The Buzz Around Bugs

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80%
agricultural CO2
emissions

Proposal

2018

Start promotional campaigns within the community

2019

First farm ready to commercially sell crickets

2022

Second farm ready to commercially sell crickets

2025

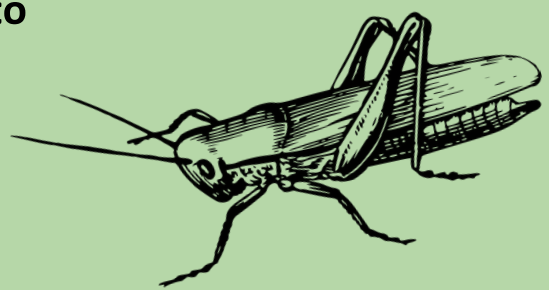
Third farm ready to commercially sell crickets

2030

40% transition to crickets

2050

>80% transition to crickets



Why Crickets?

- Insects are a highly nutritious food source, and high in:
  - Energy
  - Fibre
  - Vitamins
  - Saturated fats
  - **Protein**

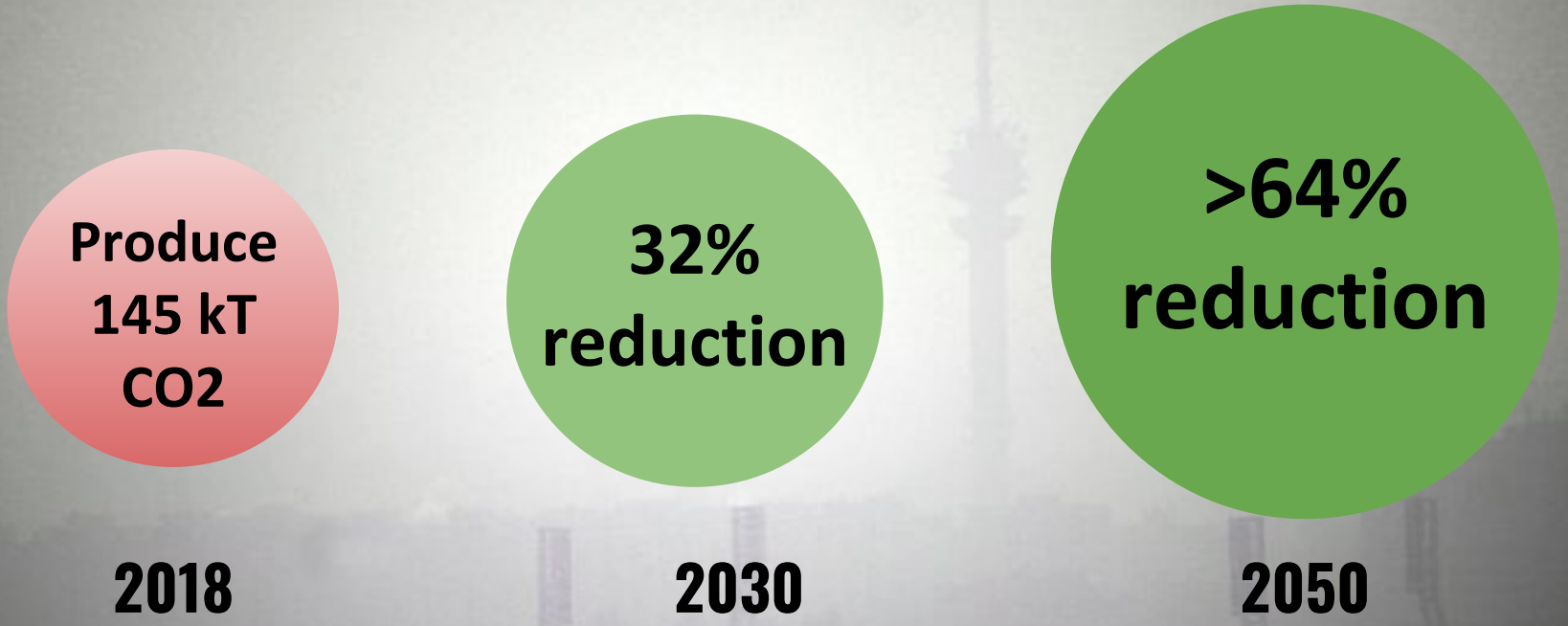
Nutritional Content (per 100 g)	Whole Cricket Powder	Beef
Energy (kcal)	447	278
Protein (g) *	63	25.6
Fat (g)	19	18.7
Omega 3 Fatty Acids (g)	0.25	0.009
Iron (mg)	5.6	2.4

Cheaper

Healthier

Safer

Carbon Reduction in Agriculture Sector



138 kT

Carbon Dioxide reduction in 2050!

Transportation

Uses 100% of organic waste


Our final message….

Crickets as a Solution to Agricultural Greenhouse Gas Emissions

Nutritional Benefits

- More nutritious than beef, pork and poultry
- Significantly higher in protein content
- Additionally high in vitamins and minerals

Carbon Emissions

Up to 80% agricultural sector CO_2 reduction

Reduction from other sectors

Transportation
705 T CO2/yr

Food waste
14,930 T CO2/yr

Social Change

- Widely accepted in several countries around the world
- Education, awareness and experience can make this practice popular in Western Society

References

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Carbon Emission Reduction

Within the agricultural sector: agricultural emissions, agricultural soil use, fertilizer use, manure management

- Agricultural emissions from livestock decreases 95%
- Conventional meat uses 59% of croplands
- Manure management can also be partially eliminated

Social Acceptance

- A study conducted at the University of Parma, found that 65.7% of the sample would taste edible insect properties given the opportunity [4]
- Several studies have found positive correlation between liking novel food products on first exposure and likelihood of future consumption [5]
- Ontario is home to the largest cricket farm in North America called Entomo Farms, with the popularity of insects increasing in western society

Food Safety

- Billions of dollars are invested into the livestock industry annually on treatment of viruses and antibiotic resistant infections [1]
- European Food Safety Authority (EFSA) has found that most bacterial pathogens found in unprocessed insects such as campylobacter are present in lower amounts than most unprocessed meats [3]
- Countries such as The Netherlands and Belgium have drafted legislation to officially permit insect species as a food source [2]

Carbon Tax Prices

Year	Beef	Chicken	Pork
2018: $10/ tonne of CO_2	**$1.24/kg**	**$0.28/kg**	**$0.34**
2020: $25/ tonne of CO_2	**$3.10/kg**	**$0.74/kg**	**$0.96/kg**

Carbon Reduction: 2050

2050			
	100% conversion		80% conversion
Deduction Sources	kT CO2e/yr per person	kT CO2e/yr/population	kT CO2e/yr/ population
Agriculture Emissions (livestock, enteric fermentation)	0.000265	78.387	62.7096
Manure Management	0.00014	41.412	33.1296
Agricultural Soils	0.0001829	54.10182	43.281456
Fertilizer	0.00000885	2.61783	2.094264
Emissions			
Emissions from insects	0.0000137	4.05246	3.241968
Total emissions original	0.000725	214.455	214.455
Total emissions now	0.00014195	41.98881	76.482048
Percent deduction	80.42068966	80.42068966	64.33655172

Revenue

Variable cost: Cost of initial cricket population, employees, technology and workers

Total profit/loss from 2018-2030														
Year		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Costs	Building cost		1077251.67			1077251.67			1077251.67					
	Variable cost	50000000	2642748	2642748	2642748	5285496	5285496	5285496	7928244	7928244	7928244	7928244	7928244	7928244
	Total variable cost													
Profit	Insect consumption (kg)	0	197692.772	332075.906	468529.402	607053.261	747647.482	1027283.15	1311059.55	1598976.67	1891034.51	2187233.08	2487572.37	2863643.48
	Profit	0	3953855.43	6641518.12	9370588.04	12141065.2	14952949.6	20545663	26221190.9	31979533.3	37820690.2	43744661.6	49751447.4	57272869.5
Revenue from year		-51077251.7	1311107.43	3998770.12	5650588.38	6855569.22	9667453.63	14182915.4	18292946.9	24051289.3	29892446.2	35816417.6	41823203.4	49344625.5
Total profit/loss		-52674037	-51362930	-47364159	-41713571	-34858002	-25190548	-11007633	7285314.09	31336603.4	61229049.6	97045467.2	138868671	188213296

Carbon Reduction: 2030

2030				
	100% conversion		80% conversion	40% conversion
Deductions	kT CO2e/yr per person	kT CO2e/yr population	kT CO2e/yr/population	kT CO2e/yr/population
Agriculture Emissions (livestock, enteric fermentation)	0.000265	58.035	46.428	23.214
Manure Management	0.00014	30.66	24.528	12.264
Agricultural Soils	0.0001829	40.0551	32.04408	16.02204
Fertilizer	0.00000885	1.93815	1.55052	0.77526
		0	0	0
Emissions		0	0	0
Emissions from insects	0.0000137	3.0003	2.40024	1.20012
Total emissions original	0.000725	158.775	158.775	158.775
Total emissions now	0.00014195	31.08705	56.62464	107.69982
Percent deduction	80.42068966	80.42068966	64.33655172	32.16827586

Cost of a Standard Cricket Farm

Infrastructure: $1,077,251.67

Industrial Technology: $2,587.69
$4,395.69

Electricity: $7,766.25/month

Workers: $2,628,000

Total: $3,720,000

Harvest Process:

Maintaining Crickets is a 6 Step Process:

1. Feeding: supply of plant-based and protein-based food and water
2. Breeding: the crickets will mate and then soil will be placed for the females to lay their eggs
3. Incubation: eggs are placed in 30 to 35 degrees Celsius environment
4. Harvesting: the crickets are harvested and frozen
5. Grinding:
6. Packaging and Processing: our new policies
    - Labelling
    - Recognition of crickets