



GLOBAL LEADER IN PLANT & SOIL HEALTH

**FBS TECHNOLOGIES HAVE THE POWER TO DECREASE  
AGRICULTURAL GREENHOUSE GAS EMISSIONS BY 37%**

## CLIMATE IMPACT REPORT



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A photograph of a person's arm and hand holding a stalk of wheat in a field. The person is wearing a green and white plaid shirt and a dark jacket. The background is a blurred field of wheat under a bright sky.

# EXECUTIVE SUMMARY

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## EXECUTIVE SUMMARY

### Purpose & Background

Global greenhouse gas (GHG) emissions are rising rapidly, causing temperatures to increase, accelerating climate-related disasters, and bringing the planet closer to irreversible damage. Climate change is also placing extraordinary stress on the agricultural sector. Climate change directly impacts agricultural productivity by disrupting food availability, increasing supply chain instability, and damaging crops through extreme weather conditions. Agricultural activities also use a significant portion of our planet's precious resources accounting for approximately 34% of land use, 70% of water use, and driving over

30% of global GHG emissions. Consequentially, agriculture is the sector that has the most significant near-term potential to mitigate GHG emissions. Sector participants must improve crop yield and quality while also addressing climate adaptation and mitigation. The answer lies with agricultural biologicals.

This FBSciences Climate Impact Report qualifies and quantifies the powerful climate adaptation and climate mitigation benefits of agricultural biologicals, specifically, FBS Technologies. As a global leader in agricultural biologicals, FBSciences has invested 15 years and tens of millions of dollars into research

proving their proprietary biological technologies, products, and crop programs improve plant health, soil health, and climate health. Our extensive research draws on over \$100 million of global commercial success. It encompasses over 1500 independent and university trials on over 50 crops across six continents, covering various growing conditions. As a result, FBS Technologies, and agricultural biologicals more broadly, have an enormous opportunity for mainstream adoption as both practical adaption tools in the face of increasing climate challenges and essential mitigation tools to reduce GHG emissions and reverse the harmful effects of climate change.

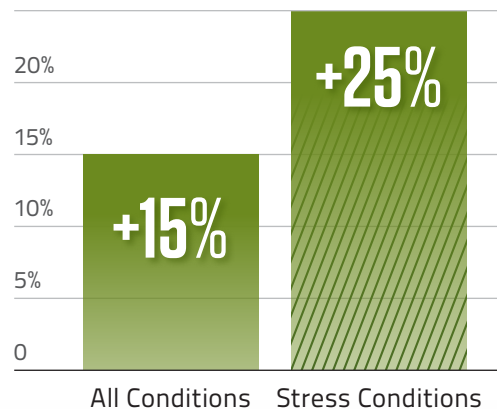
### Results & Impact

#### CLIMATE ADAPTATION

As our climate continues to change, so do the challenges farmers face in the field. These challenges include unpredictable changes in temperature, precipitation, wind, new pests, diseases, and weeds. Climate adaptation is adjusting to these damaging effects of climate change.

FBS Technologies build plants that can better withstand and adapt to climate change. Plants treated with FBS Technologies have shown 10-15% larger roots, providing better access to water and nutrients, and greater photosynthesis that subsequently increases vigor and yield. Healthier plants are better able to withstand and recover from abiotic and biotic stresses. In fact, FBS Technologies perform the best in stress conditions like drought, cold, heat, excess rain, salt, and pest and disease pressure. The average yield increase for FBS Technologies across all crops in all conditions is 15%. However, when crops are experiencing stress, the average yield increase is 25%.

#### ACCELERATED YIELD INCREASE IN STRESS CONDITIONS





## EXECUTIVE SUMMARY

# Results & Impact

### CLIMATE MITIGATION

FBS Technologies have proven the potential to reduce global agricultural GHG emissions by more than one-third (37%). In fact, if FBS technologies were applied to all corn, soy and wheat crops, it could reduce global agricultural GHG emissions by more than one-third (37%). This reduction represents over 2,140 MMtCO<sub>2</sub>e emissions avoided annually or 1.2 MtCO<sub>2</sub>e per acre (3.0 MtCO<sub>2</sub>e per hectare), equivalent to four months of every year with zero agricultural emissions.



### N<sub>2</sub>O EMISSIONS

Though nitrous oxide (N<sub>2</sub>O) represents less than 10% of global GHG emissions, it is 300 times worse than carbon dioxide (CO<sub>2</sub>) in its warming effects. Thus, even a slight reduction in N<sub>2</sub>O has a significant impact. Agricultural activities produce three-quarters of N<sub>2</sub>O emissions. Only half of applied nitrogen (N) fertilizer is taken up and used by the plant, leaving N in the soil to be leached away or off-gassed into the atmosphere. By improving N efficiency and utilization, the agriculture industry can take the lead in solving this problem.

The only thing preventing us from realizing these benefits now is the rate of adoption of biologicals, specifically products like FBS Technologies. FBS Technologies improve nitrogen use efficiency (NUE) by 33%, which leads to a 32% reduction in N<sub>2</sub>O emissions. Reducing N<sub>2</sub>O emissions by 32% from every acre of global cereal grain crops (46% of cropland) would effectively reduce annual GHG emissions from agriculture by 4%.



### CO<sub>2</sub> EMISSIONS

Carbon dioxide (CO<sub>2</sub>) emissions are the largest and most well understood, accounting for 80% of total GHG emissions. We cannot underestimate the problem of CO<sub>2</sub> emissions. They represent a massive, intractable problem and one that we are running short on time to solve. A central tenant of reducing agricultural GHG emissions is the foundation that plants must be grown with more above-ground and below-ground biomass, which can capture and hold organic carbon for hundreds of years, and this begins with soil health.

FBS Technologies build soils that can better sequester carbon by increasing above-ground biomass by 8%, below-ground biomass by 15%, and root exudate production by 14%. These three components cumulatively increase soil carbon by 10% and lead to a 10% reduction in CO<sub>2</sub> emissions. That is equivalent to reducing average annual global agricultural emissions by 33%.

**N<sub>2</sub>O is 300 times worse than CO<sub>2</sub> in its climate warming effects**





# AGRICULTURAL BIOLOGICALS OVERVIEW





# AGRICULTURAL BIOLOGICALS OVERVIEW

Agricultural biologicals are a diverse group of products derived from naturally occurring microorganisms or microbes, plant extracts, beneficial insects, or other naturally occurring materials or organic matter. Little-known or understood just ten years ago, biologicals are among the fastest-growing agricultural inputs, with the global market size expected to grow from approximately US\$10 billion today to US\$24 billion by 2027.

## AGRICULTURAL BIOLOGICALS FALL INTO THREE MAIN CATEGORIES

01

### BIOSTIMULANTS

USED PRIMARILY FOR PLANT  
GROWTH ENHANCEMENT

02

### BIOPESTICIDES

MAINLY USED FOR PLANT  
PROTECTION OR BIOCONTROL

03

### BIOFERTILIZERS

USED PRIMARILY FOR  
PLANT NUTRITION

## Drivers of Growth & Adoption

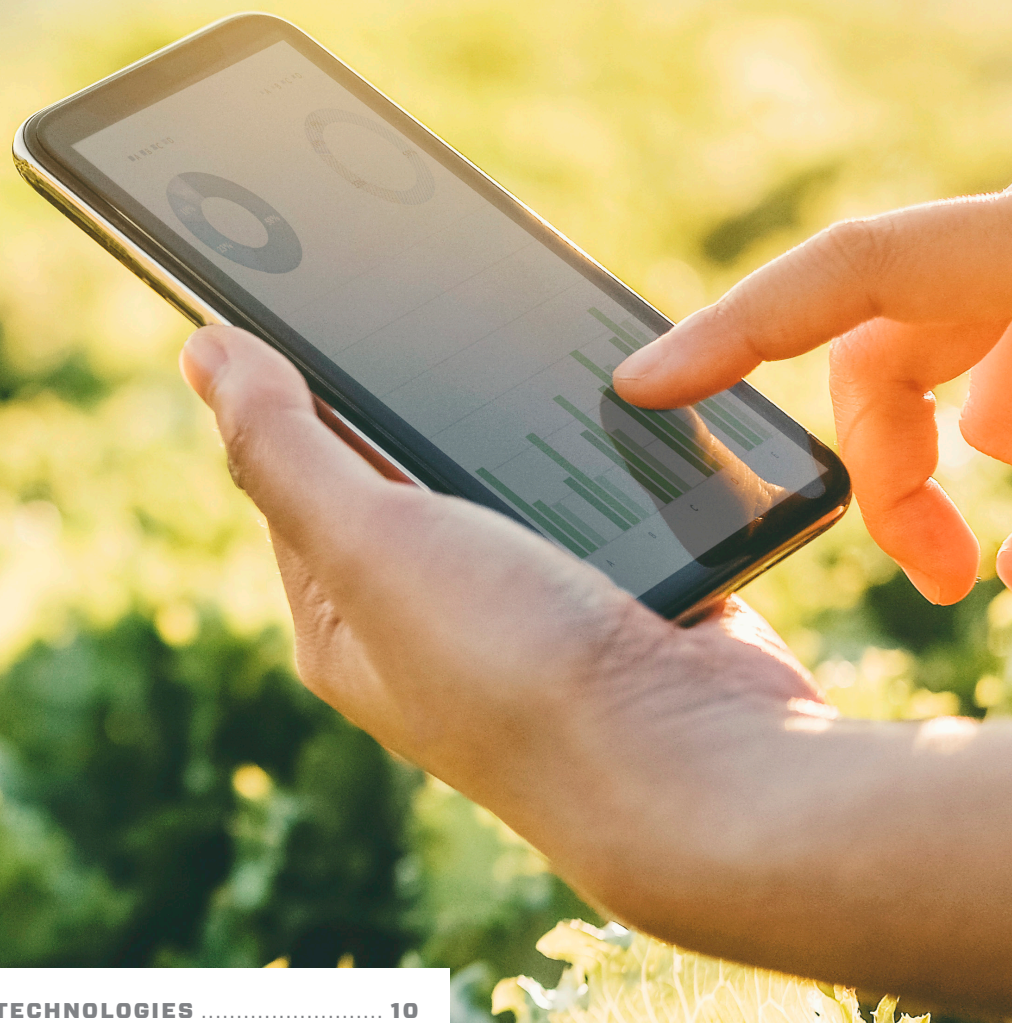
Various macro factors, including the necessity for innovations to meet the food needs of a growing world population, increasing consumer interest in organic products, weed, and insect resistance to chemicals used in agriculture, exploding demand for agricultural sustainability, and concerns about the impacts of current agricultural practices are driving the growth of agricultural biologicals.

Agricultural biologicals are seeing increasing adoption because of their comprehensive benefits to both productivity and sustainability. Today, growers worldwide use biologicals to increase plant health, drive yield, help mitigate stress, and provide a host of other benefits while lowering the environmental impact of conventional agriculture by improving the efficiency of crop growth and utilization of traditional fertilizers and pesticides.

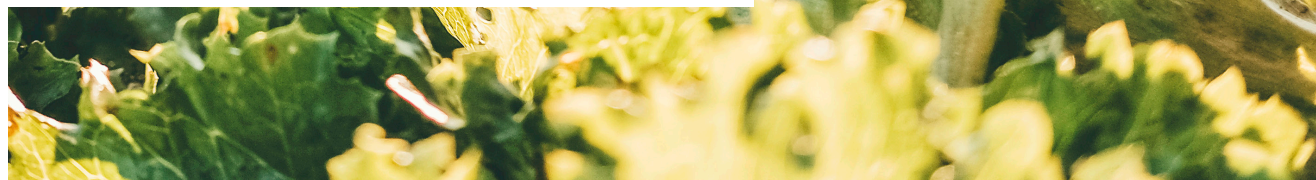




# FBSCIENCES & FBS TECHNOLOGIES



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# FBSCIENCES & FBS TECHNOLOGIES



## GLOBAL LEADERS IN PLANT & SOIL HEALTH

FBSciences is a global leader in the discovery and commercialization of agricultural biologicals that form the foundation of a comprehensive lineup of plant and soil health products and solutions. Our purpose is to harness the power of nature to transform global agriculture and food production sustainably.



## CLIMATE SMART & SUSTAINABLE

FBSciences produces natural, sustainable technologies from renewable sources that help preserve land and water. Our technologies and products provide powerful climate adaptation benefits and transformative climate mitigation solutions to reduce global GHG emissions.



## ROBUST TECHNOLOGIES & IP PLATFORM

FBSciences has a powerful lineup of proprietary technologies used to produce highly compatible, conventional and organic biostimulants, biopesticides, and fertilizers for seed, soil, and foliar applications on every managed acre globally. A robust patent and trademark portfolio protects our technologies, and registrations are in place in most major international markets.



## 15 YEARS OF SUPERIOR PERFORMANCE

FBSciences has invested millions of dollars into research and innovation to prove our solutions significantly improve plant health, soil health, and climate health. Powerful and consistent yield enhancements with an average increase of 15% globally across all crops have been observed. Other benefits include healthier plants with increased quality and nutrient density and improved tolerance to and recovery from abiotic and biotic stresses.



## DRIVEN BY SCIENCE

Our industry-leading team of scientists is significantly advancing the understanding and control of naturally derived technologies. Our unique approach balances the chemistry of our technologies with plant biology and our production processes. We have made advances necessary to achieve a degree of quality control that has never before been seen for products derived from natural sources.



## RAPID SUSTAINABLE GROWTH

Strong growth and expansion with over 30% compounded annual growth over the past several years with similar growth rates expected well into the future as we rapidly expand our global footprint.



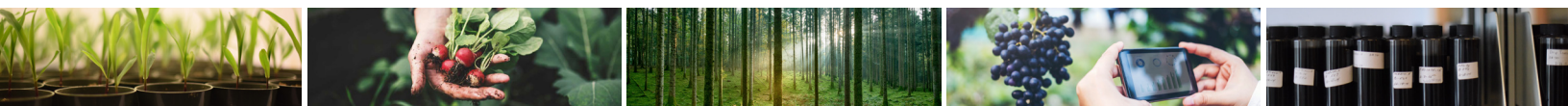
## FBSCIENCES & FBS TECHNOLOGIES

# Understanding FBS Technologies



### NATURAL ORGANIC MATTER (NOM)

FBS Technologies are diverse mixtures of thousands of unique organic compounds derived from natural organic matter (NOM) in the environment (e.g., soil, water, sediment, peats, coals, etc.). NOM forms primarily from the microbial degradation of plant matter and exists at varying concentrations depending on the source. Every product derived from NOM is unique because no two sources of NOM are identical. Each source can have tens of thousands of individual organic compounds. The precise properties and chemical composition of any given NOM depend on both the source matter and the specific extraction conditions. The NOM that forms the basis of FBS Technologies comes from young, unique soil and vegetation environments derived mainly from decaying plant debris from generations of plants adapting to a harsh climate. Our scientists lead the field in characterizing and understanding NOM, and this expertise and knowledge are at the core of everything we do.



### PROPRIETARY PRODUCTION PROCESSES

The effectiveness of FBS Technologies comes from more than the source material. Our proprietary production processes play a prominent role in determining the unique properties of our technologies. The organic material in the source can vary depending on the time of year and the environmental conditions. Still, the production methods and inputs used to capture the targeted components and concentrate them impact the composition of the final product and minimize its variability. Subsets of compounds within FBS Technologies lead to desired plant responses, and different subsets produce different responses. From our advanced research, we know which types of compounds elicit which responses, allowing us to optimize the proper ratios of the various components required for each production batch to generate specific plant responses. While adhering to the highest quality standards, our leading team of scientists and engineers target, extract, refine, and concentrate the most biologically active compounds.



### MODES OF ACTION & GENETIC EXPRESSION

There is no single, easily identifiable mode of action (MOA) for FBS Technologies. This is in part because FBS Technologies consist of thousands of interdependent, synergistic compounds. Mode of action is a sequence of key events and processes that occur in response to applying a product responsible for the physiological outcome. Essentially, the mode of action explains how the product produces the intended effect. Our research has shown that the various compounds in FBS Technologies elicit different plant responses. The various compounds work together to deliver predictable and repeatable benefits, not the individual components. All of the compounds in the proper ratios lead to the performance of the FBS Technologies.

FBS Technologies influence genetic expression, which helps the plant focus on the vital processes required throughout the growth cycle. FBS Technologies do not change genes; they change how the genes are expressed (what it does, when it does it, and how much it does it). FBS Technologies send a message to the plant to use its genetic code and available resources more efficiently for crop production. The changes improve growth, water and nutrient use efficiency, and help the plant deal with stress better. FBS Technologies allow the plant to reduce non-critical activities and apply its resources to the most critical process. For example, the need to develop a robust and efficient root system is predominantly in the early vegetative stage of the crop. By late vegetative and reproductive stages, the crop's energy focuses on reproduction. When the plant is under drought stress, FBS Technologies help slow the transpiration rate (water leaving the plant via evaporation), allowing the plant to use water more efficiently. The essential processes are dependent on the growth stage.



## FBSCIENCES & FBS TECHNOLOGIES

# Distinct Advantages Over Other Biologicals

FBS Technologies provide distinct advantages over other agricultural biologicals. While other technologies offer some characteristics, features, or benefits, no biological technologies provide the exact scope of features, benefits, and consistent performance as FBS Technologies and our product lines.



### HIGHLY CONSISTENT

FBS Technologies have incredibly consistent results, with a greater than 85% success rate observed in over 1500 independent trials. Superior consistency in performance stems from the advanced science utilized in developing the technologies paired with rigorous quality control parameters employed during production.



### LOWER USE RATES

FBS Technologies have lower use rates than many biologicals and other agricultural inputs allowing them to be easily incorporated into various cropping systems. We are working with ounces per acre versus gallons or tons per acre.



### HIGH BIOACTIVITY

A higher unit of activity, meaning the products are more bioactive, is consistently observed at low application rates.



### HIGHLY COMPATIBLE

FBS Technologies exhibit excellent compatibility and product stability, allowing them to be easily formulated into different end-use formulations.



### HIGHLY SYNERGISTIC

We have found complementary and often synergistic performance when FBS Technologies combine with other biologicals or crop inputs. In some cases, these synergies will support up to a 50% reduction in the application rate of the other input with no loss in performance.



### LONG & STABLE SHELF LIFE

FBS Technologies have a very long shelf life, especially by industry standards. Therefore, we err on the conservative side and say that FBS Technologies have 7-10 years of storage life. Still, we have yet to find the technologies unusable due to age.





# CLIMATE CHANGE & AGRICULTURE



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## CLIMATE CHANGE & AGRICULTURE

# Climate Change. Unprecedented Challenges.

Climate change is perhaps the single biggest challenge of our times. The earth is warmer than it's been in 125,000 years and temperatures continue to rise at an unprecedented pace. In 2019, atmospheric carbon dioxide (CO<sub>2</sub>) concentrations reached the highest levels in at least 2 million years. From 1980 to 2019, the global monthly average concentrations of CO<sub>2</sub> have risen from around 339 parts per million to 410 parts per million, increasing more than 20% in fewer than 40 years. The three leading greenhouse gases (GHG) – CO<sub>2</sub>, methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) are the most significant contributors to climate change, accounting for 97% of GHG emissions. All are exploding in growth, setting records for atmospheric concentrations in 2020 and again in 2021.

Climate change results from increasing amounts of GHG that get trapped in the earth's atmosphere and warm the planet. This increase in temperature has wreaked havoc on our climate. As a result, precipitation patterns have shifted worldwide, and the shifts will intensify over the coming years. Climate scientists have recorded an unprecedented surge in climate-related disasters, including devastating floods, crippling droughts, and catastrophic fires. As climate change worsens, dangerous weather events become more frequent or severe, destroying people's livelihoods and communities.

Without global cooperation and commitments from groups and industries to make meaningful changes to reverse the course, we will continue to escalate risks to stability with far-reaching consequences for human health, food security, and global well-being. The assessment from the United Nations' (UN's) Intergovernmental Panel on Climate Change (IPCC) says conditions are poised to get worse if GHG emissions continue, stating that "the future of the planet depends, in large part, on the choices that humanity makes today."

## A TRANSFORMATIVE OPPORTUNITY

Climate change amplifies existing pressures on the agricultural sector directly tied to crop productivity and food security, creating many new climate challenges. There is an urgent need to mitigate GHG emissions as it has become increasingly clear that there is an interdependent link between plant health, soil health, and climate health. It is vital to all three that sector participants broadly adopt sustainable technologies and production practices without sacrificing gains in yield and productivity as the industry struggles to keep up with the demands of a growing population. Because the global food production system is the largest contributor to GHG emissions, emission-reducing innovations in agriculture are incredibly impactful. Agricultural land has the potential to be a large carbon sink, sequestering carbon in the soil and removing it from Earth's atmosphere. Increases in water use efficiency in agriculture would result in more precise use of increasingly scarce water resources. Sustainable agricultural practices also result in a food production system that is more resilient, leading to more stable global food systems with fewer disruptions. Climate-smart agricultural practices can also increase productivity and yield while improving ROI for growers, leading to the widespread adoption of more effective climate change solutions. By making climate-smart changes to our agriculture and food production systems, we can not only slow climate change and its effects but also heal the climate and our planet.

## CLIMATE CHANGE & AGRICULTURE

# Nitrous Oxide: The Agriculture GHG Emission



Considered the agricultural GHG emission, at under 10%, nitrous oxide ( $\text{N}_2\text{O}$ ) is a relatively small percentage of GHG emissions compared to roughly 76% for  $\text{CO}_2$ . However, it is approximately 300 times more potent at absorbing radiation and capturing heat. Therefore, we cannot ignore its deadly and destructive impact. On the more hopeful note, once released into the atmosphere,  $\text{N}_2\text{O}$  emissions last 100 years versus up to 1000 for  $\text{CO}_2$ , so reductions can also have a more near-term impact on positive climate mitigation efforts. Agriculture accounts for about three-quarters of global  $\text{N}_2\text{O}$  emissions. Although  $\text{N}_2\text{O}$  emissions have seen a significant increase in the past two decades, little is being done to rein it in as agricultural production is directly tied to food security.

Direct emissions come from fertilized agricultural soils and livestock manure (42%), while indirect emissions come from runoff and leaching of fertilizers (25%). Indirect emissions also cause eutrophication, a phenomenon resulting from high levels of nitrogen (N) and phosphorus (P) runoff from land into water, causing overgrowth of plant life and starving other animal life from oxygen. When farmers add N fertilizer to their soil to help stimulate plant growth, about half gets taken up by the plant, and the rest is washed away in groundwater or off-gassed as  $\text{N}_2\text{O}$  or other gases. If the amount of N applied is more than the crop needs, the excess converts into  $\text{N}_2\text{O}$  at an accelerated rate. Both dire situations -- emissions that cause climate change and pollute waterways -- underline the importance of improving fertilizer efficiency to any climate-smart practice in agriculture.

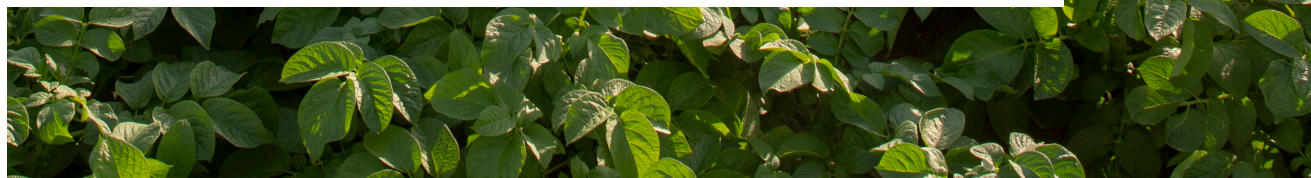
While N management is critical for climate change and other environmental impacts, it is also quite complicated. Increased N availability has made it possible to produce a lot more food. However, agriculture faces a challenge to meet the needs of a growing global population. Farmers must meet increasing yield demands, and to do so requires fertilizer, especially N fertilizer. For the past 40 years, efforts have been underway to improve productivity and efficiency to reduce the amount of fertilizer needed to produce food and fiber. Innovations have helped reduce the amount of fertilizer required to produce various crops, including no-till, better application methods, timely applications, placement of fertilizers, and advances in crop breeding to make crops more productive and less susceptible to both biotic and abiotic stresses. However, we cannot solve tomorrow's problems with yesterday's solutions. Over the last decade, the progress seen in the first 30 years has slowed. The challenge is finding and applying new technologies that will accelerate nutrient use efficiency in concrete, measurable ways while feeding a world with increasing demand for food.



# FBS TECHNOLOGIES: CLIMATE ADAPTATION



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## FBS TECHNOLOGIES: CLIMATE ADAPTATION



The first of two methods of response to the challenges posed by climate change is climate adaptation. Increasingly, climate change impacts, including drought, extreme weather events, and increased pests, will severely affect the quantity and quality of crop production. Climate adaptation is adjusting to the damaging effects of climate change already in the pipeline or environment. There is well-established evidence that agricultural biologicals can and should play a significant role in adapting commercial agriculture to those impacts.

FBS Technologies have a significant impact on climate adaptation and provide other co-benefits that have been well-researched and documented by independent trials, as well as years of commercial use on farms across the world, including abiotic stress mitigation & recovery, biotic stress mitigation and recovery, increased crop yield, improved water use efficiency, and greater nutrient density.

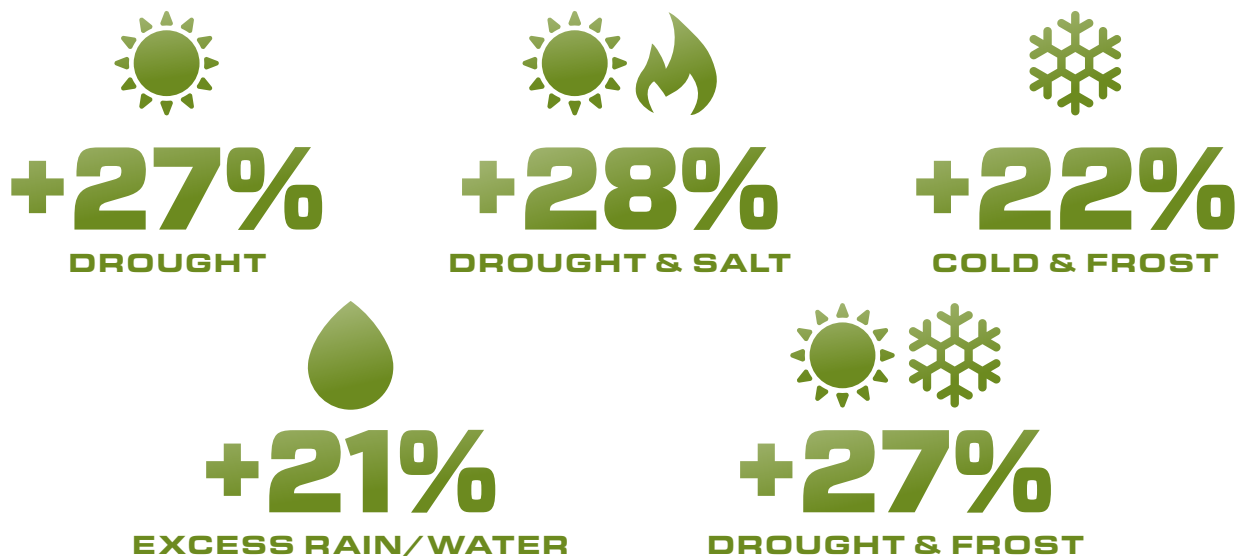


## ABIOTIC STRESS MITIGATION & RECOVERY

Abiotic stress is the negative effect of non-living environmental issues, such as extreme temperatures (low and high), excessive or deficient rainfall, water quality, and wind on crop production and yield. Global climate change will negatively impact crop yield through continued greenhouse gas (GHG) emissions leading to a further rise in temperatures causing heat and drought stress, soil salinity, and other abiotic stresses. Abiotic stress is the most significant factor impacting the growth and productivity of crops worldwide especially when stresses occur in combination. New tools will be required to help mitigate the impact of increased abiotic stress.

Through hundreds of independent and university trials, FBS Technologies have demonstrated that they mitigate stress from many factors, including drought, heat, salinity, and cold, significantly advancing crop production in the face of changes caused by climate change. FBS Technologies speed up germination, increase total germination, delay wilting, promote quicker recovery from stress, reduce biomass loss, reduce toxicity and burn from fertilizers, and produce overall healthier plants.

### AVERAGE YIELD INCREASE IN HIGH STRESS CONDITIONS





## FBS TECHNOLOGIES: CLIMATE ADAPTATION

### Biotic Stress Mitigation & Recovery

According to the Food and Agriculture Organization (FAO) of the UN, plant pests and diseases account for up to 40% of the loss of food crops. Climate change is one factor driving the spread of pests and diseases, along with increasing global trade. Climate change can affect the population size, survival rate, and geographical distribution of pests and the intensity, development, and geographical distribution of diseases.

Over the past 70 years, there have been tremendous advancements in pest control and crop productivity; however, there have been toxicity and environmental impacts that have seen many products removed from the market. We need to urgently search for new ways to control pests and minimize biotic stress that is environmentally safe and non-toxic while maintaining productivity and a secure food system.

FBS Technologies are derived from natural organic matter (NOM) and provide softer chemistries to combat biotic stress. Testing and trials demonstrate pesticidal activity, including control of nematodes, insects, and diseases. When used with other pest control products, they often increase pesticidal activity and efficacy, which in many cases allows for lower use rates.



# -44%

**POWDERY MILDEW  
REDUCTION**



# -42%

**REDUCTION IN  
NEMATODES**



#### NEMATODE CONTROL

- Reduced root damage, reduced nematode population in soil and roots, synergistic effects with standard commercial nematode products. Controls citrus, lesion, reniform, root-knot, soybean cyst, spiral, sting, stubby, and stunt nematodes.



#### INSECT CONTROL

- Control of sucking and piercing insects, enhanced systemic activity and improved efficacy, synergistic effects with common commercial insecticide products. Controls thrips, aphids, potato psyllid, mites, whiteflies, wireworms, inchworm, velvet bean caterpillar, South American bollworm, and beet armyworms.



#### DISEASE CONTROL

- Systemic performance with soil and seed applications able to control foliar diseases and foliar applications affect soil diseases, synergistic effects with standard commercial fungicide products.
- Controls Rhizoctonia, Pythium, powdery mildew, downy mildew, Phytophthora, purple blotch, frog-eye leaf spot, target spot, and anthracnose.



#### WEED CONTROL

- Enhanced systemic activity and improved efficacy, synergistic effects with common commercial herbicide products.



## FBS TECHNOLOGIES: CLIMATE ADAPTATION

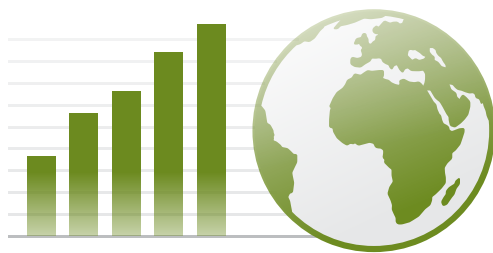
# Increasing Overall Plant Health & Crop Yields

FBS Technologies increase the uptake and internal movement and translocation of applied nutrients and those already present in the soil, reducing tie-ups and making nutrients more mobile and bioavailable to the plant. Impactful and consistent benefits include:

- **Accelerates germination, seedling establishment, and plant to plant uniformity.**
- **Increases number, length, and total surface area of roots.**
- **Increases chlorophyll density.**

FBS Technologies also influence the rhizosphere, which is the part of the soil near the roots where the root directly affects soil chemistry and biology. The plant exudes organic acids, alcohols, amino acids, etc., into the soil to favor growth. FBS Technologies significantly increase root exudates, allowing the plant to extract nutrients from the soil that were previously unavailable. Larger and more robust root systems are the most common response observed, enabling the plant to reach more water and nutrients during crucial growth periods.

All of these effects combined lead to healthier, more productive plants, which leads to dependable increases in crop yield and quality.



**+15%**  
**AVERAGE GLOBAL  
YIELD INCREASE**





## FBS TECHNOLOGIES: CLIMATE ADAPTATION

### Water Use Efficiency

If water use efficiency (WUE) is defined as the ratio of the amount of water applied to the field either by irrigation or rainfall to the quantity of plant biomass produced, optimizing WUE must be considered as a means to adapt to climate-change driven conditions. The cropping system designed to access more water from the soil before it is lost to either leaching or soil evapotranspiration will create greater plant biomass. Where does WUE begin? Physiologically, it starts in the leaf, with the creation of stomates. When a stomate is created, a root hair is created; thus, a vigorously growing young plant producing large leaves will make a vigorously growing root system, thereby developing a higher WUE. In contrast, plants that struggle to produce leaves and canopies will have a considerably lower WUE.

FBS Technologies help improve WUE, thus creating a cropping system that can effectively harvest more water, creating greater crop biomass and sequestering more carbon.



# +17%

**DEEPER ROOTS**

**HARVEST WATER FROM THE SOIL**

#### FBS TECHNOLOGIES IMPACT CROP WUE FROM THE VERY ONSET OF THE CROP CYCLE BY:

- Enhancing germination and early stand establishments, creating a crop that maximizes leaf, stomate, and root growth immediately upon emergence.
- Improving stomatal creation and function throughout the entire crop cycle, consequently increasing CO<sub>2</sub> uptake and chlorophyll production, which increases photosynthesis, creating more energy for continued expansion of a vigorous leaf and root system.
- Directly influencing root growth and nutrient uptake, thus sustaining a productive growth cycle.
- Reducing the loss of water during abiotic stresses allows the crop to use plant water for photosynthesis and maintains optimum plant biomass during stress conditions.



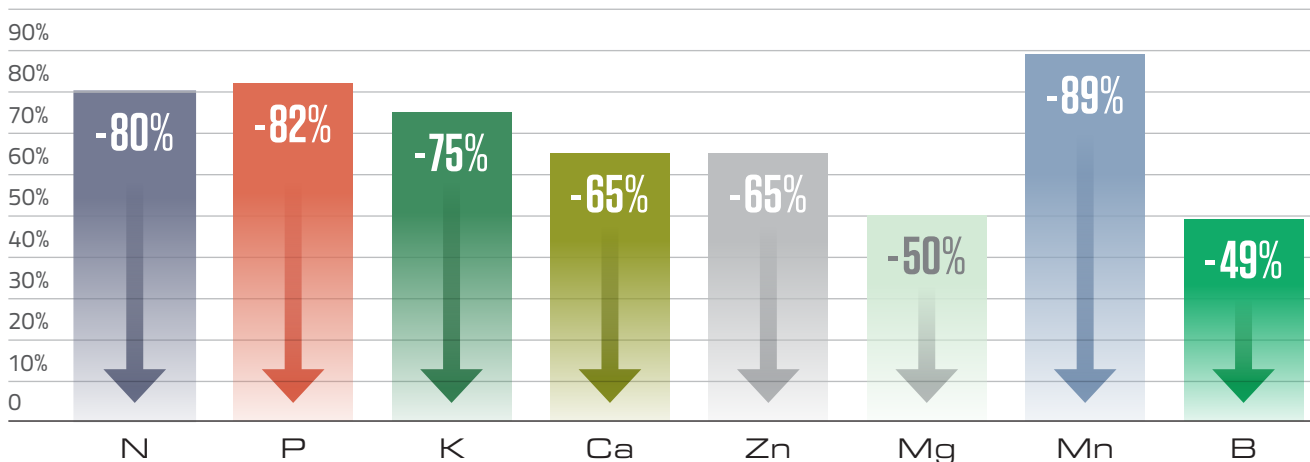


## FBS TECHNOLOGIES: CLIMATE ADAPTATION

### Increasing Nutrient Density

Over the last 75 years, nutrient density in the food we eat has decreased by an average of 30%. These changes are attributed to a decline in soil nutrient density, driven by agricultural practices designed to improve traits other than nutrition, such as size, growth rate, and pest resistance. One of the most pressing challenges for agriculture is consumer demand for higher quality food that is more nutrient dense, and tastes better, with increased transparency about how it is produced.

#### NUTRIENT DECLINE IN FOOD SINCE 1950



FBS Technologies directly promote the uptake and movement of nutrients into the plant, directing them to the growing points to improve the nutrient density of fruiting bodies.

Studies show that plants treated with FBS Technologies have increased mobility of these nutrients from leaves to other plant parts, including growing points, roots, and fruit. These studies also confirm that FBS Technologies enhance the mobility of many classic, non-phloem mobile nutrients like calcium (Ca), zinc (Zn), boron (B), manganese (Mn), iron (Fe), and copper (Cu).

The result is a healthier plant that moves more nutrients into the fruiting bodies, decreases incidences of fruit disorders, improves return on investment for the grower due to more even maturity, and produces larger, more consistent fruit size with better color. Studies also confirm a significant improvement in quality parameters like Brix, protein, starch, soluble solids, and relative feed value.



# +27%

**AVERAGE INCREASE OF  
NUTRIENTS IN FRUIT**





## FBS TECHNOLOGIES: CLIMATE ADAPTATION

### Synergies with Other Crop Inputs

FBS Technologies are highly synergistic with other agricultural inputs and products (i.e., fungicides, herbicides, insecticides, biostimulants, and fertilizers).

There are two approaches to utilize this synergism for the benefit of the environment. First, FBS Technologies support the uptake and mobility of nutrients from other products, which leads to more efficient use of these products, resulting in less runoff and leaching. This efficiency is particularly impactful with nitrogen fertilizers and pesticides, which have a known environmental impact.

Second, increased nutrient use efficiency reduces the necessary amount of applied fertilizer or pesticide to achieve the same crop yield or disease control. We have found complementary performance when FBS Technologies are combined with other inputs, supporting in some cases a 50% reduction in the application rate of other inputs with no loss in performance. This means the same performance/results can be achieved with a lower application rate of other products.







# FBS TECHNOLOGIES: CLIMATE MITIGATION

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## FBS TECHNOLOGIES: CLIMATE MITIGATION

# Reducing Ag GHG Emissions by 37%

Increasingly, the focus on addressing climate change has shifted toward climate mitigation – reducing and stabilizing the level of heat-trapping greenhouse gases (GHG) in the atmosphere. This method takes a proactive approach to climate change, aiming to heal the planet by reducing GHG emissions while still meeting food production requirements.

## REDUCING N<sub>2</sub>O EMISSIONS BY 32%

Nitrous oxide (N<sub>2</sub>O) is the third most prevalent GHG, but it is 300 times as potent as carbon dioxide (CO<sub>2</sub>) in heating our atmosphere. Consequently, it plays a significant and accelerating role in harming and altering the climate. Furthermore, the overwhelming majority of N<sub>2</sub>O emissions (78%) come from agriculture practices, and therefore the agriculture industry must play the leading role in delivering solutions for

reducing N<sub>2</sub>O emissions.

FBSciences has done extensive work in nitrogen (N) management and has proven the potential to reduce dangerous N<sub>2</sub>O emissions by 32% with their technologies through increasing nitrogen use efficiency (NUE). This reduction is equivalent to lowering global annual agricultural GHGs emissions by 4%.





## FBS TECHNOLOGIES: CLIMATE MITIGATION

# Increasing Nitrogen Use Efficiency

Increasing nitrogen use efficiency (NUE) represents an effective solution in reducing GHG emissions. However, the inefficiency of N has produced devastating long-term consequences for the environment, as outlined in the Climate and Agriculture section. Increased NUE reduces  $N_2O$  emissions because the crop utilizes more of the applied N and is consequently not available for loss into the environment. Therefore, the critical economic and environmental challenge is to achieve maximum N availability when crops need it to maximize yield while at the same time eliminating or minimizing loss of N to the environment.

### SIGNIFICANTLY IMPROVING NUE COMES DOWN TO TWO MAIN OBJECTIVES

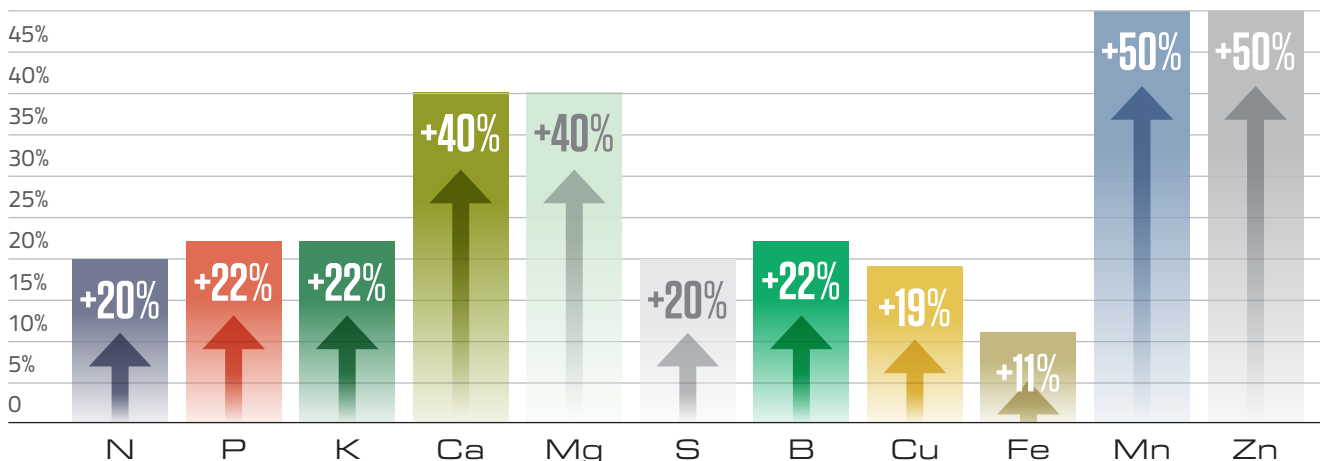
#### 1 INCREASING PLANT UPTAKE OF BOTH RESIDUAL & APPLIED N

#### 2 ASSIMILATING N INTO A PLANT-USABLE FORM

A strategy to maximize root growth and optimize root functionality throughout the growing season must be in place to accomplish the first objective. The core agronomic and horticultural benefit from the application of FBS Technologies is the creation of an extensive and productive root system. FBSciences research has proven that when applied at the beginning of the crop's life cycle, FBS Technologies significantly increase the size and productivity of the crop's root system by 10-15%. This increase is the foundation for improving NUE as a more extensive and productive root system will absorb more residual and applied N, thus building a plant that can increase NUE and decrease  $N_2O$  emissions.

Increasing plant uptake of N is step one in increasing NUE. Once nitrates are in the plant, the plant must assimilate them to a useable form that can be converted into crop yield and thus economic yield. The assimilation is a two-step enzymatic process that requires potassium (K), sulfur (S), molybdenum (Mo), and iron (Fe). The optimized root system described above is also part of achieving this point. The FBSciences-optimized root system increases the uptake of the four mentioned nutrients by 20-50% to support this process. However, there is another factor that comes into play. The movement of these nutrients within the plant is also vital in converting N to yield. As previously discussed in the Modes of Action and Genetic Expression section, our genetic expression knowledge has shown that we promote the active movement of all essential nutrients within the plant. Nitrogen, like other nutrients, needs to be managed as part of a total crop production system and cannot be managed effectively in isolation. FBS Technologies improve the efficiency of more than just N. They increase the efficiency of all nutrients (macro, secondary, micro, and trace) in all forms by 11-50%.

### FBS TECHNOLOGIES PROVEN TO INCREASE NUTRIENT EFFICIENCY 11-50%





## FBS TECHNOLOGIES: CLIMATE MITIGATION

# Reducing Future N Applications through Soybean Rotation

One way to mitigate  $N_2O$  emissions is to adopt a cropping system that allows for no synthetic N applications on an alternating schedule. A grower can accomplish this by adding a soybean rotation to a corn, small grain, or cotton production plan. Soybeans are part of the legume family; legumes have the unique ability to extract N from the atmosphere for use in plant growth. This unique ability of legumes allows for very high economic yield production with very little or no additional synthetic N. The rotation of soybeans, or other agronomic legume crops provides a “rest season” from applied N, thus mitigating  $N_2O$  emissions. For instance, if we adopted a corn-corn-soybean rotation, we have potentially reduced our  $N_2O$  risk

from applied N by as much as 33% across those three years. An every-other-year corn-soybean rotation would potentially reduce emissions even more.

In addition to the lower  $N_2O$  emissions during the season with soybeans in the field, a properly managed soybean crop will provide significant levels of N nutrition to the crop that follows. Soil microbial activity breaks down soybean residue quickly, and soybean residue is a rich supply of N for the next crop. A soybean crop can supply 30 to 70 pounds of available N to the following crop, allowing a producer to plan for corn, wheat, cotton, or another non-legume crop with reduced N and still achieve high agronomic yields.

## FBS TECHNOLOGIES ENHANCE SOYBEAN AND LEGUME PRODUCTION IN THE FOLLOWING WAYS

- Enhances and supports vigorous and uniform germination and stand establishment.
- Creates a soybean crop that begins atmospheric N fixation at the earliest genetically determined growth stage. This helps build a crop with higher yield potential.
- Creates and maintains a healthy and productive nodulation system, thus creating more N.
- Enhances the soil microbiome leading to increased and productive nodulation.
- Creates more biomass by enhancing the crop's stomatal system and increasing the crop's ability to manage abiotic stresses, creating higher yield potential for the current year and N-rich residue for the following crop.





## FBS TECHNOLOGIES: CLIMATE MITIGATION

# Measuring the Impact: 32% Reduction in N<sub>2</sub>O Emissions

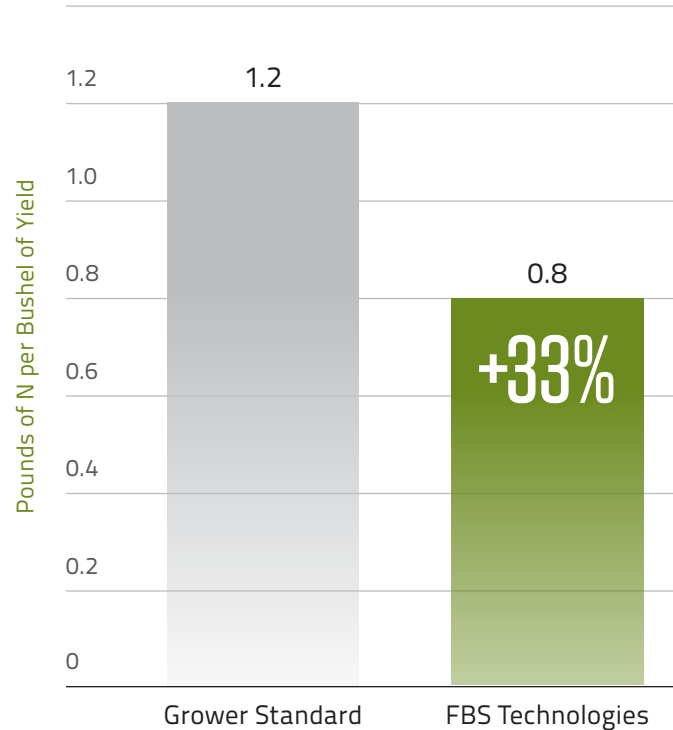
By increasing the plant uptake of N and supporting the conversion of N into a plant-usable form, FBS Technologies improve overall N efficiency by an average of 33% across all crops. The goal is not to necessarily reduce the amount of N applied but to maximize the efficiency so that more of each pound of N is taken up and used by the plant to produce yield, thereby leaving less N in the environment to become N<sub>2</sub>O.



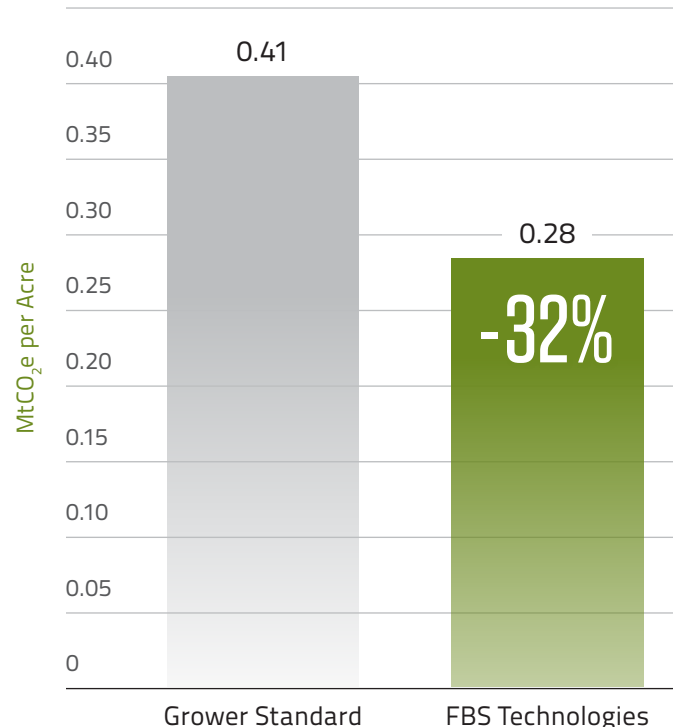
For example, looking at FBSciences' research on corn shows the potential to change from 1.20 pounds of N per bushel of yield (22 grams of N per kilogram of yield) to 0.80 pounds of N per bushel of yield (14 grams of N per kilogram of yield) which is an increase in efficiency of 33%. This improvement in N efficiency means the crop utilizes more N from the soil, leaving less available to volatilize or leach into the environment. By extrapolating this improvement to all global acres of cereal grains (46% of global cropland according to UNFAO), 218 MMtCO<sub>2</sub>e of annual agricultural GHGs (3.7%) can be mitigated. Thus, FBS Technologies can be a foundational part of a system allowing growers to manage N and increase NUE powerfully across any cropping system.

FBS Technologies increase soybean yield by 5%. Our research shows that FBS Technologies increase the number and size of nodules, particularly those on the plant's taproot, by 15%. More recent research has proven that nodule numbers are not as crucial to legume yield as nodule health. Based on this, we are turning our focus to increasing nodule health and productivity. It is important to note that we have not included the benefit from soybean yield and nodules in our calculations for reducing N<sub>2</sub>O emissions. While we believe our technologies produce a real advantage, we recognize that measuring and quantifying the direct effect on N<sub>2</sub>O emissions can be challenging. FBS Technologies can be a foundational part of a regenerative agronomic system that incorporates legumes and dramatically increases the farmer's ability to manage N across any cropping system and significantly reduce global GHG emissions.

### 33% INCREASE IN N EFFICIENCY



### 32% REDUCTION IN N<sub>2</sub>O EMISSIONS PER ACRE





## FBS TECHNOLOGIES: CLIMATE MITIGATION

# Reducing CO<sub>2</sub> Emissions by 10%

Carbon dioxide (CO<sub>2</sub>) emissions are the largest and most well understood, accounting for 80% of total GHG emissions. The problem of CO<sub>2</sub> emissions cannot be overstated. They represent a massive, intractable problem and one that we are running short on time to solve.

FBSciences has done extensive research on carbon and its connection between plant health, soil health, and climate health. Independent trials have proven the potential to increase soil carbon by 10% by increasing above-ground biomass, below-ground biomass, and root exudates. Increasing soil carbon has a direct connection to reducing global annual agricultural CO<sub>2</sub> emissions by 33%.





### Building Plants that Increase Roots, Shoots, & Soil Carbon

When plants grow, they remove CO<sub>2</sub> from the atmosphere to form sugars and release oxygen during photosynthesis. Once the plant dies, the roots and the crop residue on the surface immediately begin to decay and degrade, contributing organic carbon to the soil. Roots also contribute organic matter to the soil while the plant is alive through rhizodeposition, which is organic material released by the roots, including root exudates, sloughed cells, and mucilage. Most of the organic matter deposited into the soil from both roots and shoots will be converted to CO<sub>2</sub> and released into the atmosphere relatively quickly. However, a smaller portion will undergo further change and become a stable form of organic carbon longstanding for hundreds to thousands of years. Organic matter contributions from roots contribute to soil organic carbon (SOC) stabilization in the soil. Increasing rooting structures that can retain carbon for significant periods increases the soil's carbon-holding capacity, contributing directly to GHG reduction.

**FBS Technologies have demonstrated they contribute significantly to the stabilization & sequestration of SOC in the following ways:**

- Increasing chlorophyll production and photosynthetic rates, which removes more CO<sub>2</sub> from the atmosphere and produces sugars that feed the plant by optimizing stomatal creation and functionality and increasing the total leaf area of plants. The end result is an increased quantity of carbon sequestered within the biomass of trunks, stems, leaves, roots as well as within traditional commodities.
- Greater leaf area and stomatal function help increase the size and architecture of the root system to facilitate greater uptake of water and nutrients, increasing the amount of above-ground biomass, or organic matter returned to the soil.
- Increasing the biomass of root systems, including number, length, surface area, and volume, contributing to SOC stabilization by forming soil aggregates that make the SOC less accessible to microbial decomposition.
- Increasing the amount of rhizodeposition, which includes plant exudates, sloughed root cells, and mucilage.

**INCREASES  
SOIL CARBON**

**+10%**

**ABOVE-GROUND  
BIOMASS  
+8%**

**BELOW-GROUND  
BIOMASS  
+15%**

**ROOT EXUDATE  
PRODUCTION  
+14%**

**SEQUESTERING CARBON**



### Building Soils to Sequester Carbon

It is essential to think of carbon as an agronomic and horticulture product or commodity like wheat, corn, apples, almonds, etc. We need to develop a crop and field management system that optimizes the production of both the traditional product and carbon, building a cropping system that harvests atmospheric CO<sub>2</sub>, optimizes grain and fruit production, and sequesters higher amounts of carbon.

By combining FBS Technologies and formulating with other beneficial agronomic inputs, FBSciences has built a food and fiber production system that can farm for both traditional commodities (wheat, corn, apples, almonds, etc.) but also for the emerging carbon commodity. This allows us to see carbon as a new product, leverage our existing knowledge, gain new understanding, re-position old products, and create new ones to lead this new multi-product farming system.

The central tenant of reducing agricultural GHG emissions is the foundation that plants must be grown with more above-ground and below-ground biomass, which can capture and hold organic carbon for hundreds of years, and this begins with soil health. Soil health is a crucial part of the planet's health and critical in climate mitigation and adaptation.

A practical example of this would be FBSciences' CarbonBoost® soil health line which combines FBS Technologies with biological consortia to build healthier soils that create a living environment that maximizes the plant's potential and at the same time sequesters carbon by optimizing the soil environment. FBS Technologies increase root mass and density, but the addition of specific biological consortia dramatically improves soil health by lubricating the roots, improving the soil's water-holding capacity, and extending the roots' area of influence to four to six times larger.

By building healthier, more biodiverse soils with optimized microorganisms, improved water, and nutrient use efficiency, that grow bigger and healthier plants, we can increase carbon sequestration and decrease GHG emissions.





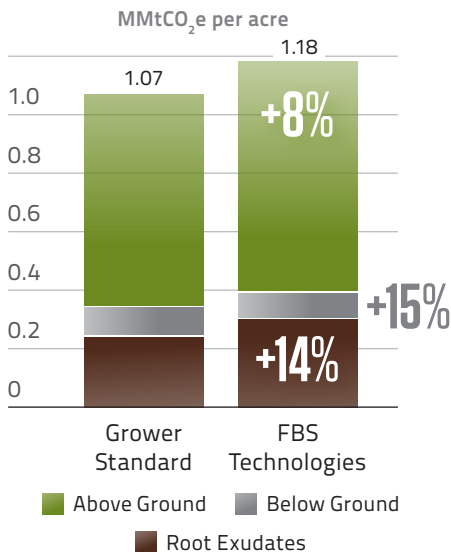
## FBS TECHNOLOGIES: CLIMATE MITIGATION

# Measuring the Impact: 10% Reduction in CO<sub>2</sub> Emissions

FBSciences' products drive greater soil health and carbon sequestration with an 8% increase in above-ground biomass, a 15% increase in below-ground biomass, and a 14% increase in root exudation. Soil organic carbon (SOC) plays a critical role in controlling GHG emissions from agriculture. It is the single largest terrestrial repository for carbon, so stabilizing and increasing the amount of SOC reduces CO<sub>2</sub> emissions into the atmosphere.

The plant's stomatal systems are the entry point for the acquisition of CO<sub>2</sub> into the plant, and thus stomates have a direct and positive impact on carbon sequestration. FBS Technologies impact the creation and functionality of the plant's stomatal system and increase overall above-ground biomass by 8%. By extrapolating this improvement to all global cereal grain acres (46% of global cropland), we can prevent 1,054 MMtCO<sub>2</sub>e GHG emissions (18%).

### 10% INCREASE IN CO<sub>2</sub> EMISSIONS MITIGATED



FBSciences research has demonstrated that crops treated with FBS Technologies develop larger, deeper, and more productive roots. Increasing below-ground biomass by 15% mitigates 198 MMtCO<sub>2</sub>e of annual agricultural GHG emissions (3%), assuming one application of FBS Technologies on each global acre of cereal grains.

Additionally, FBSciences' research has documented greater root exudates. Optimized and increased CO<sub>2</sub> harvesting produces a more significant above-ground and below-ground biomass that has a greater capacity to sequester carbon. Again, extrapolating to 46% of global cropland in cereal grains, increased root exudates from FBS Technologies can mitigate 670 MMtCO<sub>2</sub>e of annual agricultural GHGs (12%).

These three components cumulatively increase soil carbon by 10% and lead to a 10% reduction in CO<sub>2</sub> emissions. That is equivalent to reducing average annual global agricultural emissions by 33%.





## FBS TECHNOLOGIES: CLIMATE MITIGATION

# Reducing Global Agricultural GHG Emissions by 37%

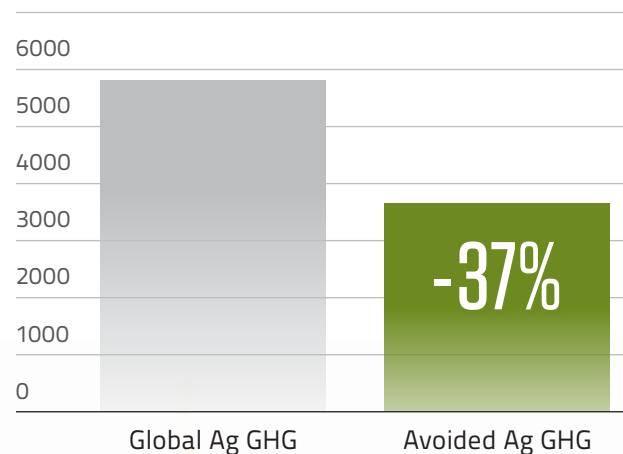
FBS Technologies have the potential to reduce global agricultural GHG emissions by 37%. This reduction represents over 2,141 MMtCO<sub>2</sub>e emissions avoided annually.

There are 1,789 million global acres (724 million hectares) of cereal grains, representing 46% of global cropland. A single application of FBS Technologies on each of these acres has a significant potential to reduce GHG emissions and positively impact overall climate health. Independent research and reasonable assumptions based on known N<sub>2</sub>O and CO<sub>2</sub> emissions metrics are the basis for these calculations. Integrating FBS Technologies into a comprehensive regenerative ag production program maximizes the impact agriculture can have on the environment's health.

FBS Technologies are immediate solutions that can be deployed to improve plant health, soil health, and climate health, providing economic and environmental benefits to farmers, agribusinesses, consumers, and the general population. If we adjust our assumptions to be more conservative to mirror the more immediate benefits of FBS Technologies more closely, there would be a 20% reduction of global agricultural GHG emissions. This comprises a 3% reduction in N<sub>2</sub>O emissions and an 18% reduction in CO<sub>2</sub> emissions.

### REDUCTION IN GLOBAL AG GHG EMISSIONS

MMtCO<sub>2</sub>e per acre





# CONCLUSIONS & FINDINGS



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## CONCLUSIONS & FINDINGS

# Impact on Climate Adaptation

In fields around the world, FBS Technologies have proven their impact on climate adaptation and their ability to provide other benefits, including increased crop yield, improved water use efficiency, and greater nutrient density for the foods grown.



### ABIOTIC STRESS MITIGATION & RECOVERY

- 21-28% yield increase despite drought, high-salt water, cold, frost, and excess rain
- Delayed wilting and faster recovery
- Faster germination in cold soils
- Protects against phytotoxicity or burn

### 15% AVERAGE GLOBAL YIELD INCREASE

- Over 1500 independent and university trials
- 53 different crops and six continents
- 15 years of proven trial data and commercial success
- Consistent delivery of improvements in plant health and ROI to the grower

### BIOTIC STRESS MITIGATION & RECOVERY

- Control of nematodes for multiple generations, reduced root damage, synergies with other nematicides
- Control of diseases, systemic performance, synergies with other fungicides
- Control of sucking and piercing insects, synergy with other insecticides
- Enhanced systemic activity and efficacy of herbicides

### IMPROVED WATER USE EFFICIENCY

- Enhanced germination maximizes leaf, stomate, and root growth
- Improved stomatal creation and function increases photosynthesis creating more energy for vigorous root growth
- Reducing loss of water during abiotic stress





## CONCLUSIONS & FINDINGS

# Impact on Climate Mitigation & Reducing GHG Emissions

### FBS TECHNOLOGIES CAN DECREASE AGRICULTURAL GREENHOUSE GAS EMISSIONS BY 37%

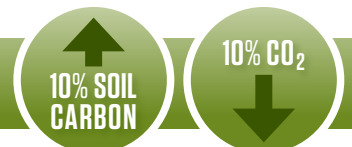
**32% REDUCTION OF NITROUS OXIDE (N<sub>2</sub>O) EMISSIONS  
LEADING TO 4% REDUCTION IN GLOBAL AG GHG EMISSIONS**



- FBS Technologies increase nitrogen use efficiency (NUE) by 33%; therefore, less N is lost into the environment.
- FBS Technologies do two main things to improve NUE:
  - Increase plant uptake of both residual and applied N
  - Assimilate N into a plant-usable form
- The goal is not to necessarily reduce the amount of N applied but to maximize the efficiency so that more of each pound of N is taken up and used by the plant to produce yield, thereby leaving less N in the environment to become N<sub>2</sub>O.

FBS Technologies have proven the potential to increase NUE by 33% from 1.20 pounds of N per bushel of yield (22 grams of N per kilogram of yield) to 0.80 pounds of N per bushel of yield (14 grams of N per kilogram of yield).

**10% REDUCTION OF CARBON DIOXIDE (CO<sub>2</sub>) EMISSIONS  
LEADING TO 33% REDUCTION IN GLOBAL AG GHG EMISSIONS**



- FBS Technologies increase soil carbon by 10% by increasing above-ground biomass, below-ground biomass, and root exudates.
- Increasing soil carbon directly connects to reducing global annual agricultural CO<sub>2</sub> emissions by 33%.
- FBSciences research has demonstrated that crops treated with FBS Technologies develop larger, deeper, and more substantial roots.
- Additionally, FBSciences research has documented enhanced photosynthetic rates and increases in overall biomass.
- FBSciences trials have shown a reduction in soil pH when FBS Technologies were applied, indicating enhanced root exudates, which significantly increases the creation and stabilization of SOC.
- FBS Technologies create a symbiotic relationship with the soil microbiome and enriched root exudates.

The total amount of GHG emissions reduced further increases by incorporating other mitigation methods such as no-till, cover crops, or leaving crop residue in the field, all of which offer a potential amplifying effect on existing efforts. Furthermore, biologicals provide several additional benefits related to climate adaptation, including better endurance to abiotic and biotic stresses, improving water use efficiency, increased yields, and improved crop quality.



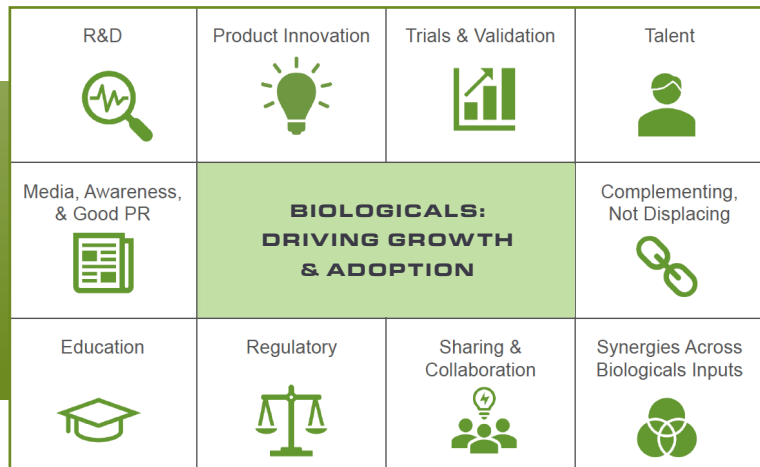
# BIOLOGICALS: CHALLENGES & OPPORTUNITIES





# BIOLOGICALS: CHALLENGES & OPPORTUNITIES

Biologicals represent a practical and powerful solution for both climate adaptation and mitigation. Today, agricultural biologicals are the fastest-growing inputs in agriculture. However, with enormous momentum and growth opportunity comes challenges that must be addressed to ensure sustained adoption and growth.



## R RESEARCH, INNOVATION & VALIDATION

We need 70% more food to feed a population of nine billion by 2050, which can only be achieved sustainably through continuous research and innovation. R&D and innovation with collaboration and investment from both the private and public sectors are essential, including new field trials and studies that validate these technologies as climate-smart tools.

## T TALENT & ATTRACTING YOUTH

Agriculture is a growing sector in need of talent. The agricultural labor force is aging globally, yet this population is key to addressing the world's biggest challenges. It is a sector enjoying an influx of capital, innovation, and opportunity and, therefore, ripe to attract bright young minds. We must ensure we are attracting the next generation of farmers and agribusiness professionals to lead the sector.

## C COMPLEMENTING & COLLABORATING

Biologicals synergize with traditional agriculture inputs by enhancing overall yield, providing a more significant buffer for climate impacts and a powerful tool for mitigating GHG emissions. Collaboration and integration between conventional agriculture companies and those leading the research and development on climate-smart biological technologies are essential to enable large-scale impact on climate adaption and mitigation.

## R REGULATORY

Strong leadership from regulatory bodies is essential to provide a solid framework for growth while minimizing over regulation that stifles innovation and commercialization.

## E EDUCATION & AWARENESS

We need to increase awareness and educate all stakeholders that biologicals are a solution to the growing climate problem we face today. Given the significant potential of agriculture to contribute to climate change, the public and private sectors need to address these challenges so that innovation and implementation continue to move forward.





# BIOLOGICALS & CARBON MARKETS





# BIOLOGICALS & CARBON MARKETS



## GROWTH OF CARBON MARKETS

Carbon markets are a tool that can help reduce climate emissions.

Simply put, they allow one polluting entity to buy credits from another entity that reduces emissions. Carbon markets are expanding rapidly, surging ahead by 20% in 2020, reaching a sizable valuation of US\$277 billion. The private sector has increasingly taken the lead due to anticipated regulations from escalating effects of climate change. Investment firms are starting to rank companies by their ESG (environmental, social & governance) score and have demonstrated that those companies produce better returns than their more polluting counterparts.



## CARBON MARKETS & AGRICULTURE

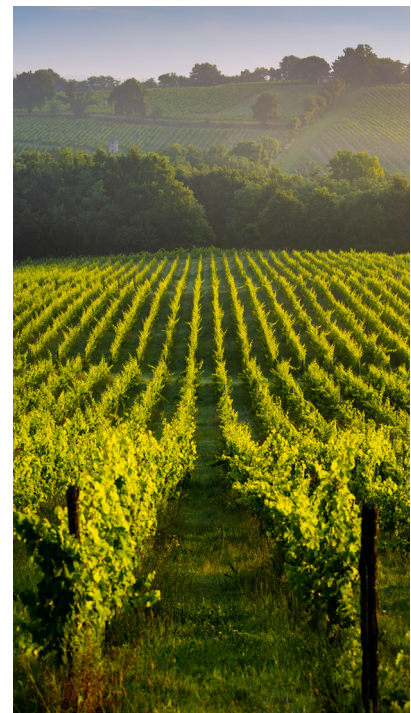
With the highest emission numbers by sector in climate damage compared to any other industry, public and private sectors have now shifted significant focus to mitigating agricultural emissions while maintaining the crucial balance of food production. In the past year, governmental programs in the USA, EU, and Australia are taking shape worth billions of dollars that incentivize farmers to incorporate various climate-smart practices. Additionally, leading private sector agricultural companies have committed climate pledges and even begun pilot programs to compensate farmers for practices that reduce climate change emissions.



## CARBON MARKETS & BIOLOGICALS

If we go a step further and understand the impact the widespread use of biologicals would have on reducing GHG emissions globally, the next logical step would be to support any effort to create a market to compensate growers for accelerating adoption.

In total, we conservatively estimate GHG mitigation via FBS Technologies to be 1.22 MtCO<sub>2</sub>e/acre (3.02 MtCO<sub>2</sub>e/hectare), representing a value of US\$15/acre (US\$37.07 per hectare) in the carbon market. This reduction is in addition to providing co-benefits, including an average yield increase of 15%, better tolerance to abiotic and biotic stresses, and improving nutrient and water use efficiencies.





# FBSCIENCES' CLIMATE HEALTH COMMITMENT & ACTION PLAN





# FBSCIENCES' CLIMATE HEALTH COMMITMENT & ACTION PLAN



FBSciences has made breakthrough advances in understanding and quantifying the positive impact of agricultural biologicals on climate adaptation and climate mitigation. The scientific foundation of that discovery has been the culmination of millions of dollars in research over 15 years to understand and quantify how these materials positively affect plant health, soil health, and climate health and the interconnected symbiotic relationship between all three. FBSciences will continue to serve as a change agent to ensure that these transformative tools can achieve the impact that science has shown us is possible.

## FBSCIENCES IS COMMITTED TO ADVANCEMENT IN 5 KEY AREAS AS PART OF OUR CLIMATE COMMITMENT

### ONE ..... **RESEARCH & PROOF**

FBSciences will continue to build on its extensive research database to advance further and validate agricultural biologicals as effective climate adaptation and mitigation solutions. Specifically, FBSciences will expand new measurement criteria to quantify the impact on climate health and invest in GHG mitigation research to understand further how these technologies increase soil carbon and decrease N<sub>2</sub>O emissions through NUE and N-fixation, resulting in healthier plants and more fertile, carbon-rich soils.

### TWO ..... **SOIL HEALTH PRODUCT LINE**

FBSciences launched its CarbonBoost® soil health line in July 2021. The synergistic benefits of FBS Technologies to plant, soil, and climate health are already well established. However, this new line is built to further boost and accelerate soil health benefits. These products include our biostimulant technologies alongside new crop-specific biological consortia. The powerful and synergistic combination of these materials will provide all of the hallmark benefits of FBS Technologies such as increased yield and plant health, enhanced nutrient and water use efficiency, and increased abiotic stress mitigation, while also delivering the supercharged effect of the microbes beyond those provided by FBS Technologies or the biological consortia alone.

### THREE ... **PARTNERSHIPS**

FBSciences will continue to forge and build partnerships with leaders and innovators in agriculture and climate arenas. FBSciences will align with industry experts in food production to help transform agriculture globally while working closely with broader authorities and experts in climate and sustainability to develop collaborative, practical solutions.

### FOUR .... **EDUCATION, PR, MARKETING & AWARENESS**

FBSciences will continue to serve as a leader, educator, and advocate for adopting biological products to benefit climate-smart agriculture. Education and awareness should be both top-down and bottom-up. As adoption grows, all stakeholders will need to use their voice and reach to communicate the positive impact agricultural biologicals can have on climate health.

### FIVE ..... **GROWER COMPENSATION & CARBON MARKETS**

FBSciences is committed to increasing farmers' profitability through higher yields and supporting the development of carbon markets focused on compensating farmers for their commitment to climate-smart production practices. Developing carbon markets can give growers additional financial incentives, which will increase the adoption of climate-smart farming practices.





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