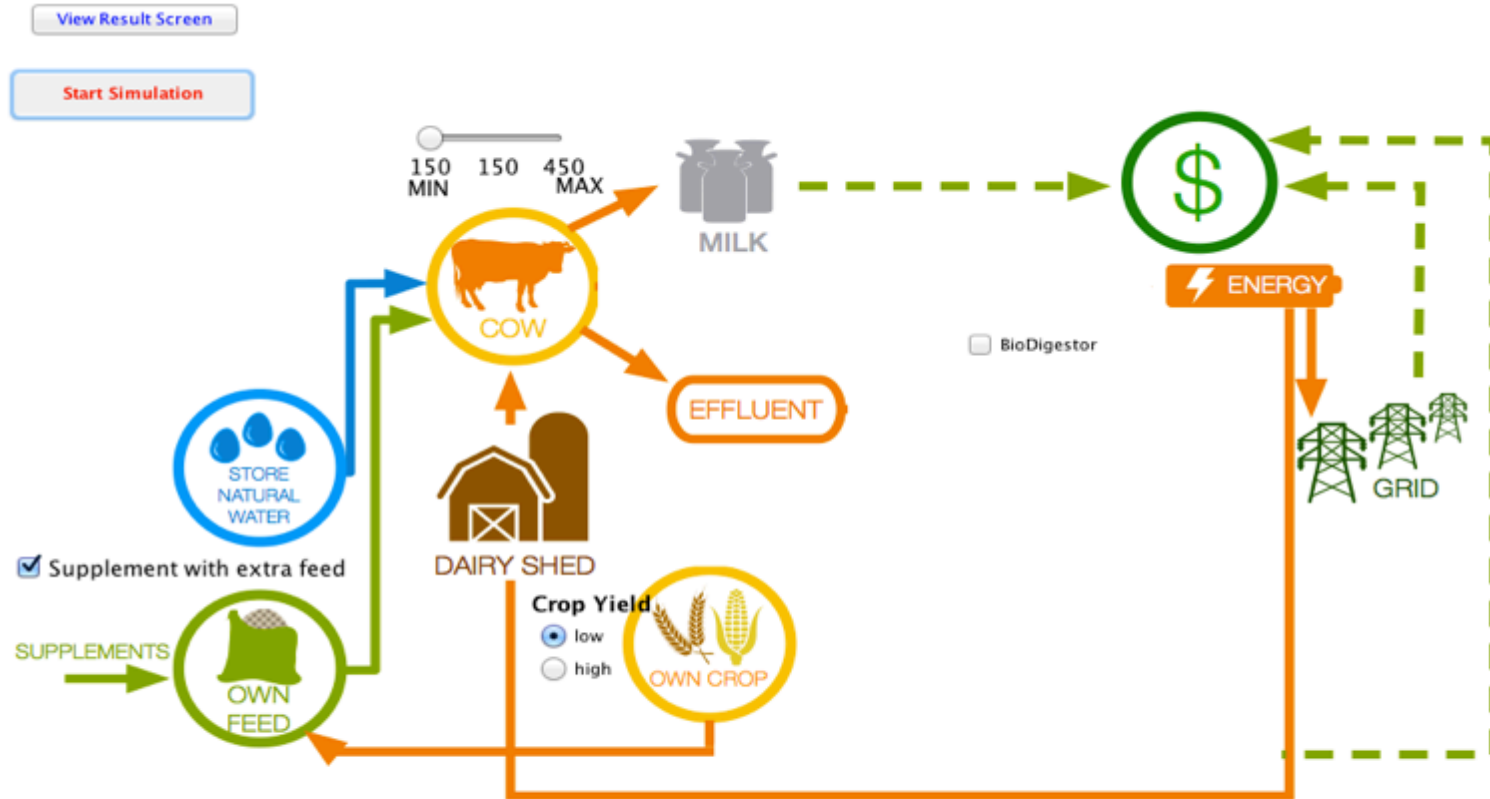


# Sustainable Farming





# Sustainable Farming



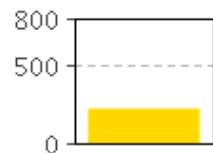
©2015 Wintec and TS Farming Solutions



©2015 Waikato Institute of Technology

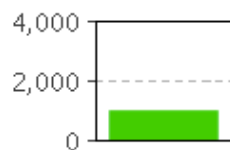
# \$ 353,710

## Daily Results



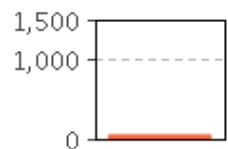
**Milk Production**

Milk solids: 220.5



**Income**

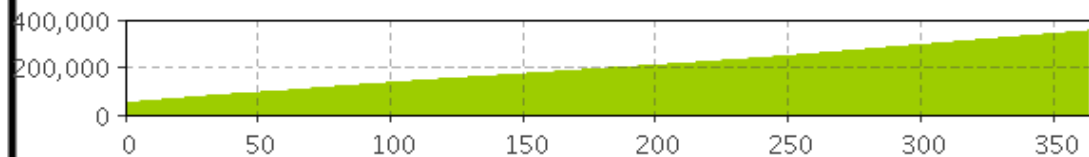
Milk Production: 992.25 (100.0%)  
Aqua Farming: 0 (0.0%)  
Electricity Generation: 0 (0.0%)



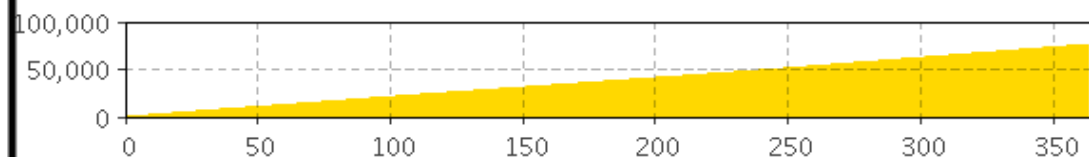
**Expenses**

Energy Cost: 60 (100.0%)  
Supplement Feed: 0 (0.0%)

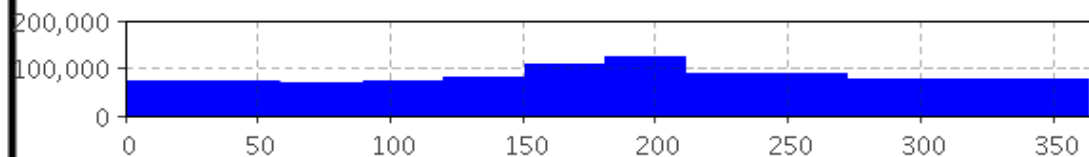
## Annual Results



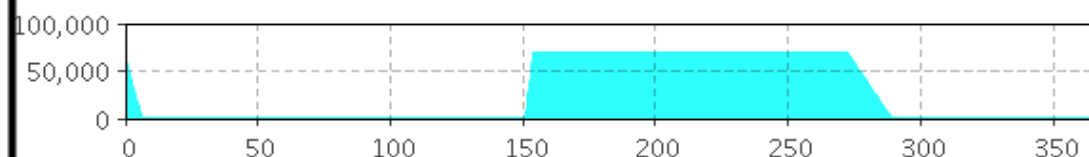
Income



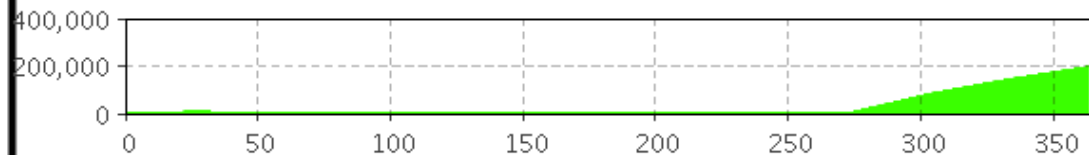
Milk Production



Rainfall



Water Availability



Pasture

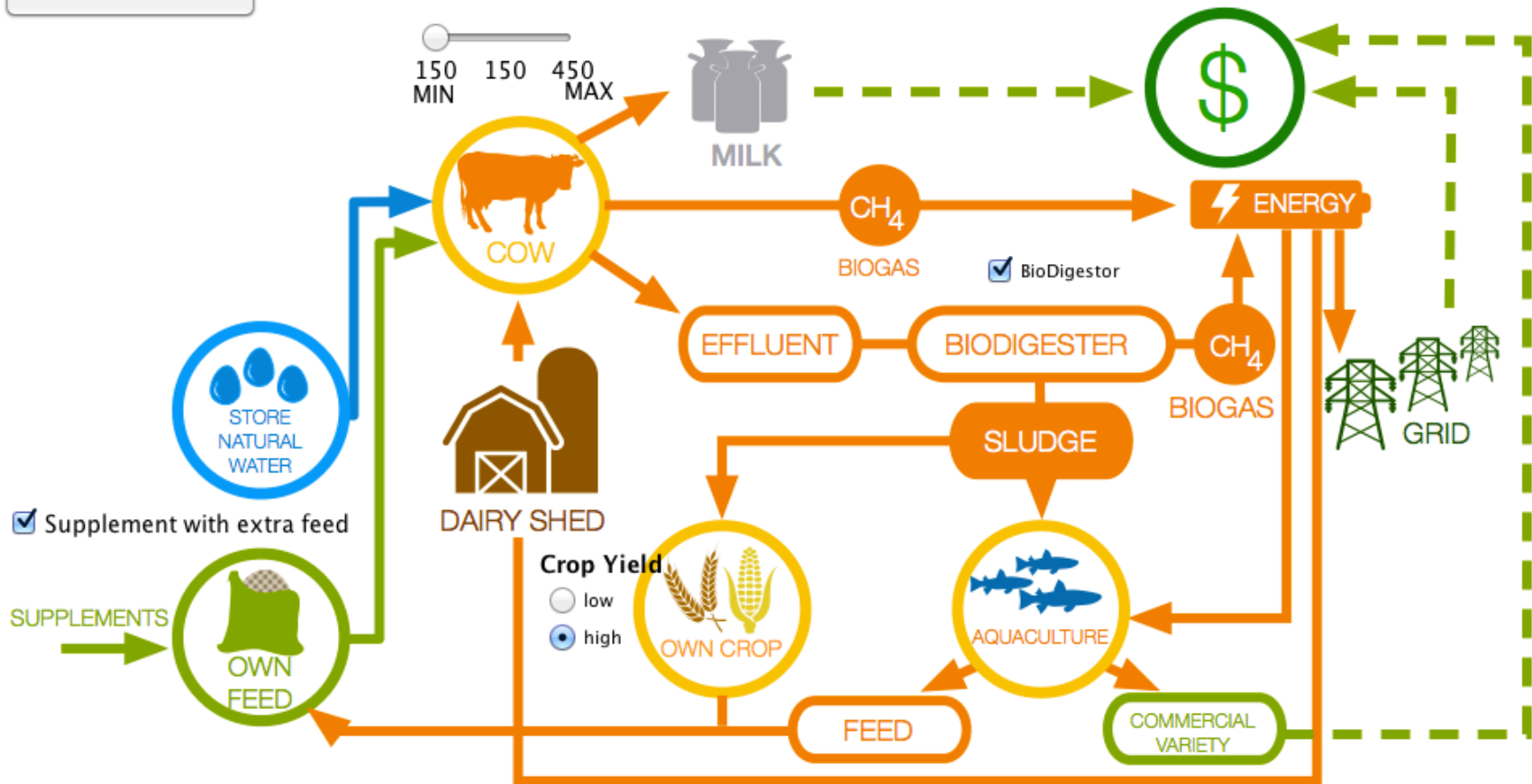
Fish Protein

Grass Silage

# Sustainable Farming

[View Result Screen](#)

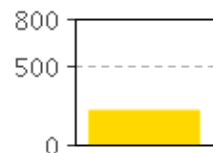
[Start Simulation](#)





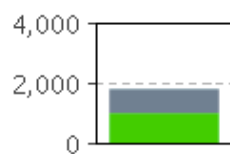
# \$ 681,199

## Daily Results



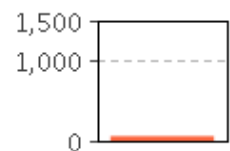
### Milk Production

Milksolids: 220.5



### Income

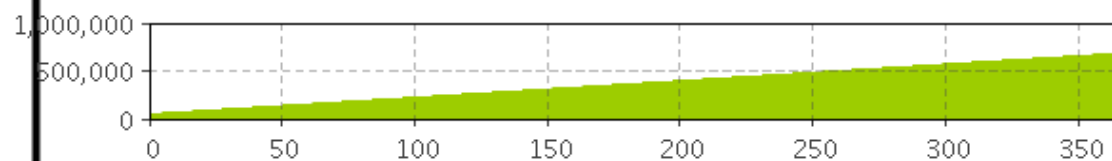
Milk Production: 992.25 (55.3%)  
Aqua Farming: 800 (44.6%)  
Electricity Generation: 2 (0.1%)



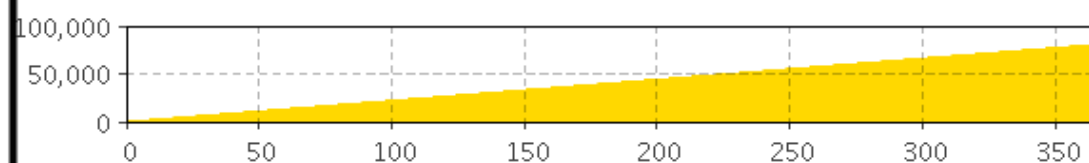
### Expenses

Energy Cost: 60 (100.0%)  
Supplement Feed: 0 (0.0%)

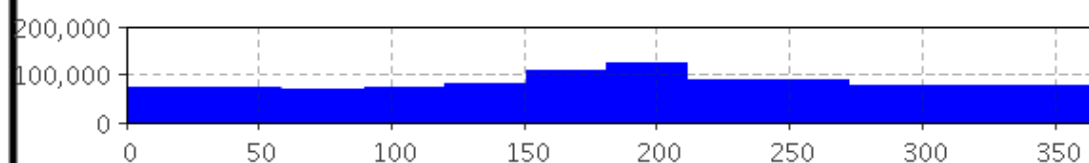
## Annual Results



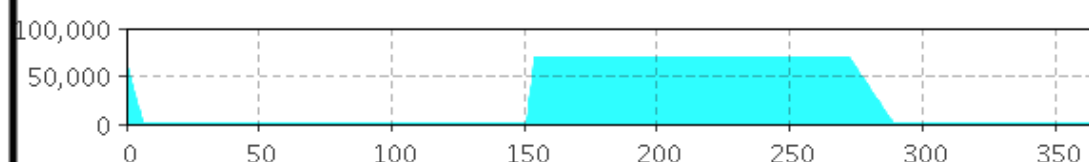
Income



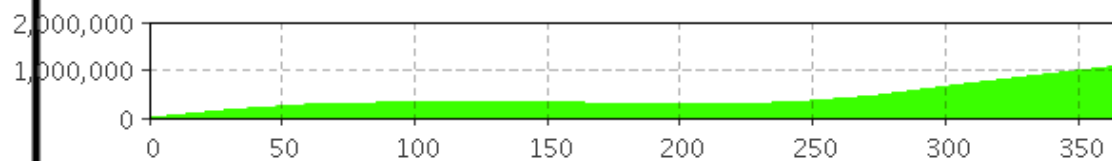
Milk Production



Rainfall



Water Availability



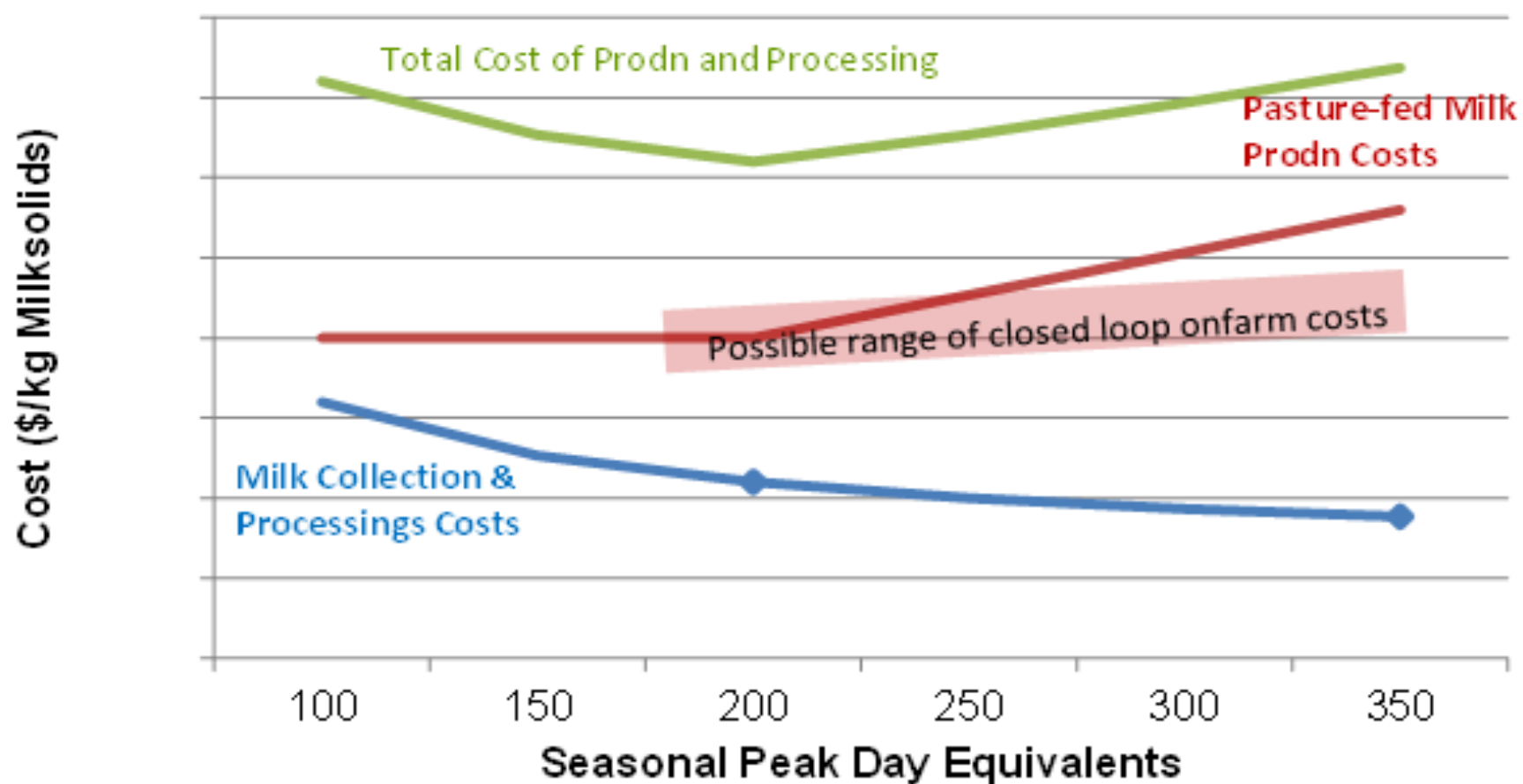
Pasture

Fish Protein

Grass Silage



**TS** Farming  
Solutions Limited



## Education

TS Farming is integrating education into the closed loop system with assistance and funding from;

- NZ Ministry of Education
- NZ Ministry of Primary Industries
- Wintec
- North Tec
- Primary ITO
- Northland Trades Academy



**TS** Farming  
Solutions Limited

## Education ...continued

### Key aspects of the approach

- Engage students early and across a wide range of disciplines
- Meaningful and relevant learning – project based approach
- Physical learning space with specialist tutors
- Full immersion
- Involving International Students



**TS** Farming  
Solutions Limited

Where the Koura live .....

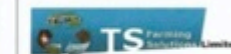






# TS Farming Solutions Limited

Where the students live .....



**OPUS**

Whangarei Office  
09 443 1700

PO Box 100  
Whangarei 1008  
New Zealand

Project: TS Farming Solutions Limited

Client: TANEKAHA, NORTHLAND

Project: CAMP FACILITIES

Layout

Project: 1-10000-00 / 005-WC

Sheet: 201

Scale: A

# Comments

