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EXPLORING BIO-STIMULANTS

Demand, Growth & Challenges

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The bio stimulants industry has technology and solutions that deliver improved quality, yield and ROI for growers around the world.

Can we move the grower's mindset to embracing our advancement as an essential part of their program?



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FUTURE OF GROWING
Why should it matter



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To solve our climate challenge and protect nature **we must embrace, transform and accelerate innovation in agriculture.**

As one of the largest greenhouse gas emitting sectors of the global economy, **efforts to embrace bio-stimulant technology and solutions in our global food systems need to be at the heart of change.**

To reach our goals **we must close the technology gap in agriculture**, with new technologies and methods of producing food which protect nature.

Source: UKCOP26, Glasgow, UK

Inorganic
Fertilisers

18%

Ammonia
Pollution

Agriculture
responsible

87%

Nitrous Oxide
Emissions

Drinking
Water

15%

Nitrate
Pollution

Microbial
Biomass

13%

Average
Reduction



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IMPACT



REDUCE



QUALITY



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FUTURE OF GROWING
How can we make a difference



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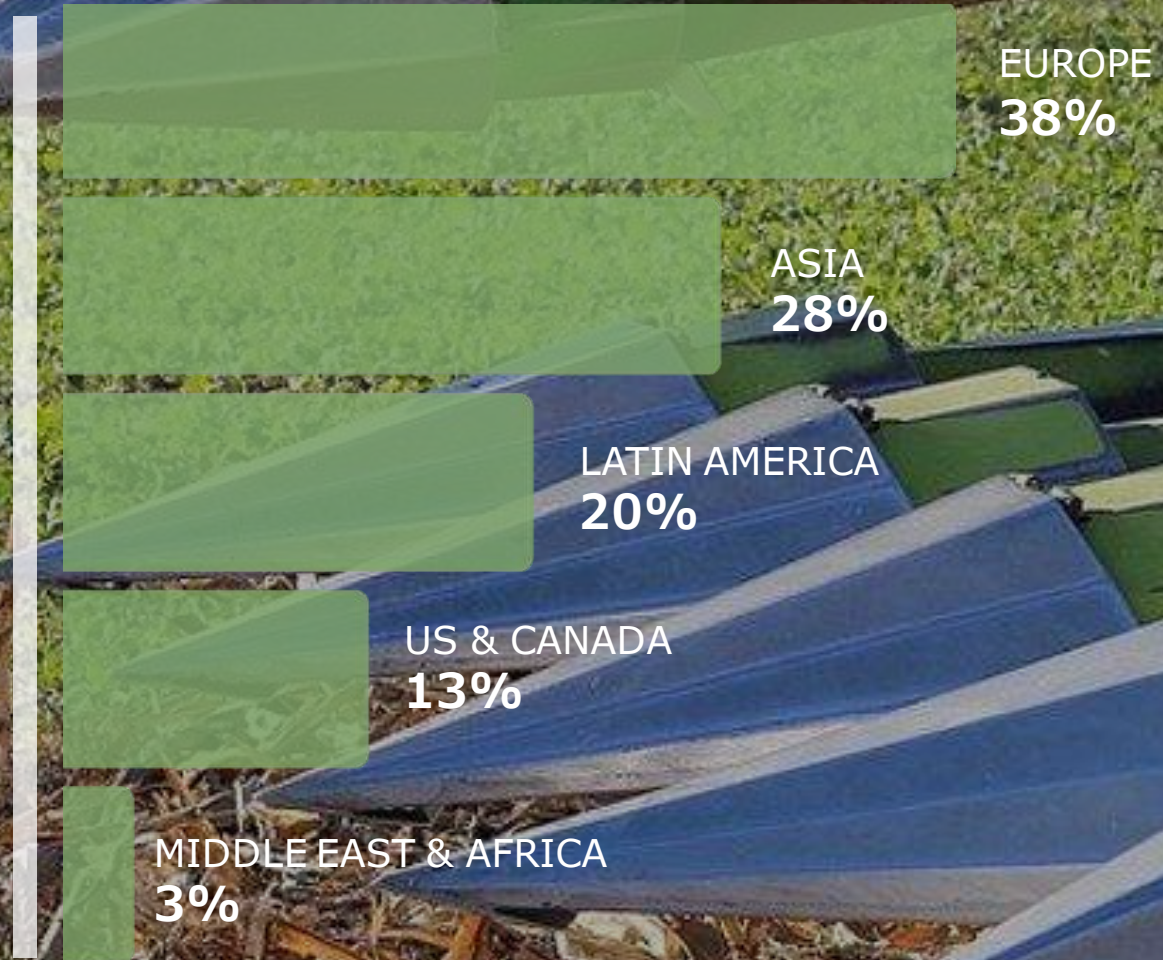
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EMBRACING BIO-STIMULANTS

Bio stimulants and sustainable farming are amazing, and benefits everyone from manufacturer to consumer.

We need to move the grower's mindset to embracing bio-stimulant advancement as an essential part of their program, needed to achieve world climate goals, crop quality and ROI outcomes consistently with evidence of efficacy.

GLOBAL BIO-STIMULANTS MARKET





Protect and nurture

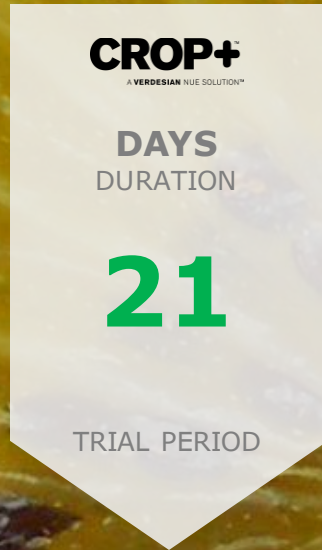
People want to know the food they are eating is safe, and the production of it is not harming the environment

It's got to be affordable; scales of economy need to be high to meet affordability

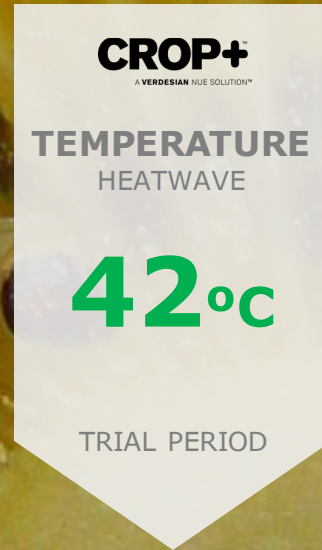
Supermarkets are starting to enforce residue levels, pesticides, and other elements

For the industry to embrace, improve and grow it needs an industry body who can create greater awareness and understanding

BIOSOLUTIONS AWARD ITALY 2023 | Yellow Kiwi – Variety G3



CROP+
The trial period was 21 days. Results were compared to non-treated crops



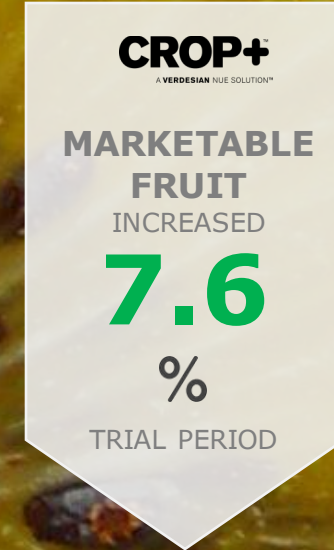
CROP+
The 21-day duration of the trial was conducted through a heatwave



CROP+
Fruit drop was successfully reduced by 14.5%, which was compared to untreated crops in the same trial



CROP+
Yield was increased by 6.3 Tonnes per Hectare when compared to the untreated crop in the trial



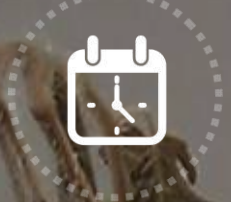
CROP+
The marketable fruit was increased by 7.6%, when compared to the untreated crops



Improves flavour by increasing the soluble solids/acidinity index on tomato fruits, even under water stress



Improved quality of taste and sweetness to tomato



Improvement in quality retained 9 days post-harvest



Overcoming Abiotic stress



To determine the influence of cold stress; and the effect of use the bio-stimulant CROP+ had on chemical characteristics, two tomato fruit plants were subjected to low temperature stress.

The plant on the right was treated with the Bio-Stimulant CROP+.

2 weekly product applications were made to the tomatoe plant on the right, then both plants were exposed to -5 degrees for periods of 2 hours.

It was successfully demonstrated that the anti-oxidant technology in CROP+ reduced abiotic stress



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FUTURE OF GROWING
What needs to happen

Global bio-stimulants market

S&P Global

S&P Global estimates the bio-stimulants market to be worth to be around US\$2,556 million in 2021, growing at a rate of **10% per annum**, indicating increasing global demand for bio-stimulants.



MARKETSANDMARKETS™

Markets & Markets values the bio-stimulants market at USD 3.5 billion in 2022, projected to grow at a CAGR of 11.8% to reach **USD 6.2 billion** by 2027.





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WHAT NUE NEEDS TO HAPPEN
To meet the **CAGR forecast**

AGRICULTURAL CHALLENGES | Seaweed

Global seaweed production has risen exponentially to 30Mton annually, and could face production limitations

37% of bio-stimulants used globally contain seaweed extracts and represents \$940m

S&P Global

Seaweed has potential as a direct food source for humans and animals, seaweed extracts are not only shown to boost abiotic stress resistance in crops but also to increase their nutritional value.

Overall crop yield could be increased by the application of seaweed extracts as bio-stimulants under normal and stress conditions.

COAL
EXTRACTS

33
%

BIO-STIMULANTS
GLOBALLY

AGRICULTURAL CHALLENGES | Humic & fulvic acid

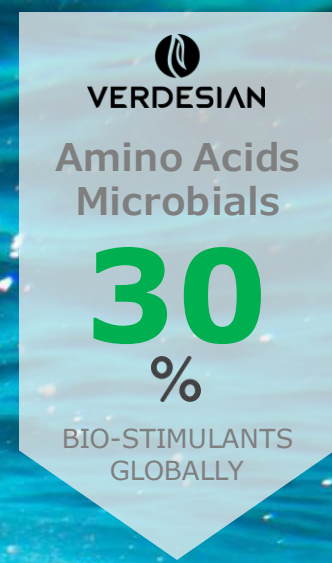
33% of bio-stimulants globally use coal extracts, and this represents \$840m globally.

Coal as a source of energy is damaging the global environment

S&P Global

The materials derived from coal have been found to be useful in agriculture as fertilizers, insecticides, disinfectants, herbicides, fungicides, fumigants, preservatives, plant-growth regulators, and food dyes.

Crop nutrition derived from coal provide phosphorus, calcium and other nutrients that crops need to grow while increasing soils' capacity to hold water



AGRICULTURAL CHALLENGES | Amino acids & microbials

30% of bio-stimulants used globally contain amino acids and microbials. Amino acid sources are marine, animal and veg, which represents \$800m globally.

Amino acids and microbials can modulate gene expression and induce metabolic changes in treated crops

The most likely candidates for the biostimulant effects of AC & MB are the complex carbohydrate compounds found in these extracts.

This is the future, but obstacles exist in the **supply chain** around the sources of amino acids and amongst **industry regulators** for microbials.

GROWER ADOPTION

US market growth is needed, as its currently so small, and they hold the distinction of being the top producer in the world of maize.

The average size of a maize field in the US is around 4 times the size of the average French farm. The cost of facilitating a 2nd treatment / application is potentially inordinate and causing concern amongst growers regarding the retainable ROI

Bio stimulants going forwards must have a clear demonstratable ROI across the environment, climate, quality and yield.



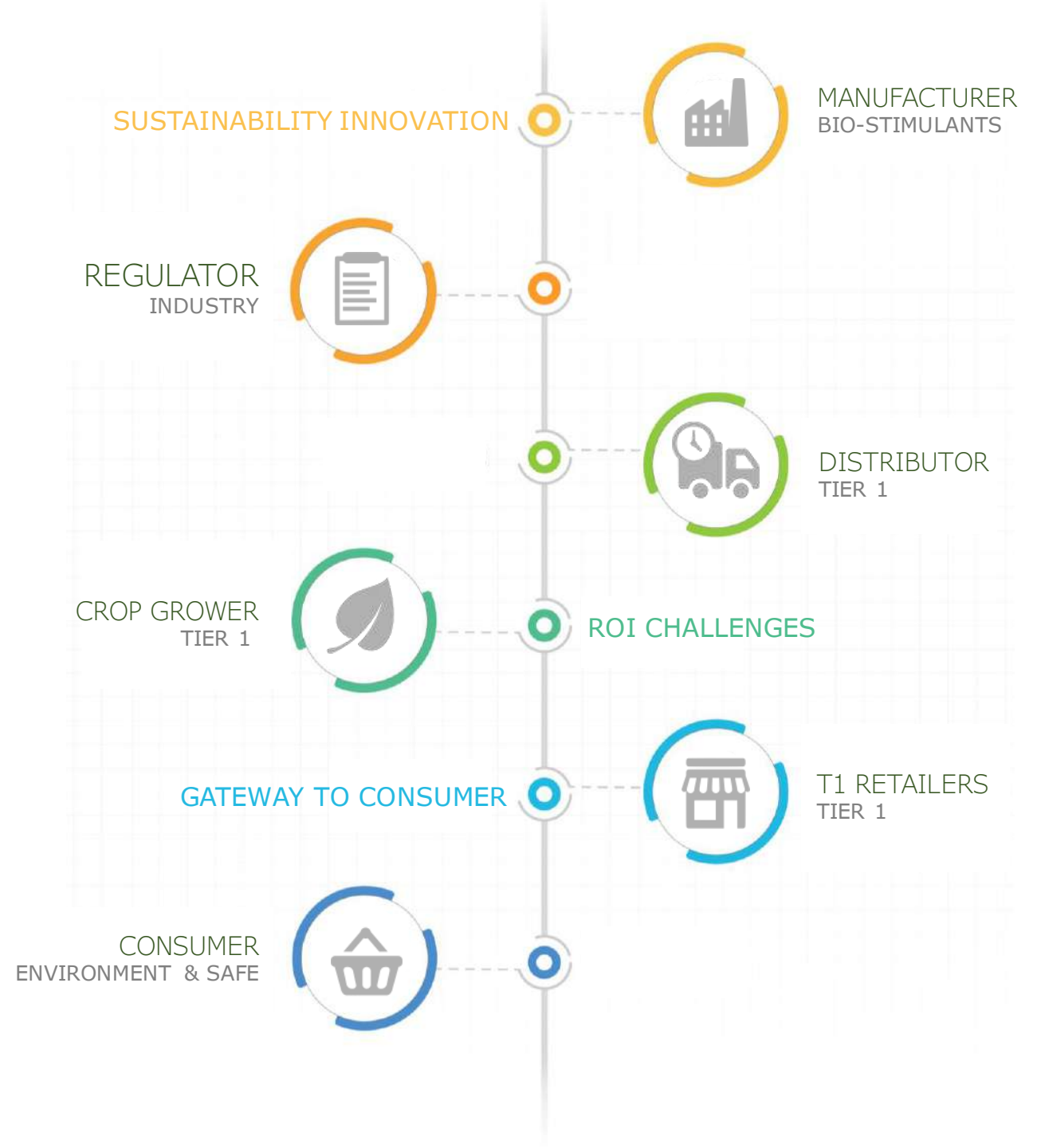
CLOSING THE GAP

To reach our projected CAGR and solve our climate challenges, while protecting nature, supermarkets must embrace, transform and help accelerate innovation in agriculture

As the preeminent link in the supply chain from manufacturer to consumer tier one supermarkets need to take accountability and responsibility, by not creating regulation, policies and procedures for their respective supply chains, outside of industry, regulator and consumer requirements

To reach our goals we must close the gap in agriculture, with new technologies and methods of producing food which maximise quality and protect nature







IMPACT

Growers are unintentionally **blocking the projected 11.8% CAGR**, due to their compressed margins and the **continued pressure to operate at a profit**.

With many growers in **single percentage ROI**, they are forming cost-based views around **the importance of Bio-Stimulants** and sustainable farming.



REDUCE

The retail sector of the supply chain is the key to overcoming this sustainable farming obstacle as they are **the gateway and controller to the consumer**.

This gives them the **power to influence the grower** in a **sustainability and environmental direction**.



QUALITY

The whole industry needs a **collective independent body** made up from the 500+ manufacturers within it, to **create awareness and educate** the retailers.

We need to **help Retailers to do the right thing** in their supplier policies back to the growers, **encouraging them to embrace our Bio-stimulant advancements** and control what they should be doing in their farming practice

AGRICULTURAL CHALLENGES | Summary



We must collectively move the grower's mindset



Support and commitment at tier one supermarkets



Embrace the next generation of technology and innovation



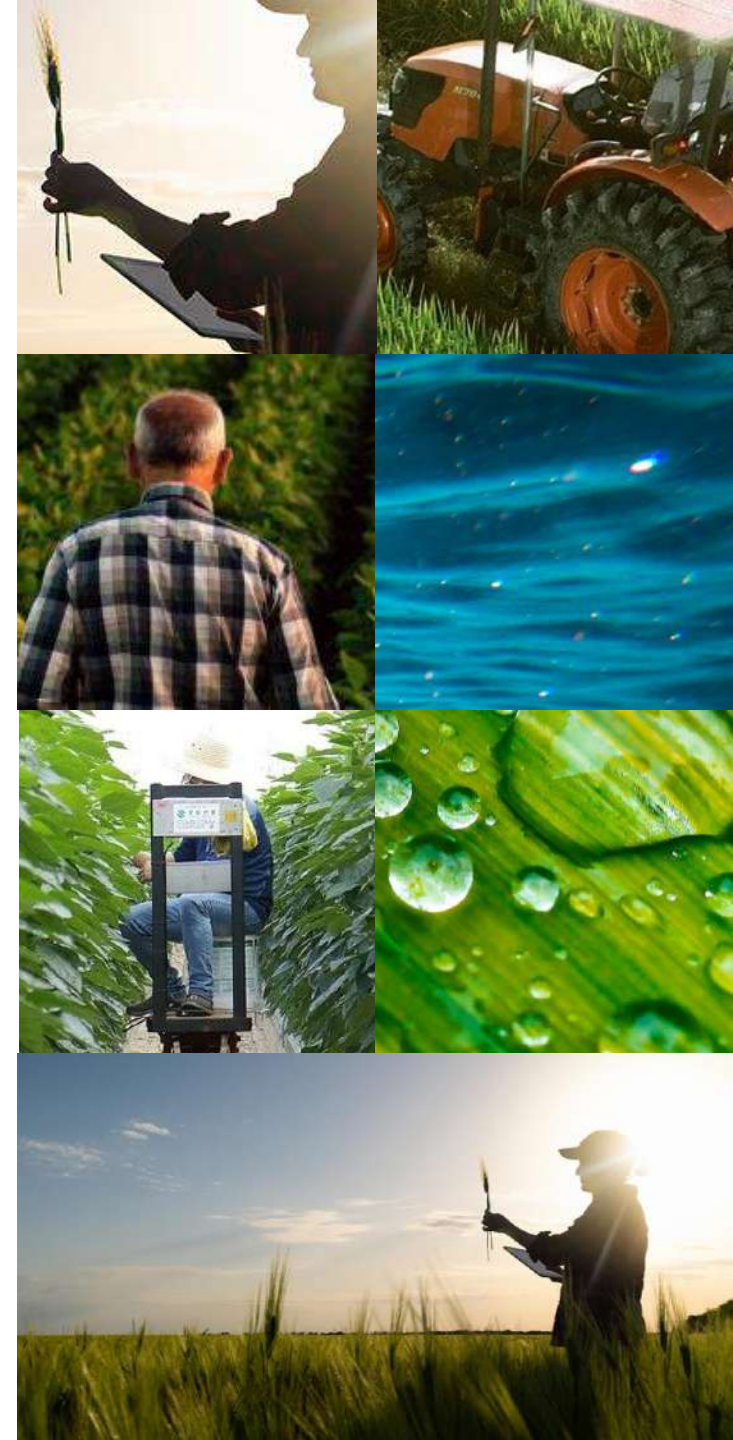
Industry collective body needed create awareness and educate the supply chain



Reverse our unintentional damage to the environment



Bio-stimulants going forwards must have a clear ROI (environment, climate, quality and yield)





IMPACT



REDUCE



QUALITY



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