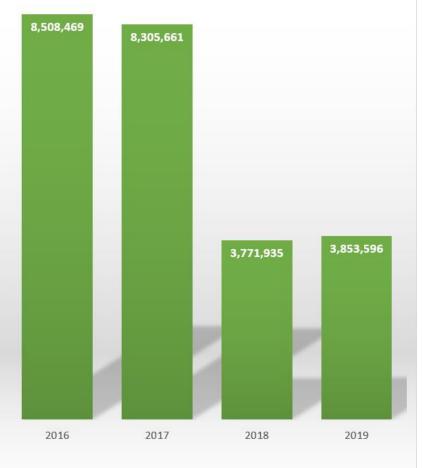


Global Centre for Regenerative Agriculture

Turning an economic and climate crisis into an opportunity.



Canadian Net Farm Income (in billions) 2016-2019

The Problem: Thin Profits

Inefficiencies and uncertainties result in thin farmer profits...

Even before COVID, <u>Canadian Net Farm</u> Income dropped 55% from 2016 – 2019.

With COVID, the "breadth and depth of issues impacting the agrifood policy landscape in Canada has perhaps never been more challenging." Agri-Food Economic Systems, Aug 2020

"When farmers struggle financially, the agriculture sector and Canadian economy suffer too."

Western Producer





The Problem: Inefficiency

Pests, disease and weeds reduce crop yields by as much as 40% globally.

Every year, we use 2M tons of pesticide globally.

Despite all the chemicals applied, 50-90% gets washed into the environment, depleting soil carbon.





The Opportunity: Ag can be a Net Sink of Carbon

Given that human agriculture activities shape 50% of habitable land on Earth (and about 37% of the Earth's total land area), there is a huge opportunity in transforming this vast area **to a net sink of atmospheric carbon.**

Farmers are Canada's largest opportunity to combat climate change through carbon sequestration.



We need to act now

Climate Crisis



As outlined by <u>Environment and Climate Change Canada</u>, Canada is experiencing faster rising temps than the global average, widespread arctic sea ice melt, changing precipitation patterns and increasingly extreme weather events.

COVID Recovery



The <u>Conference Board of Canada</u> warns that more than 10M Canadians are still out of work and "businesses are operating in a challenging environment because of risks associated with COVID-19" as Canada's federal government has prioritized a "green recovery."

Food Security



Canada will welcome another 10M people by 2050. 1 in 7 Canadians report food insecurity in the last 30 days, with the rate jumping to 1 in 5 in households with children. Canadians out of work due to COVID are 3x more likely to report food insecurity.

Response to Urgent Recommendations

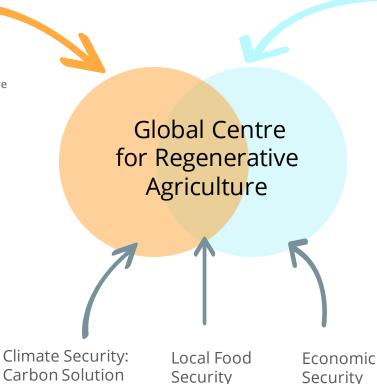
Our Government

Establish BC as a global agritech leader

Create an

- agriculture and agritech institute as a collaborative entity across post-secondary institutions
- 3 Examine land use policies and other regulatory considerations
- 4 Adopt the United Nations' sustainable development goals (SDGs)





Our Business Community

- Establish a Global Agri-tech Precinct
- Create a Clean-tech Centre for Innovation and R&D
- 3 Establish a carbon offset system





An Economic Plan for B.C. Families and Businesses.

Response to Canadian Economic Recommendations

Canadian Government Rally private sector and government to work together toward bold objectives Develop a Big Data strategy to securely collect agronor and economic data and provide decision-making tools

- Develop a Big Data strategy to securely collect agronomic and economic data and provide decision-making tools to enhance yield, crop quality, competitiveness & transparency
- 3 Launch an agriculture / agri-food pilot by convening private and public sector stakeholders
- 4 Adopt a new, bold agricultural and agri-food sector growth strategy across departments



THE PATH TO PROSPERITY

EXECUTIVE SUMMARY

ADVISORY COUNCIL ON ECONOMIC GROW February 6, 2017

Global Centre for Regenerative Agriculture

Climate Security: Carbon Solution

Local Food Security Economic Security

With Canadian Businesses

- Position Canada as central global trading hub
- Catalyze business-led "innovation marketplaces" to foster commercialization where Canada has momentum
- Increase Canada's share of global agricultural exports to become 2nd largest exporter & double share of world Agriculture & Agri-food exports



Response to Ag Industry Recommendations

Producing Prosperity Plan

- Recognize agriculture's centrality to Canada's future health and prosperity
- 2 Ability to remain profitable, compete in global agri-food markets and provide affordable food
- Need for data and updated soil mapping current lack of reliable, up-to-date and comparable data.
- Research partnerships between government, academia and ag targeting lower emissions from crop production and livestock



Global Centre for Regenerative Agriculture





Environmental

Stewardship

Climate Change

- Harness potential for carbon capture through research, investment, incentives and streamlined regulations
- Recognition of ag as a carbon offset protocol opportunity for market-based incentives, including early adopters
- Real world validation and demonstrations sites that encourage onfarm adoption





Netherlands has 155-times more exports per acre of farmland than Canada

\$130 Billion in

Agriculture/ Agri-food Exports

\$52,000/acre farmland

in Agriculture/Agri-food economic activity

~750,000 jobs in Agriculture/Agri-food

1 job per 3 acres

Netherlands
VS

2.5 Million acres farmland

Netherlands
Figure 160 Million acres farmland

\$56 Billion in Agriculture/Agri-food Exports

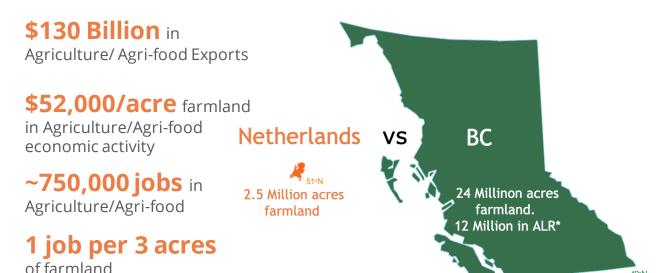
\$335/acre farmland in Agriculture/Agri-food economic activity

~2,300,000 jobs in Agriculture/Agri-food

1 job per 70 acres of farmland

Potential for **\$8.7 Trillion** in new economic value from Canadian farmland by reaching Dutch efficiency levels. At just 10% of the Netherlands' jobs per acre, Canada could add **2,570,400 new jobs** (over 2x increase), building local & rural economies.

Netherlands has 403-times more exports per acre of farmland than BC



\$3.1 Billion in Agriculture/Agri-food Exports

\$129/acre farmland in Agriculture/Agri-food economic activity

~50,000 jobs in Agriculture/Agri-food

1 job per 500 acres of farmland

Potential for **\$1.2 Trillion** in new economic value from BC farmland by reaching Dutch efficiency levels. At just 10% of the Netherlands' jobs per acre, BC could add **677,000 new jobs** (over 10x increase), building local & rural economies.

The Global Centre for Regenerative Agriculture

Agritech Research Centre





250,000 – 1,000,000 sqft for labs, classrooms, greenhouses, growth chambers, simulated environments, data centre, education and policy leadership. Concierge for technology commercialization. Hosting other partners.

Precision Agriculture



World-leading Al/ML engine for plant and soil health by using industry-leading imaging techniques to collect and optimize data for growers via satellites

1st Scaled Soil Carbon Market



Regenerative practices create carbon credits that can be sold, improving farmer profitability and reducing CO₂ levels at the same time.

Data-Driven Policy Leadership



Create data-driven policy incentives for regenerative farming practices to unlock the potential of farmlands for food security and carbon capture. Share best practices globally.

World's largest regenerative farming initiative



Plant Health

Soil Health & Carbon Capture

Yields & Farm Profit

Local Food Security

Soil is the Earth's greatest carbon store, and the healthiest, most economically-profitable carbon sink. Leveraging Canada's 167M acres of farmland to incentivize regenerative farm **practices to prove productivity and profitability for scale.**

Regenerative farming turns agriculture into ground zero in the fight against climate change, leaving the land healthier and more productive each year. Canada emits approximately 0.7 Gt of carbon per year. Meanwhile, Canada could sequester 78 Gigatonnes CO_2e by 2050 scaling regenerative farming, bringing the country beyond net zero. Getting this technology scaled in Canada and exporting to roll out globally could see from 75 up to **295 Gigatonnes CO_2e/year across the world's farmland or 8x the worlds emissions,*** turning the clock back on climate change.**

Canada's economy, environment and health benefit. And every Canadian farmer and landowner- small and large - can benefit.

What is regenerative farming?

Terramera means "our Earth." Our Earth, left to herself, is resilient and regenerative. Regenerative agriculture has a mindset of looking at nature as a system and promotes working together to improve as a whole.

Regenerative agriculture is pretty straightforward: excess carbon in the atmosphere is bad because of its role in climate change, and carbon in the soil is good because of its role as a natural fertilizer.

EXAMPLES:

Cash Crop Diversity

Cover Crop Diversity

Livestock Integration

Enhanced Root Phenotypes

Biochar & Compost

Regenerative agriculture is a set of tools and practices that pulls carbon from the air and transfers it underground—storing carbon and restoring agricultural soils.

Rather than degrading or maintaining the current health of the environment, regenerative ag **improves it with each growing cycle.**

High carbon soils are more resilient, have improved soil structure and better retain water and nutrients.

Regenerative farming: What is the opportunity?

- The farming community can be the most important part of the solution.
- Farmers and ranchers —
 guardians of over 160 million
 acres of land Canada alone are central to the success of
 carbon drawdown. Best of all,
 the needed soil practices make
 good business sense for them.
- This drawdown potential is hundreds of times more than any effort humanity has successfully completed to date.

	Ecological / Environmental	Agronomic
Benefits to Farmer	 Erosion control Local biodiversity Flood control Improved soil water retention 	 Increased profits - up to 78% more than conventional practices Reduced expenditures on fertilizer and pest suppression (10x fewer pests) Reduced need for irrigation Stronger plant health Pest and plant disease control
Benefits to Canada	 Erosion control Cleaner water (fewer nitrates, etc) Flood control Soil carbon sequestration 	 Lower risk for pest outbreaks Lower risk for plant disease outbreaks Fewer unwanted nitrates from runoff

Regenerative farming – can it work?



Meet Gabe Brown

Regenerative farmer/rancher

Gabe Brown converted his 5,400 acres of land in Bismarck, ND, just south of the Saskatchewan/Manitoba border, to a commercial regenerative farm. Brown's operation is more profitable than his conventional neighbours. On average, he **makes \$100/acre annual net profit** (compared to his neighbors at \$.10 - \$3/acre net profit*) and his biggest mixed cash crop clears **\$900/acre annual net profit** – without any pesticides, insecticides, herbicides, fertilizers or subsidies.

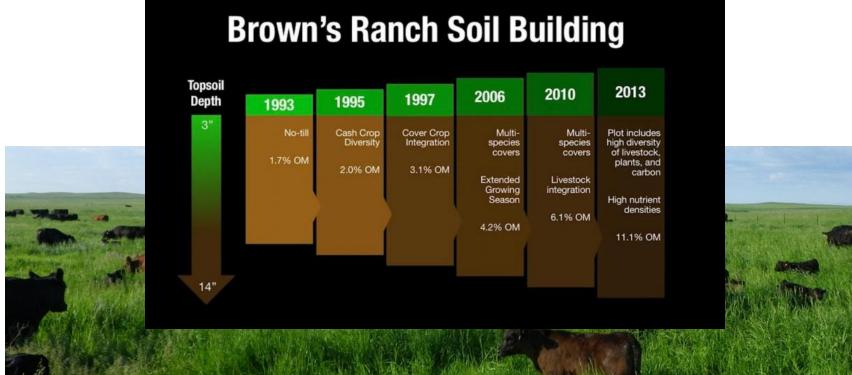
During a recent field study of Brown's Ranch, researchers observed Soil Organic Matter (SOM) ranging from **8-11%** compared to adjacent farms averaging between 0.3-1.5% SOC.

Realizing comparable gains across all global farmland could fully address 1 trillion tons of CO2 drawdown in under 50 years, enough to turn back the clock on climate change 100 years. But we need more information, we need the data to groundtruth, and the technology to understand the causative and correlative relationships to advise farmers adopt and scale.

*Farmer's Cut of the Netflix Documentary "Kiss the Ground"



Regenerative farming - what's possible



Barriers: Data, Quantification, Technology to Scale



1. Reliable Soil Carbon Quantification & Data

- Including agriculture in carbon markets and meaningfully incenting farmers to participate requires reliable, economical soil carbon quantification to scale - currently doesn't exist
- Outdated science and understanding some of Canada's soil survey maps haven't been updated since the 1940's and many soil programs terminated in the 1990's.

2. Reduced Verification Costs

- Physical verification is not feasible; too costly to scale
- Proxy approaches use assumption of carbon sequestration based on farming inputs and soil type to create an estimate. Not accurate enough for carbon trading across a country.

3. Grower Adoption & Engagement

- Tools and activities need to be groundtruthed and easy for farmers to implement and quantify their ROI
- Without incentives, education and technology, the industry status quo will continue with monocropping and conventional practices

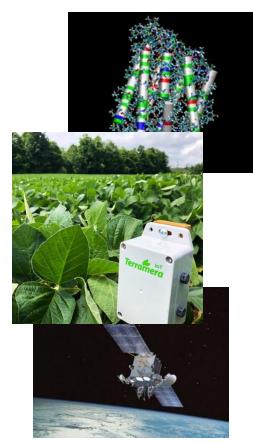
This plan breaks the barriers with technology

Terramera has **game-changing capabilities** in computational chemistry, machine learning, artificial intelligence and sensor design.

For carbon markets to thrive, they require **clear validation** so buyers can be confident of their purchases. Accurate quantification of soil carbon currently requires on site sampling or analysis.

Our technology will enable mass quantification of soil carbon using **remote sensing** from satellites and/or high-altitude drones, reducing costs and increasing the land that can be analyzed. The technology can be used to validate Canadian and global carbon markets.

We can train a model from **"ground truth" up to satellite** that can classify agricultural practices associated with soil carbon accumulation and use it to validate carbon credits.



Canadian Technology and Innovation

What's unique? Terramera combines computational chemistry, sensor data, satellite data and farm activity data to drive transfer learning, economically-scalable accuracy and more sophisticated deep learning models.



We take a **bottom-up approach**, first learning from high resolution data sources (growth chambers, greenhouses) at the plant biome level rather than developing models directly in the field like our competitors.

This process yields enormous insights into plant health and prediction that our competitors miss. **No other company currently has this expertise or ability**.

Instead of relying on a single "snapshot" data source like some competitors, we integrate many sources of data, like **genetics**, **environment and applied product**, recognizing each plays a unique role in the estimation of plant or soil health. This results in models that are less prone to error and allows us to do more than just predict outcomes – our Al/Machine Learning can **answer complex questions and infer answers**.

Canadian Intellectual Property (IP)

What is covered by the IP?

Our patents and trade-secrets include coverage of our deep learning/machine learning models used for the validation of carbon capture from different data inputs, and methods of applying them.

How difficult will it be for others to copy your ideas?

The market is becoming more competitive but no company currently has the machine learning expertise, ground-up computational models, data connections and plant intelligence that Terramera has – or the wherewithal to apply those capabilities from *in vitro* to satellite.

What is your IP strategy to maintain a competitive advantage?

IP is an essential pillar of Terramera's business model. Our in-house IP experts are focused on developing patents broadly protecting our technology. We intend to open-source some data capture technology based on our standards, keeping our patents relevant in a changing technology environment.

Terramera has

over 240 patents

(granted & pending)

and has pioneered new
areas of science with

Actigate TM to enhance
agricultural
input efficiencies, and
promote and protect
plant health.

Outcomes for Canada

Growing 2.5 Million Jobs Bridging Rural/Urban



Create an economic engine around agriculture and technology with a center that draws high-tech jobs and pioneering programs that spur rural development. Improve rural connectivity to overcome the digital divide.

Up to 78 Gigatonnes of CO₂e sequestered



With regenerative farming practices 167 M acres could pull up to ~3.915 Billion tonnes CO₂e /year out of the atmosphere, 5x Canada's total emissions and 78 Gigatonnes by 2050.

\$8.7 Trillion New Economy & Local Food Security



The global center for regenerative agriculture will help improve soil health, farm productivity and resilience. With this plan, Canada can lead the way to food security and global innovation while supporting farm to table and local food sustainability. Canada can leverage its BC cleantech cluster.

Canada-Led Global Innovation



Terramera's technologies have been billed as "world-changing ideas" by Fast Company magazine. By utilizing powerful relationships, they can rapidly deliver powerful and scalable solutions for farmers, agriculture industries and governments around the world.

Increasing Canadian Food Production, Security and Value



Ensure Local Food Security

COVID-19 has highlighted the need for food security in case global food markets are disrupted. The ability to produce and process our food locally is critical.

Working Across the Supply Chain

This means making Canadian farms as productive and profitable as possible. This will require enhancing field farms on farmlands, greenhouses and local indoor farms across the country, and improvements across the supply chain, from farms to processors to retailers to consumers.

Higher Production = Higher Exports and Food Security

Higher productivity and improved efficiencies create surpluses that can drive Canada's export market in good times and increased food security. Sustainably produced food commands a higher price and greater demand.

Building on Canada's Regional Food Hubs

Coordinating with the Regional Food Hubs will bring more opportunities for producers to increase revenue by adding value to their products.

Why this is Important: Scientific Support for our Plan

The data strongly supports that regenerative agricultural practices that pull carbon dioxide (CO2) from the atmosphere to build soil organic carbon can help farmers play a major role in not only drawing down atmospheric CO2 concentrations but also can help improve nutrient use efficiency and make our farms more resilient.... I enthusiastically support this effort and hope I have the opportunity to collaborate on this project.

- Sean Smukler, PhD Associate Professor Chair of Agriculture and Environment Associate Dean of Graduate and Post Graduate Studies, University of British Columbia Regenerative agriculture has shown to capture atmospheric carbon dioxide and sequester as soil carbon, which help improve soil health and nutrient cycling while making the production system resilient and sustainable... I enthusiastically support this effort and hope to

collaborate on this project.

- **Dr. Asim Biswas**, Associate Professor School of Environmental Sciences, University of Guelph 4

The Board of OpenGeoHub is pleased to offer its support and encouragement for a proposal produced jointly by Terramera, the University of British Columbia (UBC) and Microsoft to create and maintain a Global Centre for Regenerative Agriculture in BC Canada... We encourage Canada to be an engaged partner and leader in ground-truthing the impact of agritech on regenerative farming and SOC sequestration.

- Dr. Tomislav Hengl (Netherlands), Dr. Ishani Wheeler (Australia) Dr. Robert MacMillan (Canada) - the Board of OpenGeoHub, based in the Netherlands

"[M]uch of our country still relies on provincial soil survey maps—some of which had not been updated since the 1940s when they were first created; by the 90s, the remaining provincial soil survey programs were effectively terminated... I am highly supportive of the initiative put forth by Terramera and I believe that they have the potential to address many of these challenges

- Dr. Brandon Heung, Assistant Professor Co-Chair, Faculty of Agriculture, Dalhousie University, Canadian Digital Soil Mapping Working Group Soil-Landscapes Analysis & Modelling Lab Secretary 44

Solving the climate crisis is not just about reducing the carbon we might produce — it's about getting rid of carbon we've already put in the air. We need to get started on practical, large-scale approaches to carbon drawdown. While there are many potential options to pursue (and maximum benefit will come from a portfolio of options), improving our soils to drawdown more carbon is our highest-potential

- **Tom Chi,** Chairman of Buckminster Fuller Institute, GoogleX founder, investor and advisor

This is the high time for us to develop supportive policy and scientific strategies and the proposal Terramera developed truly shows the direction towards such shifts in agriculture. I strongly support Terramera's effort and sincerely hope the opportunity to collaborate with them.

- **Siddhartho S. Paul,** PhD Postdoctoral fellow, Dalhousie University 66

Regenerative agriculture practices have been shown to significantly increase carbon sequestration compared to no-till farming and regenerative agriculture may be able to pull as much as 88 Mt of carbon dioxide per year from the atmosphere across Canada... Regenerative agriculture is the next major step required for Canadian Agriculture to meet the societal demand of providing secure long-term food production while having net negative carbon emissions.

- **Preston Sorenson**, Ph.D., P.Ag, Postdoctoral Fellow at the University of Saskatchewan and soil scientist

Canada can turn an economic and climate crisis into an opportunity to create millions of jobs and sequester enough carbon to exceed netzero emissions by leveraging Canadian farmland, while securing our food supply, helping farmers, building Canada's rural & agricultural economy with the Global Centre for Regenerative Agriculture and Canada-led innovation.

Appendix

The Problem: Imbalance

350 Million Tons

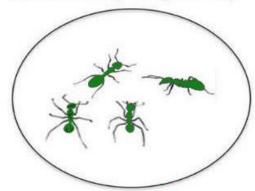
2.8% of body weight / day



Tons of food / day

~350 Million Tons

30% of body weight / day



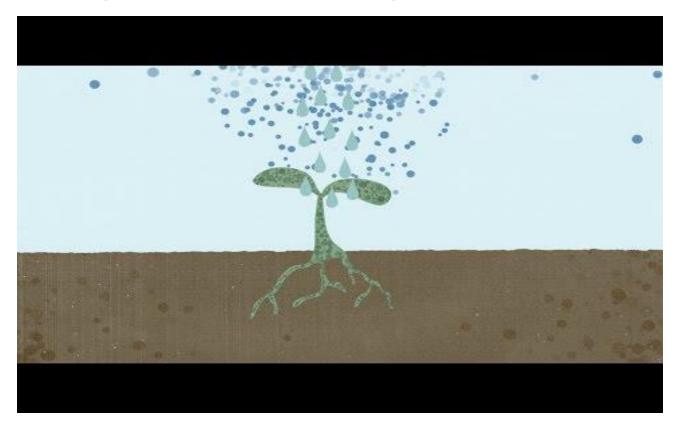
>100 Million

Tons of food / day

Ants consume 10x more food, and enrich the world.



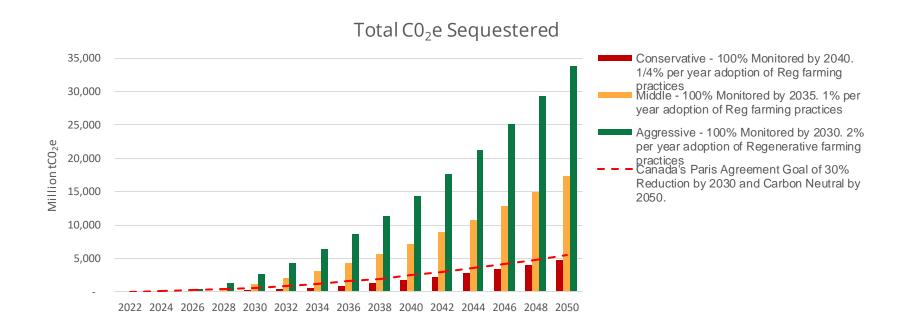
What is regenerative farming?



Assumptions

- 50% capex investment put to work by 2021, complete by 2025
 - O Buildings will take ~4 years to build however majority of other capital expenses (including grow chambers and other technology) can be built and purchased by 2021.
- Potential for >2.5 Million Direct & Indirect Jobs Created Across Canada
 - O The Netherlands employs 1 job per 3 acres of farmland. At just 10% of the Netherlands' jobs per acre, Canada could add 2,570,400 new jobs (over 2x increase), building local & rural economies.
- Potential to sequester 5x Canada's total emissions in Canadian farmland
 - O Data from the Savory Institute shows sequestration could be as high as 23.4t/acre/year, which could sequester a total of 3,915 MtC02e/year or +78 billion tonnes CO2e by 2050 on Canadian farmland. This initiative would enable more accurate measurement of soil carbon, enabling a global movement and market for carbon credits based on soil sequestration. At scale, this could result in up to 0.5 1 Trillion Tons of CO2e sequestered in global farm and rangelands, turning back the clock on climate change 100 years.
- Potential for over >\$ 8.684 Trillion in new economic activity by leveraging Canadian farmland
 - O If Canada was able to achieve the same economic output per acre as the Netherlands.

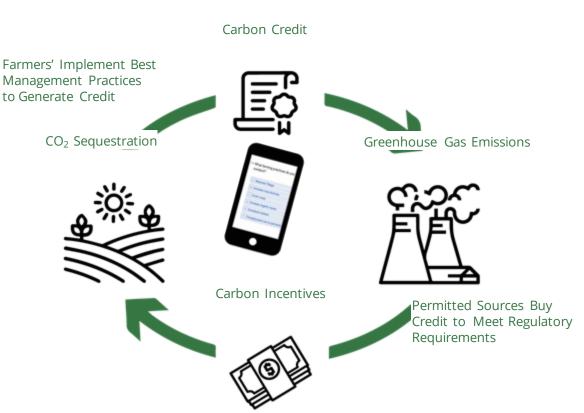
Soil Carbon Sequestration Growth



Soil Carbon Capture and Sale

A national carbon offset policy and program that brings transparency, quality verification and attracts transactional structures that make Canada and BC a hub for market offset creation, verification and purchasing. This could include interprovincial or CUSMA ITMOs (interjurisdictional trading).

Regenerative practices could increase the carbon credits available improving farmer profitability and reducing CO₂ levels at the same time.



Futureproof farming

Data Rich Research Practices

Techniques learned from this initiative would be captured and turned into curricula.

Modern Education Modalities

Online education modality means this could be taught to new or upskilling farmers around the world.

Future proofing for the next generation

Improves the profitability and sustainability of farms of all sizes and gives a clear path to attract next generation of farmers.





"How can we use technology to unlock the intelligence in nature to ensure an earth that thrives and provides for everyone?"

Revolutionary proprietary technology

Since 2010, our **integrated operations** have grown to include HQ in Vancouver, BC, research labs, growth chambers, greenhouse and a research farm



\$100M

Raised in funding; privately held.



Foundational chemistry platform designed to enhance the efficacy of synthetic chemicals and natural products used in agriculture

AI/ML Engine

Machine vision-driven machine learning models to speed discovery, development and commercialization of products

Products

Commercial crop protection



Natural pest control consumer products





240 patents

granted and pending in IP portfolio



135+ employees

quadrupled workforce since 2017; R&D team includes biologists, chemists, entomologists, plant pathologists, machine learning engineers, software engineers and robotics engineers.



Terramera's 2030 Audacious Goals

Reduce global synthetic pesticide load by

80%



Increase global farm productivity by

20%



Increase soil organic carbon by

100%



THE CHALLENGE: RE-ENGINEERING OUR AG SYSTEM

Growing demand for food production requires more effective, safe and sustainable solutions





- · Grow more food with less
- Declining trust in food systems
- Overuse of chemicals and environmental impact of waste



CHANGING FARMER ECONOMICS

- Profitability driven by efficiency improvement
- \$ value placed on sustainable and regenerative resource management
- Disruption through technology (Al, Machine Learning, Data)



CHANGING CONSUMERS

- Demanding cleaner, safer, cheaper food
- Increasingly aware of environmental impacts
- Global population growth increasing demand for food





Reinventing Crop Protection

Actigate TM targeted performance technology is our foundational chemistry platform designed to enhance the efficacy of synthetic chemicals and natural products used in agriculture



Al Uptake

Al Absorption Effective oncentrations



WHAT IS ACTIGATE & HOW DOES IT WORK?

Conventional Als

Actigate[™]

Significantly reduced dosing requirements, lower costs and high efficacy

Natural Als/biologics

Actigate™

Dramatically increased efficacy and consistency per dose*

*Can outperform conventional compounds

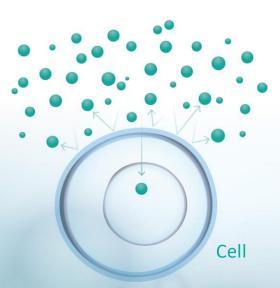




TARGETED PERFORMANCE TECHNOLOGY

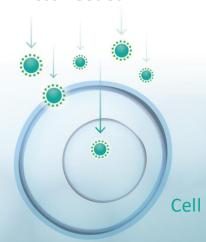


Up to 10x more needed





- more targeted
- increased uptake
- less needed





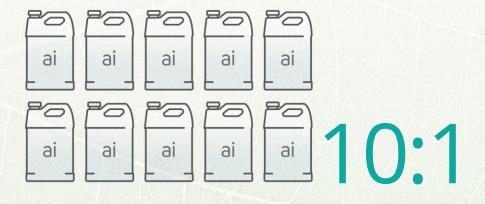


TARGETED PERFORMANCE TECHNOLOGY

Platform to Enable More with Less:

Use 90% less Active Ingredient

Amount of regular Active Ingredient (ai) needed without Actigate™





Amount needed with

Actigate¹





CREATING VALUE WITH ACTIGATE

Crop Protection
Market: **\$80B** by 2024

- **COGs savings** from significantly lower rates of synthetic Active Ingredients (Als)
- Increased sales from access to new markets enabled by lower Al rates and costs
- **Greater market share** from increased competitiveness
- Patent extension of 18 years as defense against generics
- Maintain current sales where registrations are at risk
- Increased ROI on natural products discovery by enabling biologics to finally achieve competitive efficacy and their true potential in the marketplace
- **Demonstrated commitment** to sustainability and environmental stewardship

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Our World-Class Team

We're backed by a world-class team comprised of biologists, chemists, entomologists, plant pathologists, machine learning engineers, robotics engineers, software engineers and strong leadership.





President



DR. ANNETT ROZEK **Chief Scientific** Officer



DR. TRAVIS GOOD Chief Technology Officer



DAVID NOTHMANN Chief Revenue Officer



MIKE SCOTT **Chief Financial** Officer



VALERIE MARTIN VP, Strategic Communications



JOE SOBEK VP, Agriculture Innovation & Licensing



DR. STEVE SLATER VP, Strategic Initiatives



LYNEL BARROW VP, Legal



GRAEME HERRING VP, Intellectual Property Strategy

Solid Intellectual Property Position

Multiple international patent application families, trade secrets and proprietary data



Over 240 patents granted and pending

Protect Actigate to enhance the performance of conventional and organic active ingredients

Significant barrier to entry by others who might consider their own R&D effort



New technology, speed and first-mover advantage for Terramera in this technology space

