Climate change. Growing populations. Poverty. Hunger.
Time is of the essence.

# THE WORLD NEEDS WHEAT THAT CAN WITHSTAND THE CHALLENGES OF THE 21ST CENTURY.

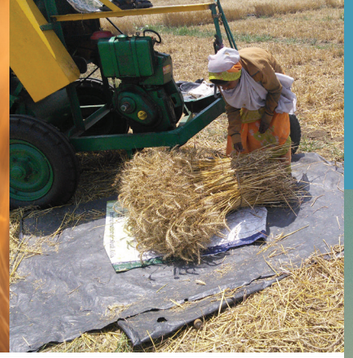
## THE BREEDING CYCLE


The conventional wheat breeding cycle can take over ten years before a new variety is released to farmers. The bottleneck in this cycle is in the evaluation process—years and years of physically measuring the characteristics and yield (phenotyping) of plants in the field. **It's expensive, it's laborious, and it's time intensive. Up until now, there wasn't a faster way.**

*"The effects of climate change and extremes impact all agriculture. The more we can learn how to develop wheat varieties that are resilient to heat and drought, the better farmers will be positioned to have improved yield stability and productivity."*

– Justin Gilpin
*CEO, Kansas Wheat*

KANSAS WHEAT



FEED THE FUTURE INNOVATION LAB
Applied Wheat Genomics

INNOVATION LAB FOR
**APPLIED WHEAT GENOMICS**

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FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

# Putting genomics to work for global food security

INNOVATION LAB FOR
**APPLIED WHEAT GENOMICS**

FEED THE FUTURE INNOVATION LAB
Applied Wheat Genomics

KANSAS STATE UNIVERSITY

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Cornell University

CIMMYT International Maize and Wheat Improvement Center

# INNOVATION LAB FOR APPLIED WHEAT GENOMICS

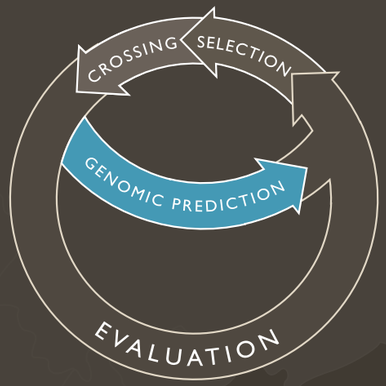
We are using cutting-edge genomics to accelerate development of climate-resilient, high-yielding and farmer-accepted wheat varieties—contributing to food and income sustainability in South Asia, and the world.


## TARGET COUNTRIES

Our focus is in South Asia, where over 20% of the world's wheat crop is produced each year. With the demand for wheat in developing countries projected to increase by 60% by 2050, the impacts of climate change have the potential to be devastating to their economy and overall well-being.

## FASTER AND MORE ACCESSIBLE TOOLS

We are developing affordable and accessible high-throughput phenotyping tools that enable breeders to rapidly measure plant traits on a global scale.




## USING BIG DATA TO SOLVE EVEN BIGGER PROBLEMS

By combining phenotypic and genotypic data from our trials in Mexico, India, Pakistan and Bangladesh, along with historical data, we are building the largest public database of elite candidate wheat varieties in the history of wheat breeding, enabling **better prediction models** which will lead to climate resilient, higher-yielding varieties in farmers' hands.

- CYCLE TIME
- IMPROVED VARIETIES IN FARMERS' HANDS, FASTER

## UNDERSTANDING GENETIC FACTORS

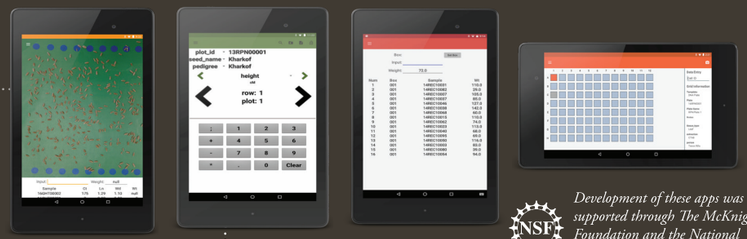
'Big data' generated thought the project enables us to understand which of the thousands of wheat genes control which traits and what the effect those genes have on yield.

## IMPACTS AT HOME

The United States produces over 2 billion bushels of wheat each year—and heat stress is a major limiting factor for wheat-producing states. Breeding methods developed in this project will be applicable internationally and domestically.

*Bangladesh, an extreme heat environment, was added as a research site in 2015. We've successfully implemented the largest wheat testing nursery in the country. Each of our sites evaluates the same materials, feeding an ever-increasing amount of valuable data into our network.*

*We are developing apps that run on smart phones and tablets and enable rapid data collection for plant breeders. These apps are being deployed in the innovation lab to facilitate the data collection across multiple countries and many research sites. The apps are also being shared with thousands of breeders around the world to facilitate breeding in many other crops.*



*Development of these apps was supported through The McKnight Foundation and the National Science Foundation.*