

Kansas Wheat Research Update

Justin Gilpin, CEO



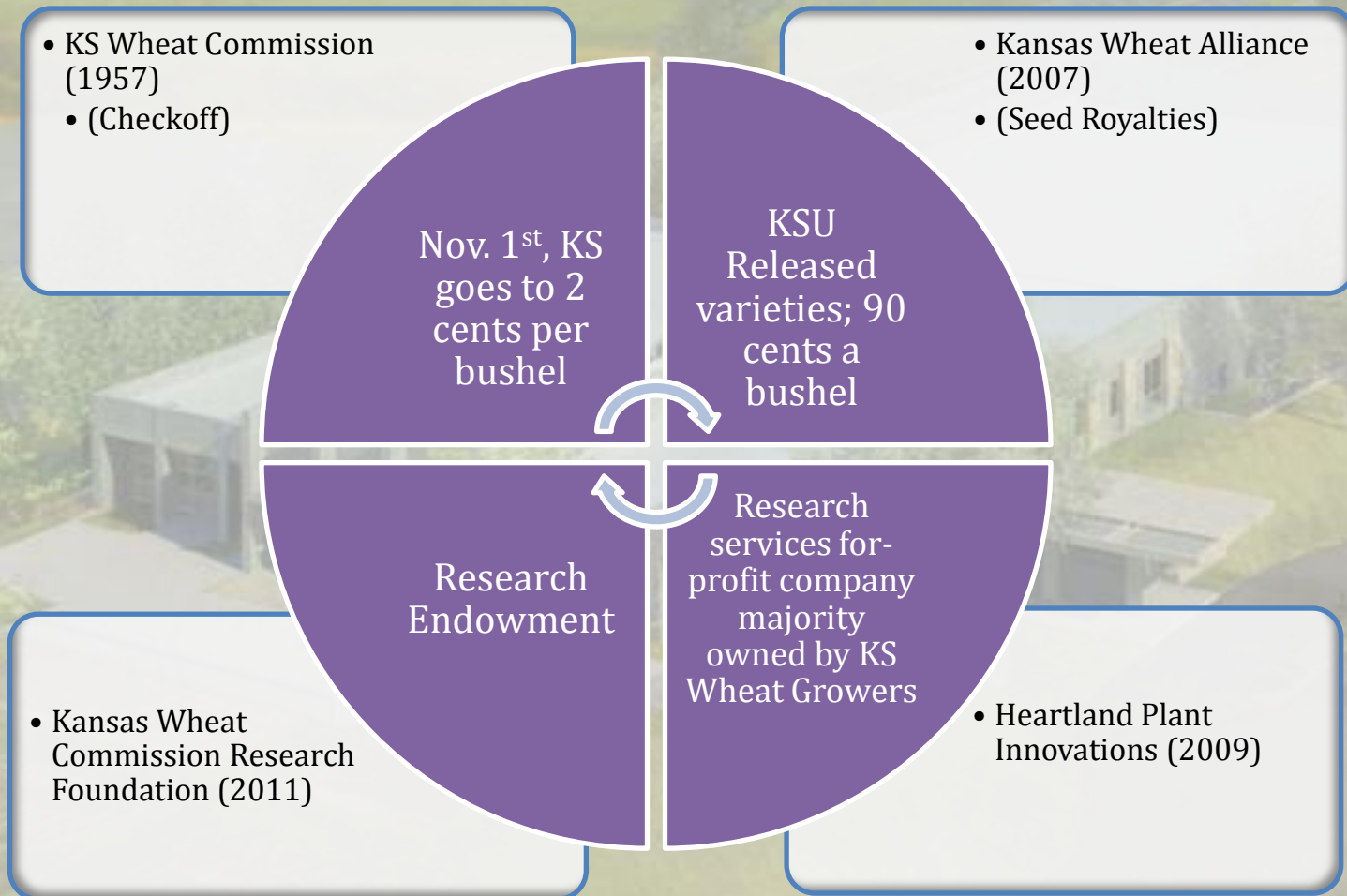
"Wheat farmers investing in their future."

Update

- Investment by Farmers
- Kansas Wheat Innovation Center
- Center Initiatives
- Challenges and Opportunities

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Farmer Investments for wheat research – multi approach



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Discussion started on...The Needs of Many

- Need to **double global food production** by 2050 to feed an estimated 9 billion people.
- Produce **more food with less** water, fewer acres.
- Global wheat demand is increasing faster than wheat production.

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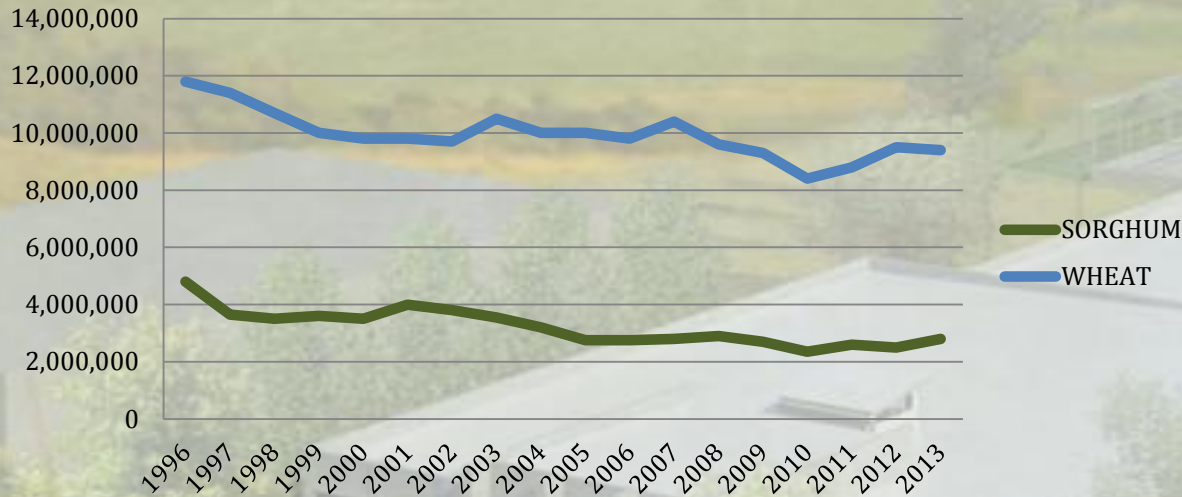
But local impact hits home...



#drought2013

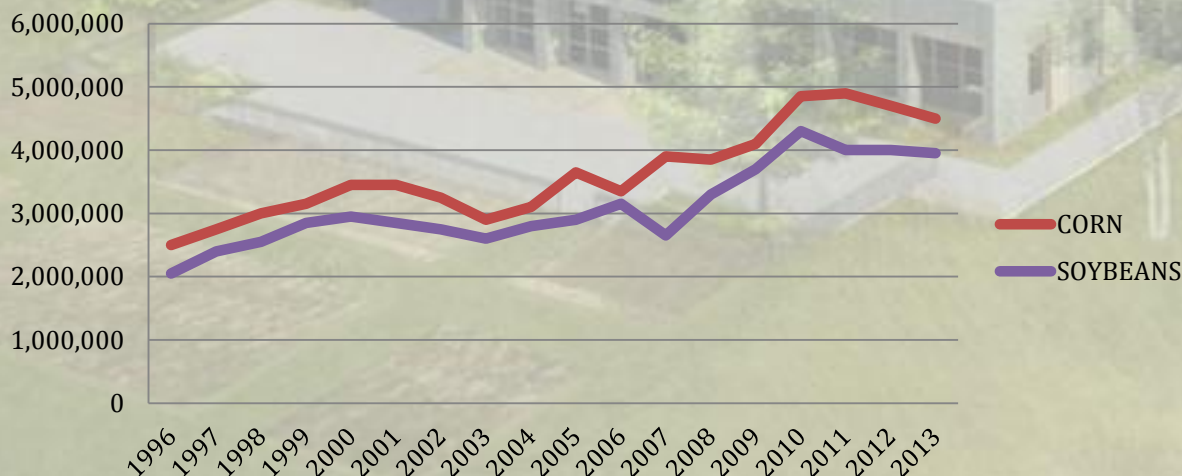
Shifts in Planted Kansas Acres

Sorghum and Wheat



- Trends in Kansas planted acres by commodity.
 - Corn + 125%
 - Soybean + 95%
 - Sorghum – 64%
 - Wheat – 19.4%

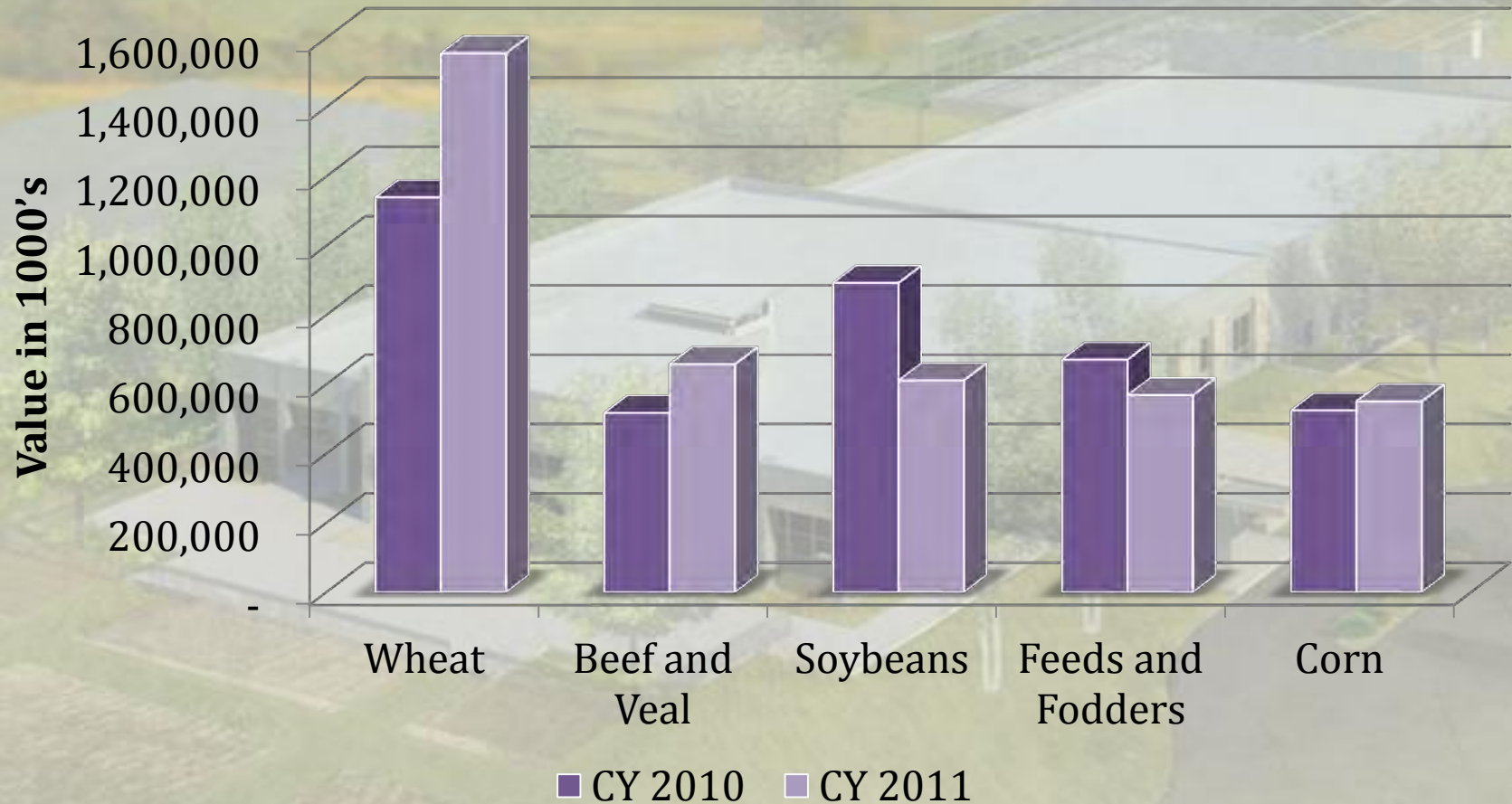
Corn and Soybeans



- Major underlying factors - biotechnology and return per acre.

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Value of Kansas Agricultural Exports – Significance of wheat



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Farmer directed organizations in Kansas time to make a difference...

- **Kansas Wheat Commission**

- Invests approx 25% of income in wheat research.
- Approx \$1.0 mi annually

- **Kansas Wheat Alliance**

- Leveraged \$2.2 Million from seed royalties 2009-2012
- \$280,000 direct funding into infrastructure at KSU

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KWA Mission and Objectives

To strengthen the wheat industry by creating a delivery system that promotes stewardship of traits and varieties, provides new funds for wheat research, and ensures the delivery of improved wheat varieties **to benefit farmers and consumers**

- **Provide Kansas wheat seed producers access to the best wheat genetics available**
- **Support K-State wheat breeding programs for the release of improved varieties**
- **Increase the acres of wheat grown in Kansas**

Two of the Farmer Initiatives through the Kansas Wheat Commission

- Kansas Wheat Innovation Center
- Kansas Wheat Commission Research Foundation



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Kansas Wheat Innovation Center



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Kansas Wheat Innovation Center

Home to:

- KS Wheat Commission
- Kansas Association of Wheat Growers
- Heartland Plant Innovations
- Kansas Wheat Alliance
- Kansas Foundation for Ag in the Classroom
- Earth's Harvest
- Kansas State University

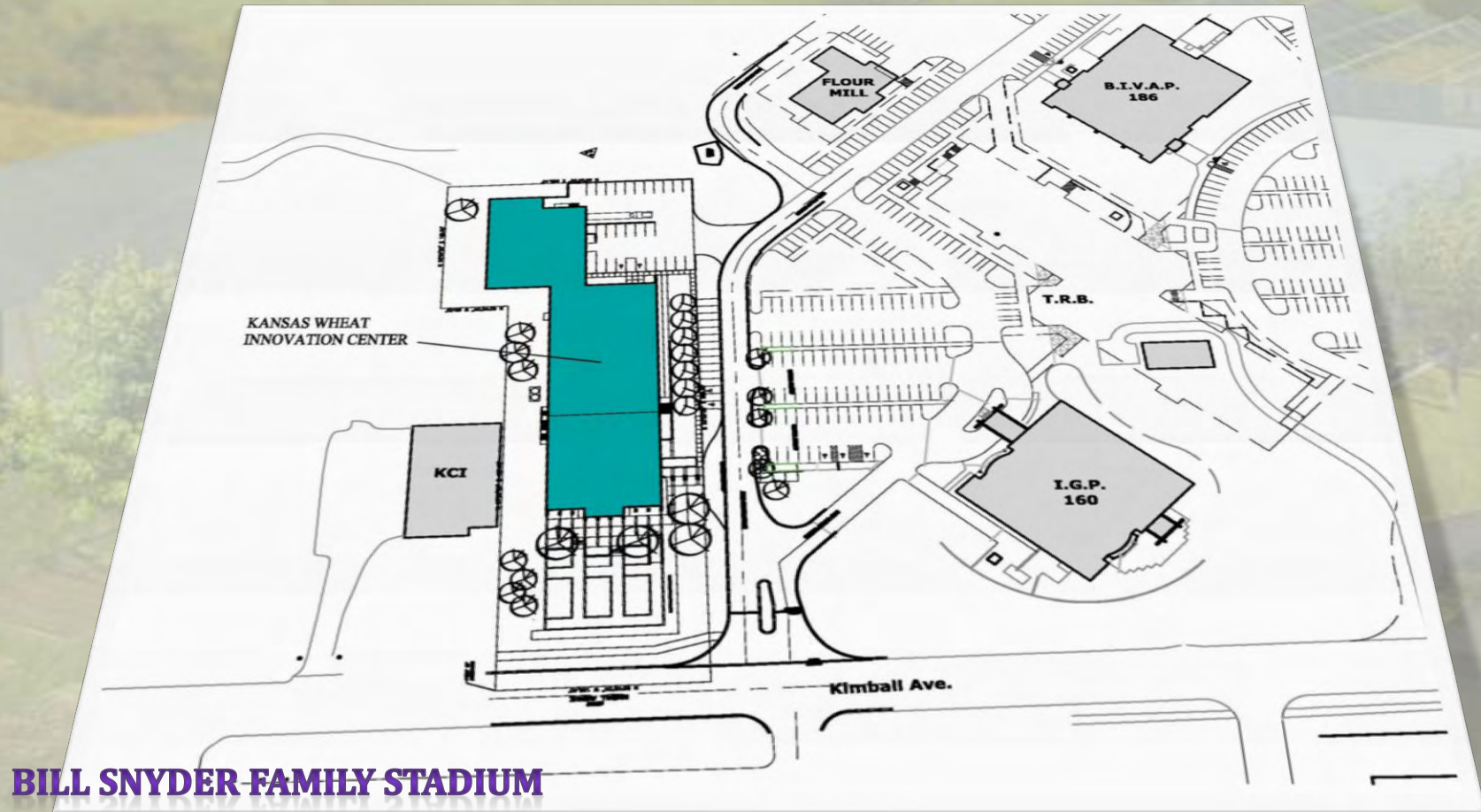
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\$10.3 Million Dollar Investment

- Majority of funding comes from wheat producers through the wheat check-off.
- Greenhouses and growth chambers funded through a \$2.5 million grant/loan from the Kansas Bioscience Authority.
- WGRRC gene bank and molecular equipment funded by a \$440,000 grant from the ***US Dept. of Commerce Economic Development Administration.***
- Land provided by K-State through long-term lease

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Location – KSU Grain Science Campus



BILL SNYDER FAMILY STADIUM



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An aerial photograph of a farm serves as the background. It features a large, light-colored barn with a dark roof, surrounded by green fields and some trees. The image is slightly blurred, giving it a soft, artistic feel.

*If you're not moving
forward...you're going backward.*

- **Kansas Farmers take a chance...**
- **Need for Innovation** – wheat has fallen behind, the world needs food.
- Growers want more **investment** in wheat
- Kansas Bioscience Authority presented an opportunity for additional funds.
- US Dept of Commerce **EDA** award
- End goal is more, improved wheat varieties in shorter development times. ***Improved Genetics in the hands of farmers faster!***

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The floor plan illustrates the layout of the University of Illinois Plant Science Building. It is divided into three main functional areas:

- Office:** Located on the left side of the plan, featuring a kitchen, reception area, board room, and several individual offices.
- Laboratory:** Occupies the central portion of the building. It includes specialized labs such as the Freezer/Fume/Growth Chamber Room, Gene Bank, Seed Lab, Genetic Resource Lab, Lab/Transformation Lab, Microarray Lab, and Molecular Biology Lab. It also contains multiple lab offices, a mechanical room, and a break room.
- Greenhouses:** Situated on the right side of the building, consisting of several large, connected glass-enclosed structures.

Additional labels on the plan include 'MECH', 'E.E.', 'STORAGE', 'BOARD ROOM', 'KITCHEN', 'RECEPTION', 'LAB OFFICE', 'LAB', 'GENE BANK', 'SEED LAB', 'GENETIC RESOURCE LAB', 'LAB/TRANSFORMATION LAB', 'MICROARRAY LAB', 'MOLECULAR BIOLOGY LAB', 'STOR.', 'BREA. ROOM', 'POTTING', 'SOIL', 'SEED PROD.', and 'RECEIVING'.



From the K-State Feed Mill



Wheat Growers Board Room



“Speak for Wheat” Test Kitchen



Entry Way and Lobby



Lab space



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Controlled Environment Plant Growth Chambers



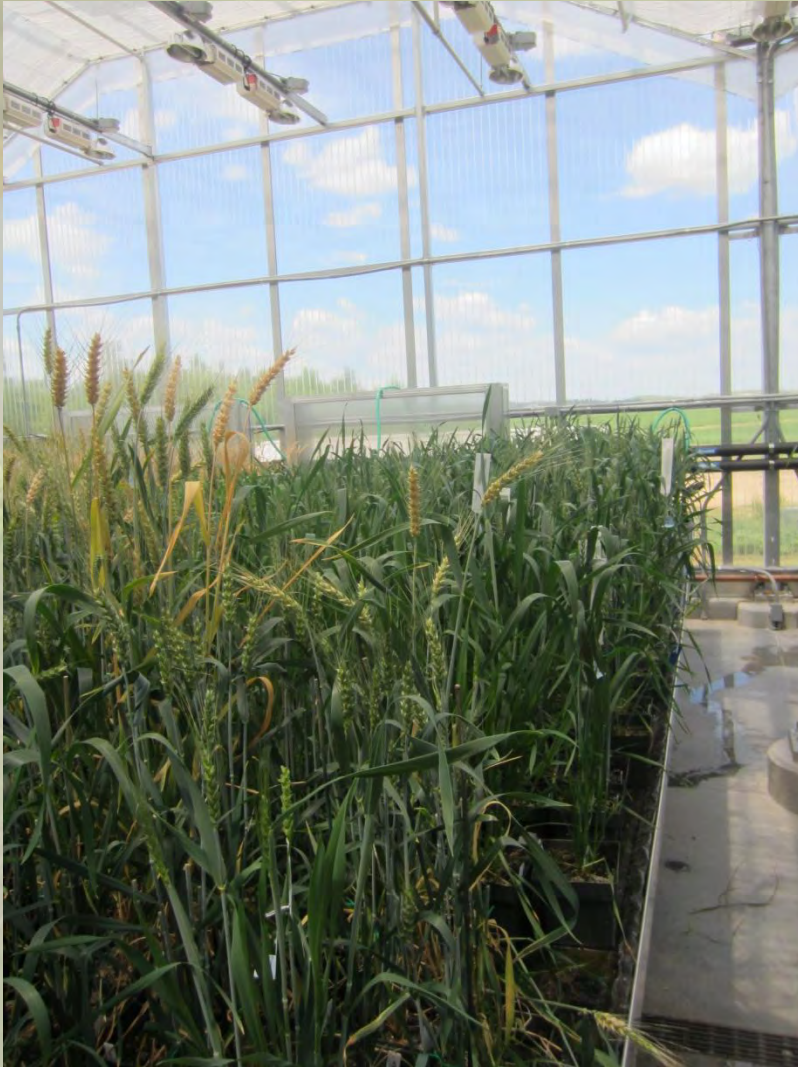
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Controlled Environment Plant Growth Chambers



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Air-Conditioned Greenhouse



- Allows work to be done in the greenhouse throughout the year
- Ideal temperature range
 < 85 degrees during the day
 <60 degrees at night

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Reach – In Growth Chambers



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State of the Art Greenhouse Space



State of the Art Greenhouse Space



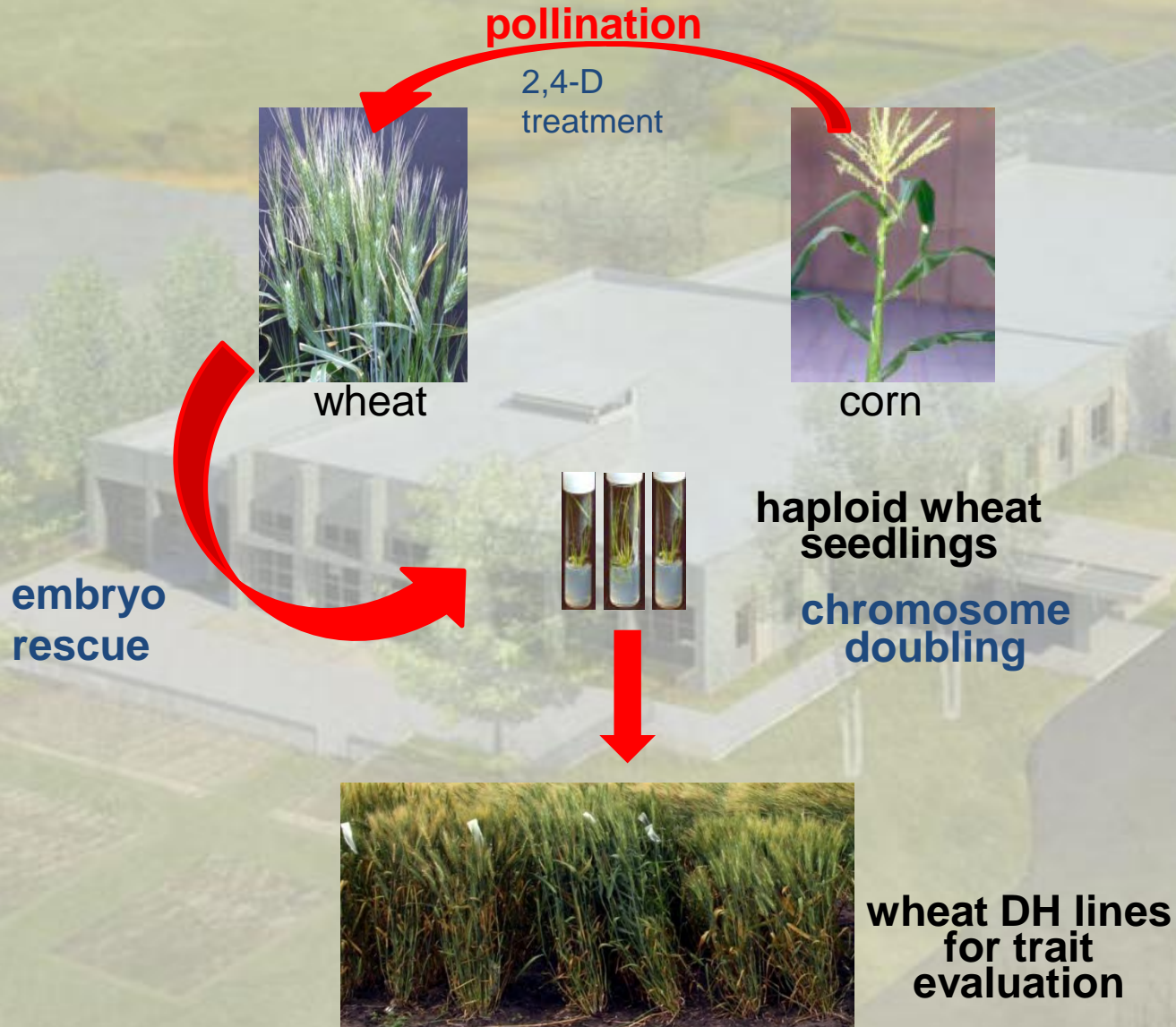
Heartland Plant Innovations

- For-profit company with multiple partners
- Foundation work in KWIC; improving wheat genetics.
- Majority owned by Kansas wheat farmers through the Kansas Association of Wheat Growers
- Provide research services for public and private wheat breeders.
- Looking for the next “thing”



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Doubled Haploid Technology



HPI DH business

- On order this year, 30,000 DH lines.
- Servicing public and private breeders and geneticists.
- 11-13 month time frame for delivery.
- Targeting minimum of 7 seeds per line.
 - Customer communication and satisfaction are priorities.
- Run like a business and goal to be self supported this year.



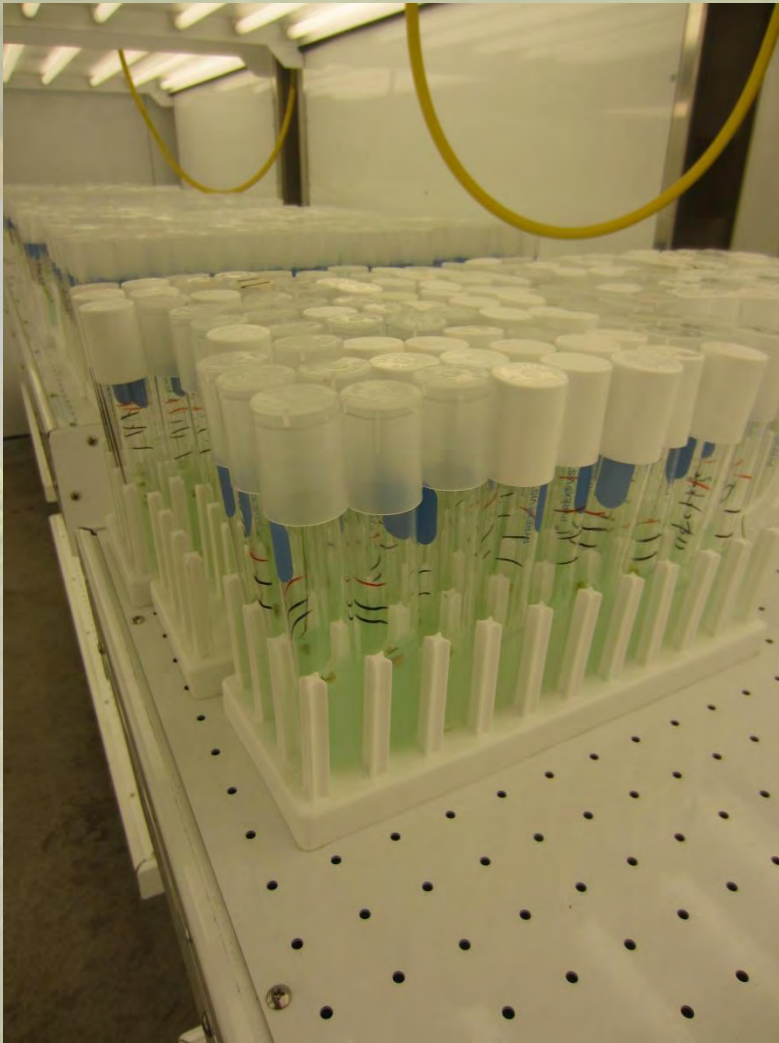
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Dedicated people...



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With dedicated resources...



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Delivering a quality end product...



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KWC Research Foundation

- Established in 2011
- Kansas 501(c)(3) nonprofit research corp
- Gifts used solely for funding wheat research
- Governed by volunteer board
- Gifts are tax deductible
- Naming rights in Kansas Wheat Innovation Center



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Syngenta “Speak for Wheat” Test Kitchen



Kansas Cooperatives Lobby



- Provides recognition of research funding support by Kansas Cooperatives
- Platinum Sponsors (\$50,000 and above)
 - Mid-Kansas Coop
 - The Garden City Coop
 - Farmway Coop
- Gold Sponsors (\$25,000 - \$49,999)
 - Midway Coop Association, Osborne, KS
- Silver Sponsors (\$10,000 - @24,999)
 - Skyland Grain, LLC, Johnson, KS
 - Right Coop Association, Wright, KS

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A Lot Happening in Manhattan



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O.H. Kruse Feed Mill



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NBAF



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Exciting new announcement NSF funding for WGRC-I/UCRC

A public-private consortium to mobilize genetic diversity to enhance wheat yield and meet food security needs.

A National Science Foundation Industry/University Cooperative Research Center
in Partnership with Kansas State University and Colorado State University



The KSU Wheat Genetics Resource Center

- K-State Board of Regents Center of Excellence
- Wheat germplasm collected over 30 years: Wild wheat relatives collected from the harshest environments on earth
- 54 germplasm releases utilized in breeding programs in 45 countries and 39 states
- “Wheat Genetic Gold Mine”

WGRC Gene Bank



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Center Mission and Rationale

- A pool of highly valuable genetics to breed into commercial varieties – Better varieties in the hands of farmers, faster
- The comprehensive training of the next generation of wheat industry scientists

Committed Members to I/UCRC

- Bayer CropScience
- ConAgra
- CWAC
- CWRF
- Dow AgroSciences
- General Mills
- HPI
- Kansas Dept of Ag
- KWC
- KWA
- Limagrain
- Syngenta

Industry Membership Benefits

- Discuss and design pre-competitive research agendas alongside researchers
- Access to intellectual property
- Human resource development
- Industry consortium reducing research redundancies and creating action-oriented strategies for increasing the wheat market from seed to consumer
- Leveraging research funding

Leveraging Research Funding

- Lower costs, reduced risk

Example 8 Members:

Membership fee of 50k each X 8 = \$400,000

NSF funding = \$100,000

1 year total: \$500,000

5 year program \$2.5 million

Members are paying \$50k for \$500,000 of research.

The greater the number of members join, the more value is generated and the lower the risk.

Potential NSF Supplemental Funding: \$1.5 million

Conclusion on NSF Center

- Valuable wheat genetics utilized in commercial wheat varieties, faster
- Easier access and applicability of data and genetics derived from WGRRC collections
- The center will:
 - Be a venue for the exchange of information
 - Reduce redundancies
 - Focus public research toward commercially valuable and market demanded deliverables
 - Be a breeding ground for the next generation of wheat industry scientists

Contacts

For further inquiries please contact:

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Additional research initiatives in Manhattan

- **Genotyping-by-sequencing, and Genomic Selection in wheat breeding – USDA and KSU**
- **TCAP – USDA/NIFA**
 - Thanks to **PIs J. Dubcovsky and G. Muehlbauer!**
 - KSU team assists by working on developing new genotyping technologies based on sequencing.
 - The data, combined with resources developed by the International Wheat Genome Sequencing Consortium (IWGSC), will lay the foundation for next-generation breeding strategies that use modern genomics and informatics approaches to improve wheat
- **High Throughput Phenotyping – USDA**
- **FTF Innovation Lab for Climate Resilient Wheat – USAID/CYMMT**
 - Apply advanced molecular breeding techniques for development of heat tolerant wheat varieties targeting South Asia
- **Fine-scale dissection of host-pathogen interaction landscape (PI-Akhunov).**
 - Gates funding working with UC-Davis, U Minnesota
- **Feed the Future Innovation Lab for Collaborative Research on Sorghum & Millet - USAID/USDA/CYMMT**
 - Focus on Africa
 - Improved varieties and marketing systems

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Investments Fostering Partnerships



- The KWIC is expanding K-State's research capabilities
- First example – doctoral project screening wild wheat relative, *Geniculata*
- Hope is to identify and transfer heat tolerance genes from these relatives into commercial wheat varieties.

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Challenges and Opportunities

For Kansas and California wheat industries

- Leverage research initiatives
 - Competitive but all on the same team!
- Marketing and Production
 - Kansas still less than 30% planted with certified seed
 - Farmers do not sell wheat on protein scale
 - IP programs; white wheat...
- Servicing California market
 - Expanding milling capacities; meeting needs

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KANSAS WHEAT COMMISSION

Kansas grown. Kansas good.

Thank You!

Questions?

www.kansaswheat.org

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