

Syngenta's Water Optimization Technologies

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Syngenta Corn R&D Portfolio Manager

“There is no one solution to deal with water scarcity. Investment is needed to develop innovative water-efficient technologies, drought-tolerant seeds, crop protection products and optimized irrigation systems.” This quote from the Syngenta website highlights several of the areas Syngenta is working in address the problem, as the global population and demand for fresh water continues to grow, agriculture will have to grow more food with less water. One of the ways Syngenta has worked to meet this need is to develop Agrisure Artesian™ hybrids. These hybrids have excellent performance under normal rainfall and provide up to 15% yield preservation under moderate and severe drought conditions. The scientific research involved in identifying these hybrids includes germplasm characterization, genetic marker technology, stress phenotyping capabilities, and the creation of novel gene combinations. Because drought is a challenging target, Syngenta is also working with Lindsey irrigation to enable the Water+ offer. This offer combines germplasm, appropriate crop chemistry, irrigation technologies and specific expertise to deliver a comprehensive solution to growers. This is only the beginning of understanding what technologies and developments can ensure more corn can be grown with less water to meet the growing global population?



Syngenta's Water Optimization Technologies

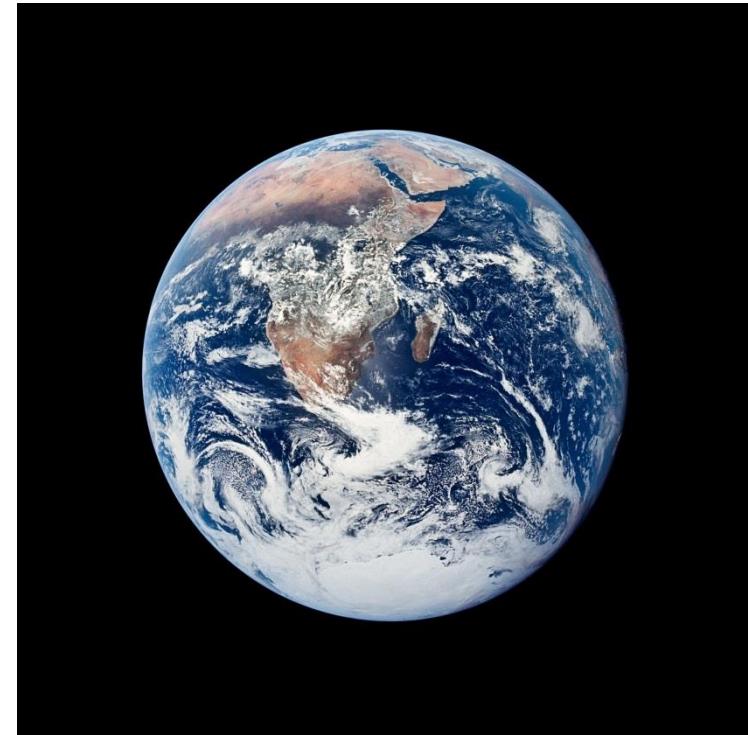


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Growing More From Less: Meeting the 21st Century's Water Challenge

- Water, at least in the forms we need for human health, economic growth, industrial manufacturing and farming, is scarce and growing scarcer.
- Less than 3 percent of the world's water is fresh. Of that 3 percent, 2.5 percent is frozen in polar regions and glaciers, so **only 0.5 percent of the planet's water is available as freshwater**—a majority of which is stored in underground aquifers, which are increasingly being depleted.
- Clearly, all segments of society must contribute to meeting the water challenge. But agriculture—which consumes 70 percent of the world's usable water—will need to be a big part of the solution.

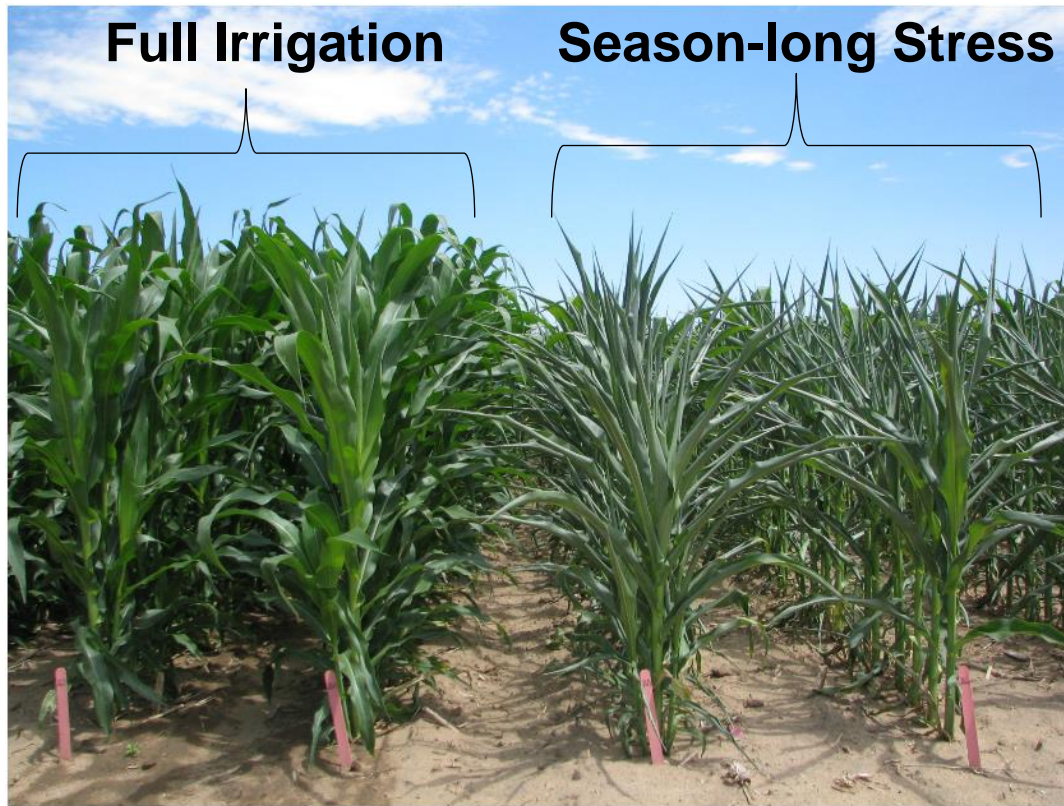


Growing More From Less: Meeting the 21st Century's Water Challenge

- New biotech and crop protection technologies allow farmers to produce more crop per drop, raising crop yields while using less water.
- The water challenge *CAN* be met. Technology acceptance and the integration of technology are critical to meet the water challenge and ensure food security.



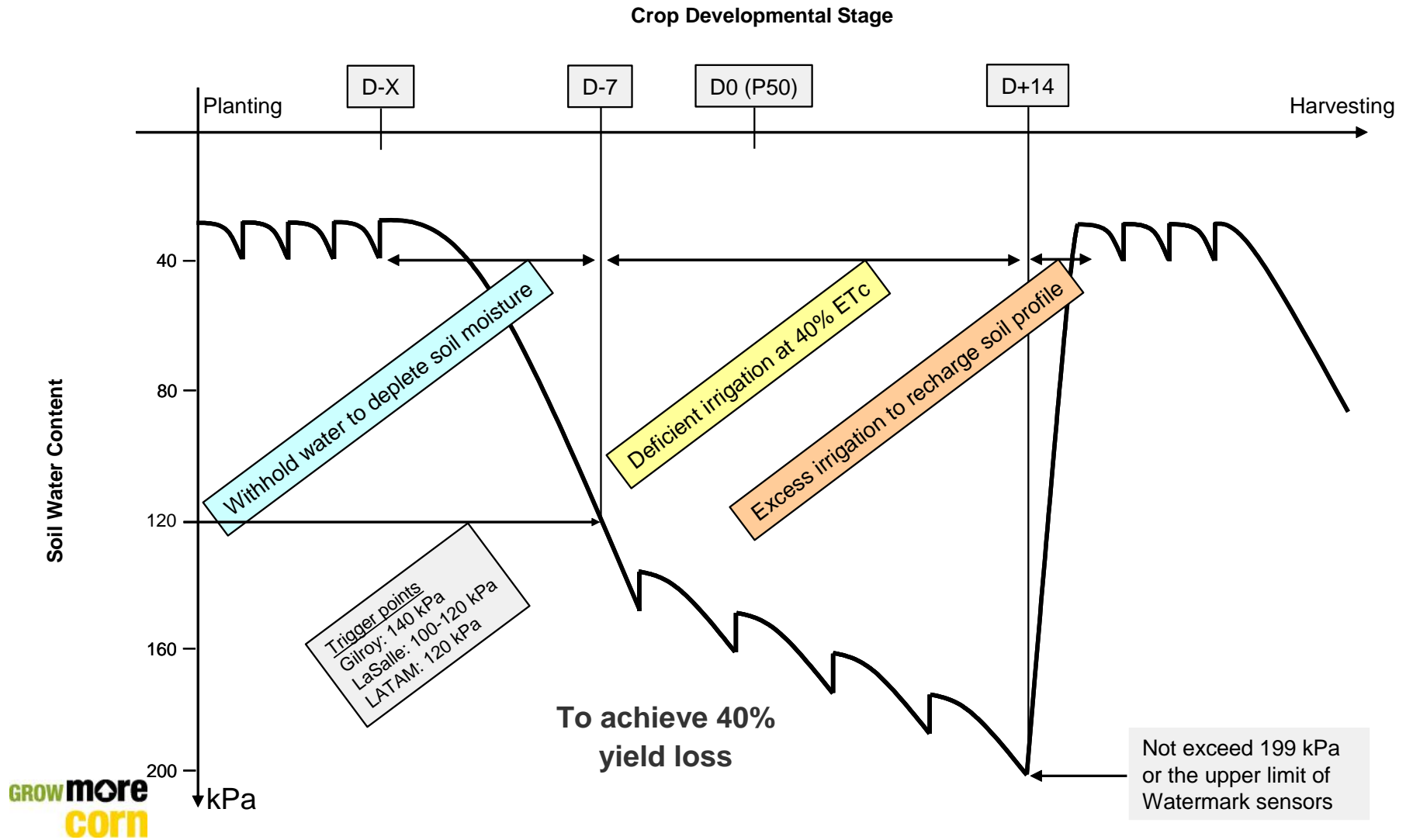
Managing Drought Stress for Agrisure Artesian Gene Selection



Syngenta Managed Stress
Environment Research Sites

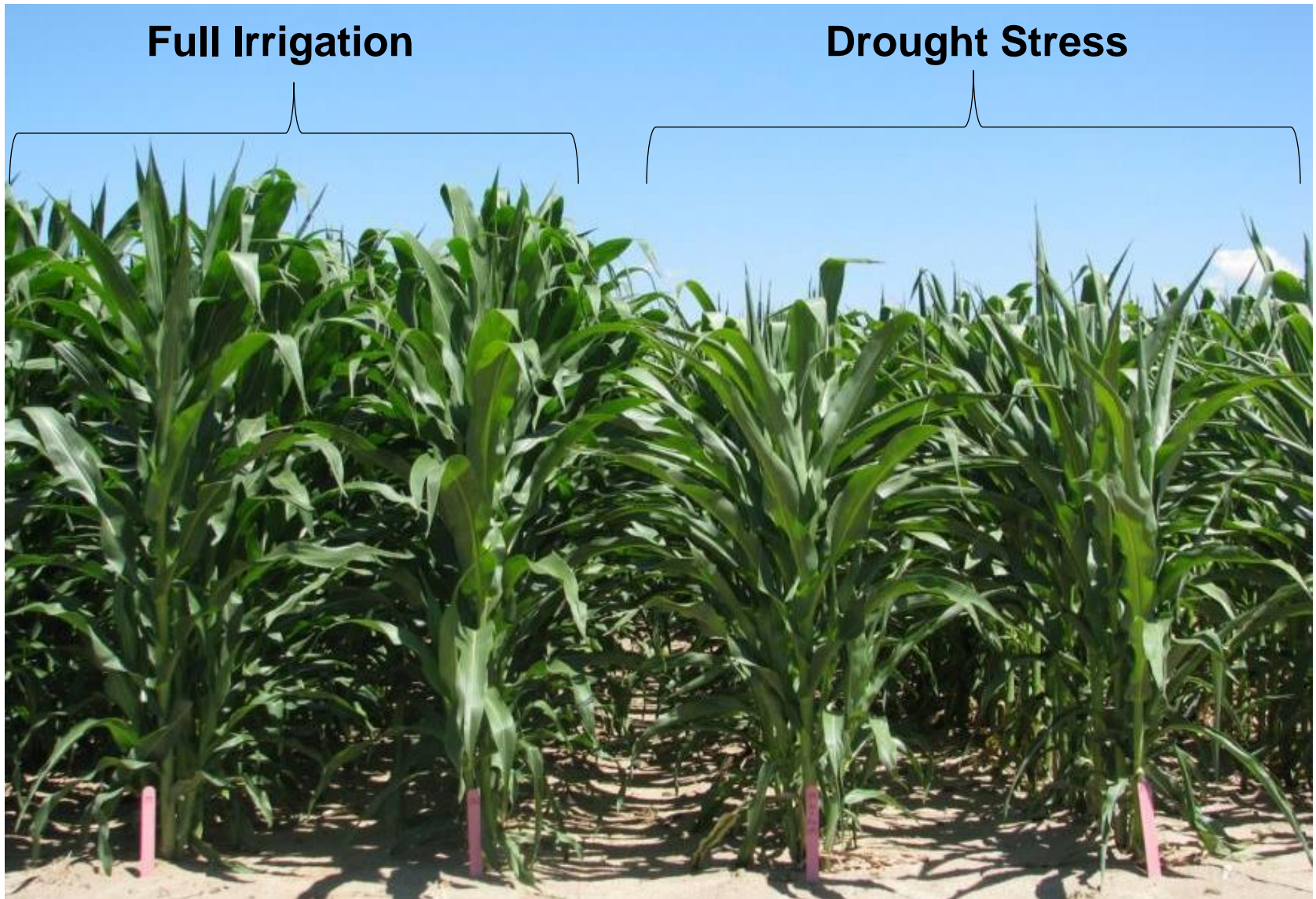


Managing Drought Stress for Agrisure Artesian Gene Selection



GROW more corn

Irrigation Treatment: Well Watered vs. Drought Stress



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Range of Phenotypic Expression Across Germplasm Grown Under Water Deficit Irrigation



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Introducing: Agrisure Artesian™

- Syngenta, the leader in water optimization in corn, is partnering with growers, researchers and industry experts to develop innovative solutions to optimize water use and maximize crop profitability.
- Agrisure Artesian™ technology offers growers a new level of season-long drought protection to help grow more corn and improve the potential return on total crop investment.



GROW more
corn

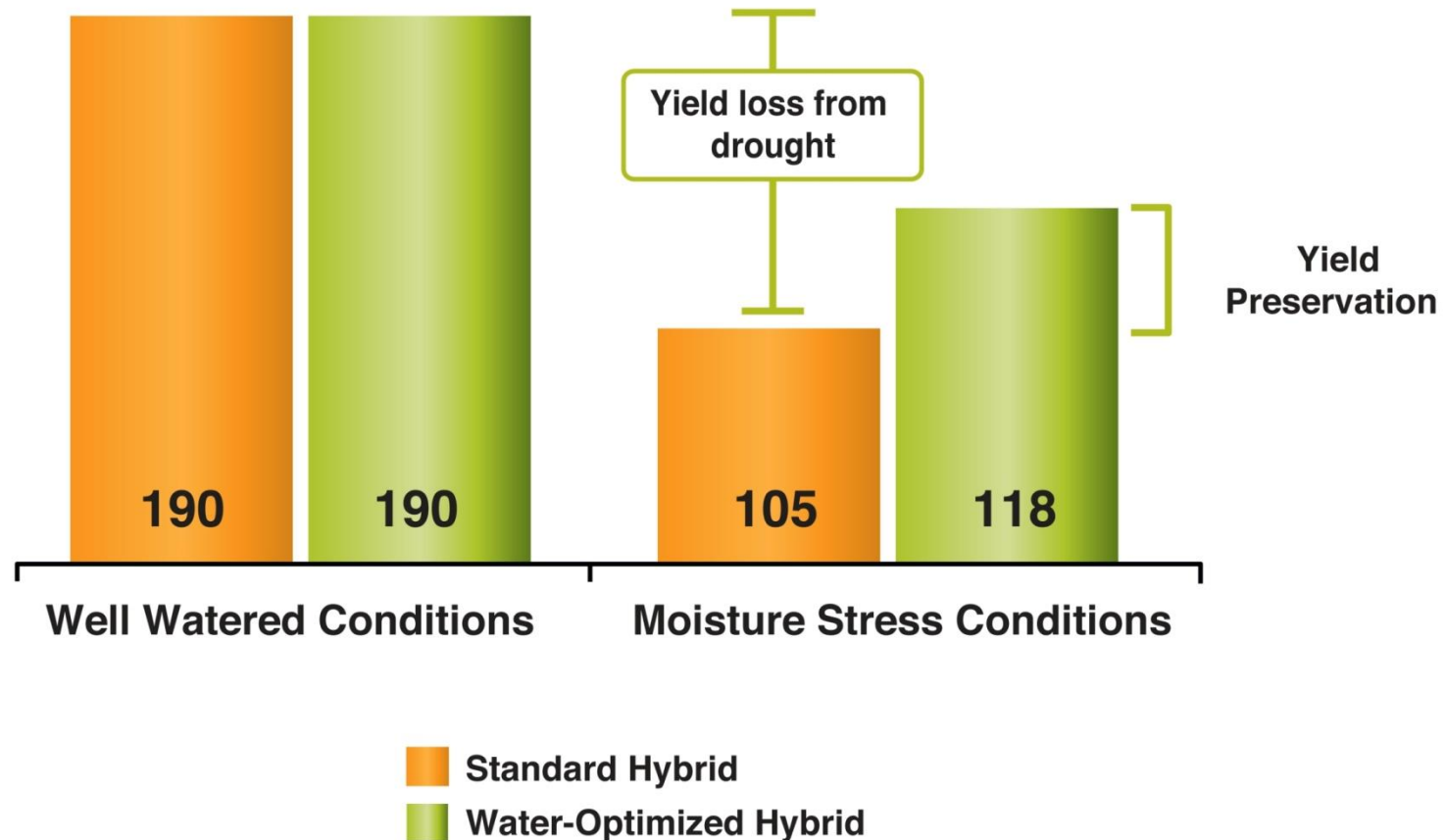


- The industry's **first water-optimized technology** for corn hybrids.
- Delivers improved yields on **dryland and limited-irrigated acres** in low rainfall environments, as well as acres in higher rainfall areas that are prone to moisture stress.¹
- Hybrids with Agrisure Artesian technology maximize yield when it rains, and **increase yield up to 15%** when it doesn't.¹

GROW **more**
corn

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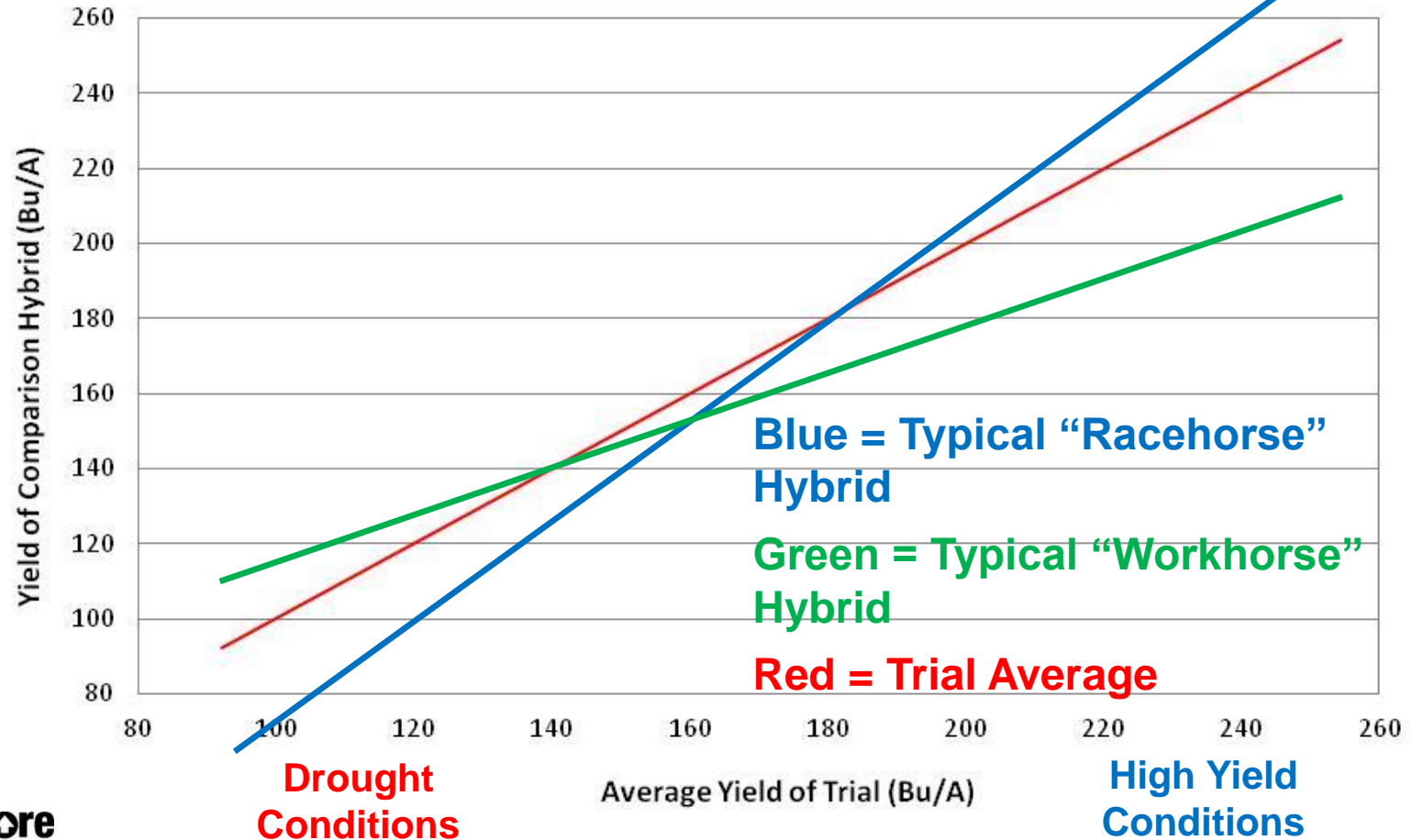
Product Concept Methodology for Validating Agrisure Artesian Technology → 15% Yield Recovery



GROW **more**
corn

Agrisure Artesian Hybrids: Combining Workhorse Dependability with Racehorse Yield Potential

Illustration of the Yield of Workhorse and Racehorse "Type" Hybrids versus an Experiment Average

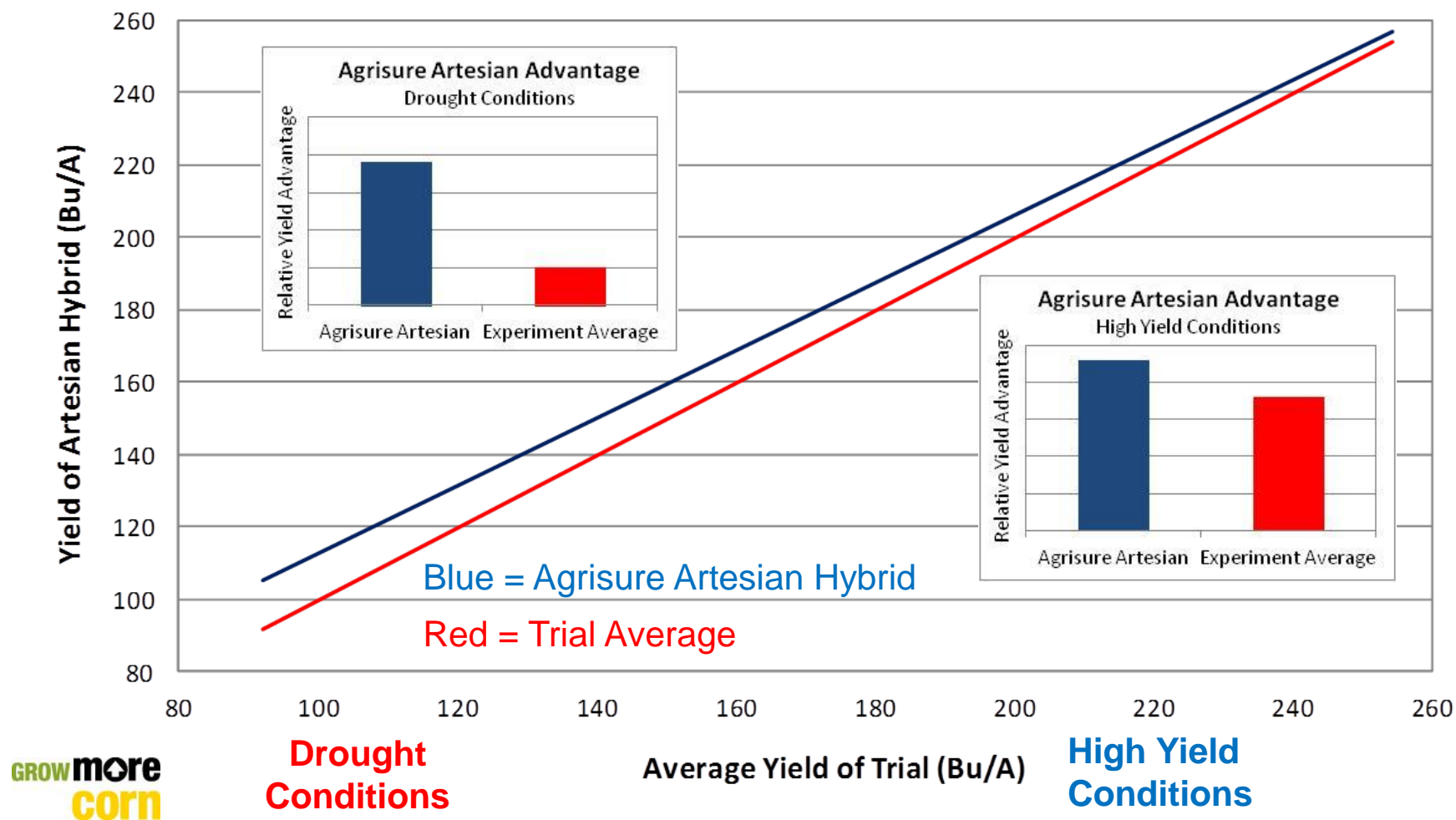


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corn

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Trial Results Confirm the Agrisure Artesian Promise

Yield of Hybrid with Agrisure Artesian Technology versus
Experiment Average – 2011 Syngenta Hybrid Advancement Trials



**GROW more
corn**

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The Water Challenge can be met, but Technology Integration is Critical



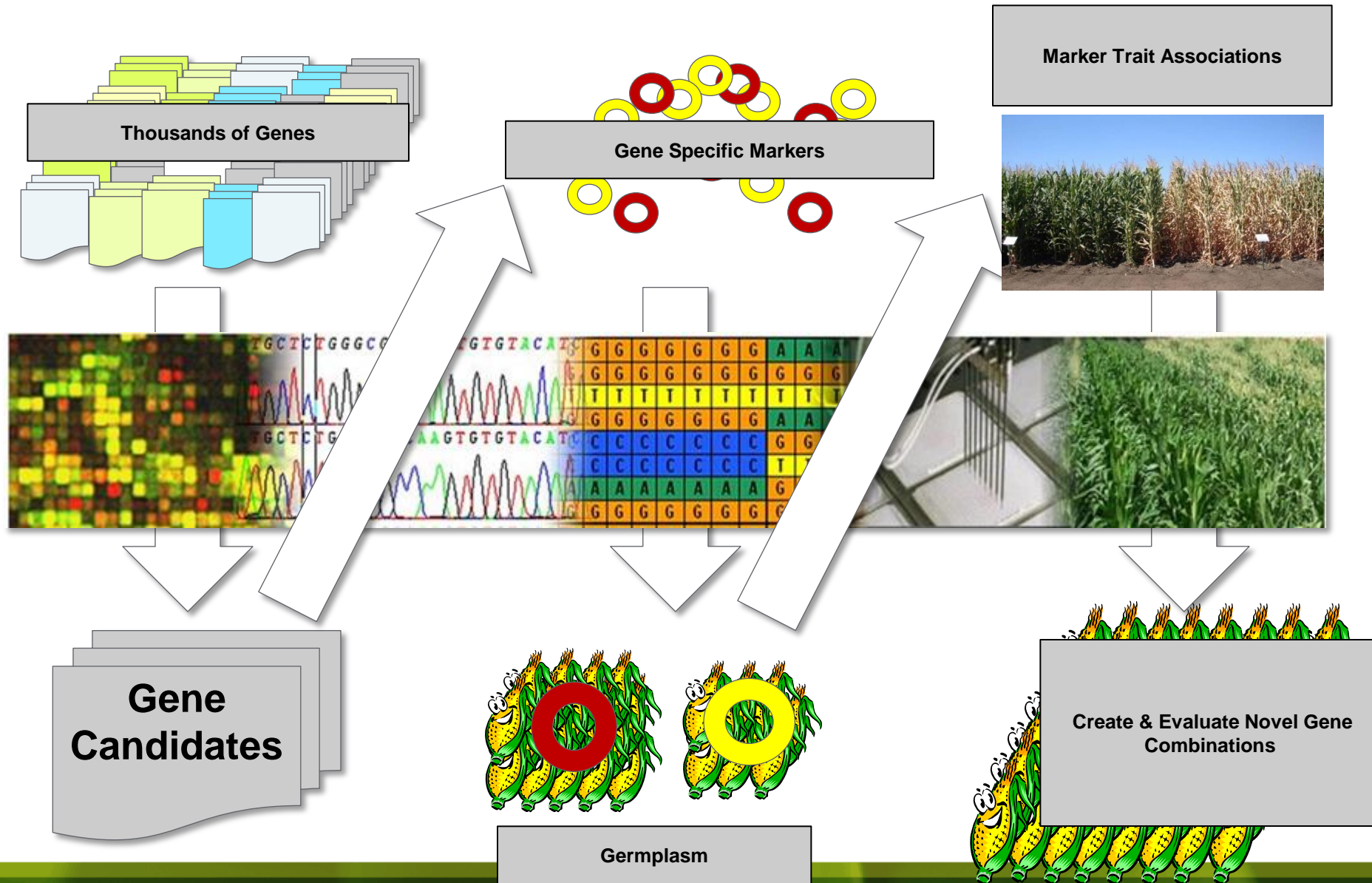
Non-irrigated



Irrigated

- Syngenta forms comprehensive Water Optimization team bringing together extensive knowledge and experience in the water space
- Integrating technologies for water optimization in non-irrigated and irrigated solutions
- Partnerships are critical to deliver future water platform
- No single technology can meet the 21st century water challenge

The Science Behind Agrisure Artesian™ Technology



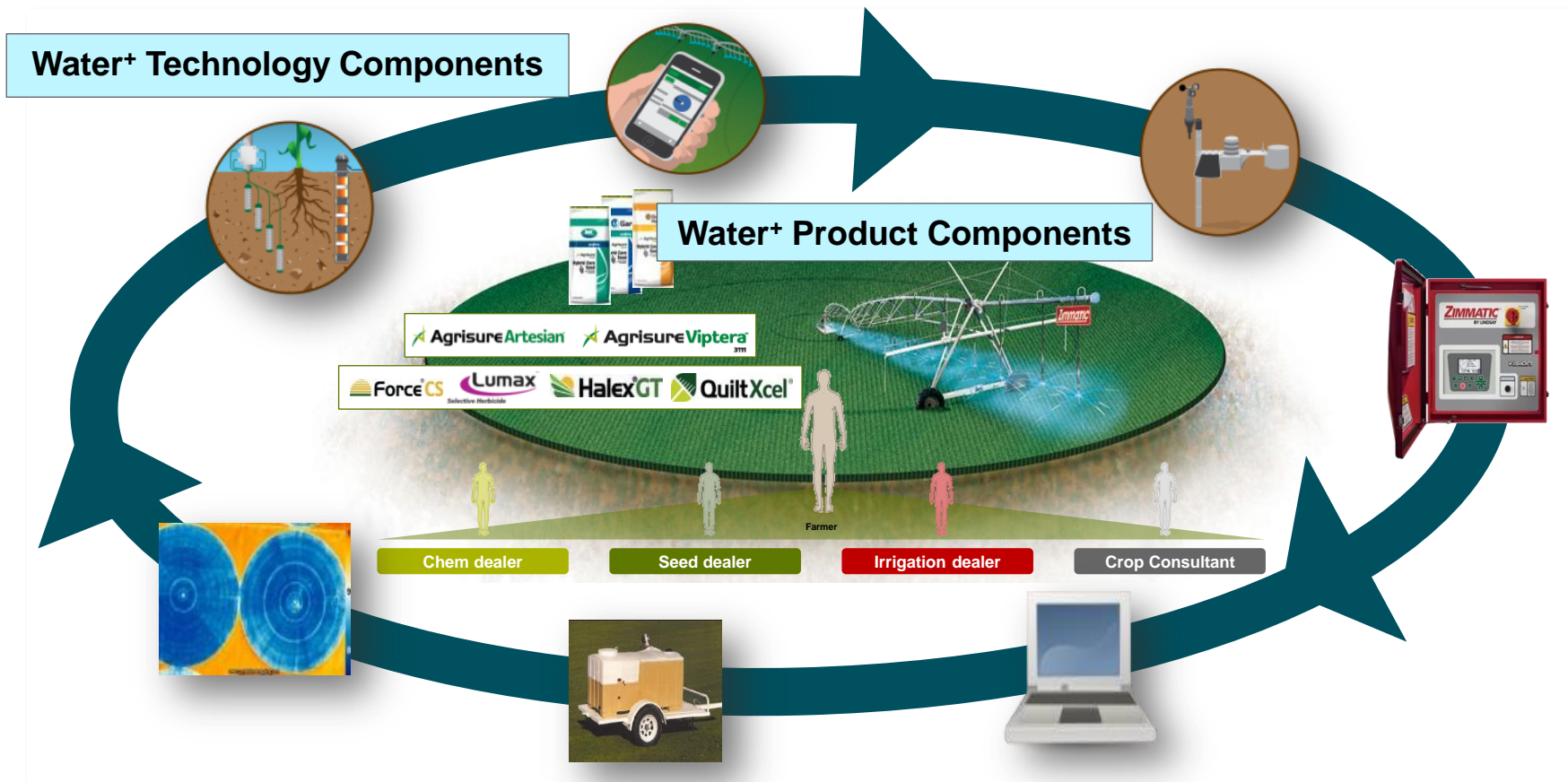
Water Optimization Requires Integration for Season-Long Performance



- Utilizing locally adapted high-performing genetics
- Increasing water-use efficiency for better drought tolerance
- Developing a more robust root system for improved water and nutrient uptake
- Removing weeds competing for water
- Maintaining growth and development longer into the stress event by sustaining essential physiological processes

Introducing: Water+ Intelligent Irrigation Platform

A comprehensive solution combining technology and expertise



Force CS and Lumax are Restricted Use Pesticides.

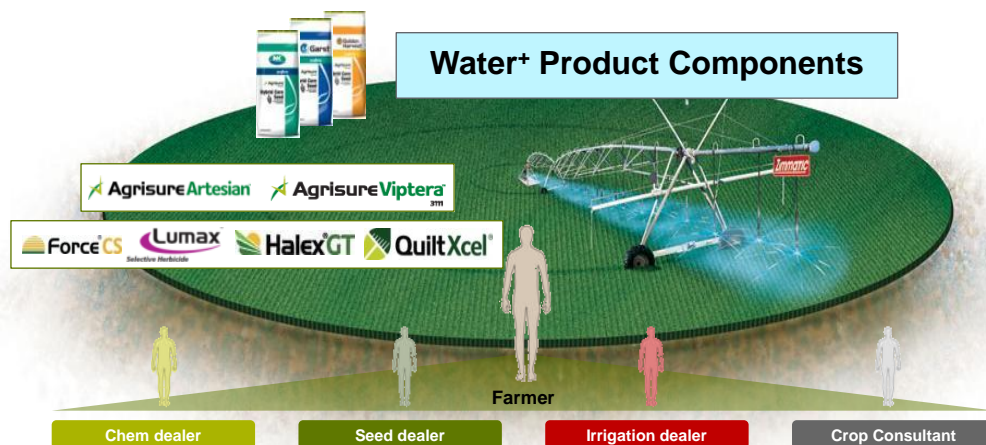
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Key Features and Benefits

Maximized Yield Potential

- Locally adapted genetics
- Best-in-class traits and crop protection inputs delivering improved water use efficiency
- Industry-leading irrigation equipment

Water+ Product Components



Simplicity and Ease of Use

- Remotely monitor and control irrigation systems
- Use pivots to apply selected crop protection inputs more precisely and with greater flexibility
- Seamlessly integrate with FieldNET® by Lindsay wireless irrigation management to share weather and field data for a powerful combined platform

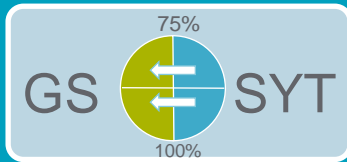
Water+ Technology Components



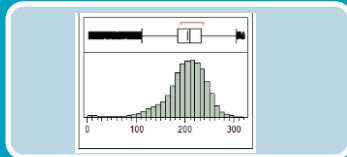
Force CS and Lumax are Restricted Use Pesticides.

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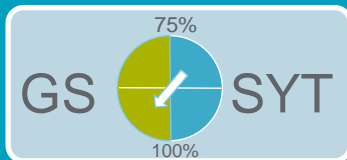
2011 Key Questions; What if...



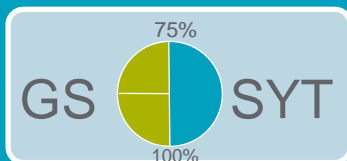
Water+ Intelligent Irrigation Platform outperformed grower standard at 100% and 75% water?



Water+ Intelligent Irrigation Platform gave better uniformity and stability thus reducing risks?



Water+ Intelligent Irrigation Platform at 75% water outperformed grower standard at 100%?



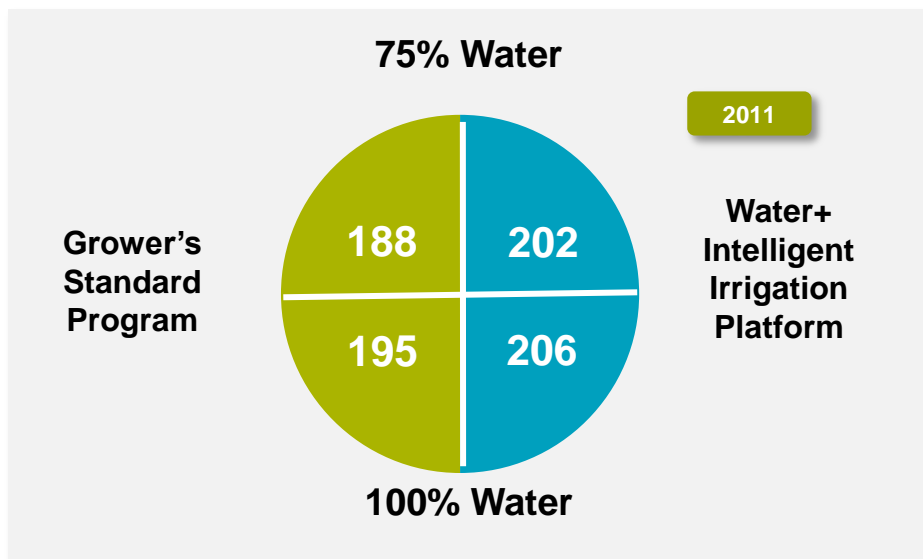
Syngenta's Agrisure Artesian™ and irrigation program provided additional benefits?



All this was statistically significant?

Key Benefits: Value Proposition

The Water+ Intelligent Irrigation Platform at 75% irrigation out-yielded the grower's standard program at 100% irrigation.

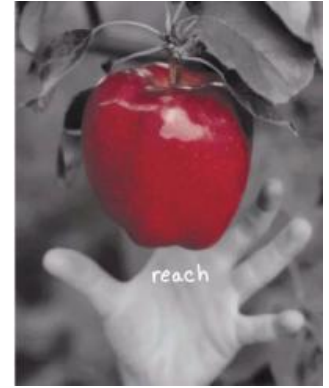
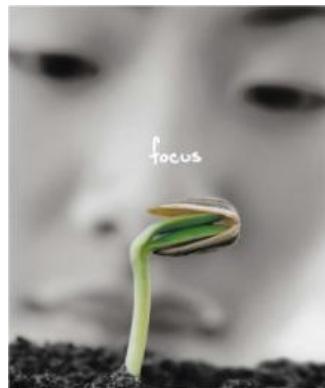


The Water+ Intelligent Irrigation Platform translates to:

- Convenient integration to scale
 - Allows grower to conveniently manage multiple pivots
- Risk mitigation through automation and technology
- Higher potential for return on investment
- Growing more corn with less water

2011. Optimal performance under variable conditions. Data collected from 27 sites with over 26 million data points collected through combine yield monitors. Eastern Colorado, Nebraska and Western Kansas.

Bringing plant potential to life



Thank you

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