

Wheat Genetics Resource Center:

Pioneering Center Without Walls

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The theme of this year's conference is building cross-university alliances that enhance research. In this context, first I will outline dominant trends and challenges of the 21st century. We must treat these trends and challenges as opportunities to build cross-university alliances to enhance research and make an impact at a global level. I will follow this with the example of the Wheat Genetics Resource Center (WGRC) that is pertinent to this discussion. At the conclusion, I will make a concrete proposal for an initiative that we can launch in Kansas to enhance cross-university alliances.

Dominant trends for the first quarter of the 21st Century:

- Expanding human population from the present 6 billion to 10 billion people;
- Eroding biodiversity and environmental degradation;
- Exploding information and life sciences research.

Dominant challenges for the first quarter of the 21st Century:

- Enhance agricultural and industrial productivity to feed, clothe, house, and entertain the extra billions and billions of people;
- Conserve air, water, soil, and germplasm;
- Educate and train manpower.

Kansas lies in the Great Plains region that is the bread basket of the nation and the world. Kansas and the Great Plains region will play an even more crucial role in feeding the world in the 21st century. In Kansas, the average yield of wheat at the beginning of the 20th century was a little more than 10 bushels per acre. At the end of the 20th century, it is now nearly 40 bushels per acre! This enhancement in yield has, in part, come from improved cultural and agronomic practices, but superior genetics has played

a major role and is poised to play an even more critical role in the 21st century.

The development of an improved variety of wheat requires the expenditure of genetic resources, and we must delve ever deeper into the gene pool to improve our crop plants. Thus, eroding biodiversity, which is one of the dominant trends of the 21st century and especially of species related to our crop plants, could be devastating to the food security of the world.

It was this realization in the early 1980's that led to the establishment of the Wheat Genetics Resource Center at Kansas State University, designated as a center of excellence by the Kansas Board of Regents in 1984. The mandate of the WGRC is to conserve genetic resources of wheat, promote their utilization in wheat improvement through basic and applied research and sponsor the training of students, postdoctoral fellows, and especially visiting scientists from public and private organizations and foreign countries. All materials, technical know-how, and knowledge are made freely available.

The funding for core facilities such as the operation of the Gene Bank was secured from wheat producers (through the Kansas Wheat Commission), the Agricultural Experiment Station, the Kansas legislature, and federal funds through USDA special and competitive grants. The mission of the WGRC is endorsed by grower organizations and university scientists in 33 states. At present, the WGRC has numerous collaborative projects locally, nationally, and internationally. The WGRC has become a center without walls in the true sense of the word.

At present, 70% of the wheat acreage in Kansas is planted to KSU-bred wheat varieties and the value of the harvested Kansas wheat crop exceeds one billion dollars. Some private varieties have WGRC germplasm in their pedigrees. However, the impact of the WGRC is even bigger as its germplasm is used worldwide especially by international centers such as CIMMYT in Mexico, who in turn share wheat germplasm freely with almost all wheat producing countries in the world.

What is the secret of the WGRC's success? Several things come to mind. It has been, and continues to be, investigator-driven. It meets a critical need for readily available wheat germplasm for basic and applied researchers. It has nurtured grassroots participation, support, and shared vision with producers, consumers, administrators, and legislators. It has maintained excellence in research. Perhaps most important, it has provided a forum and a focus for collaborative research to anyone and everyone who

has an interest in wheat crop improvement. So the WGRC is poised to play an historic role to meet the dominant challenge of the 21st Century of feeding the extra billions and billions of people.

Coming to the theme of the meeting, the WGRC model can be applied to build cross-university alliances in the area of conservation genetics in the Great Plains region. Both KSU and KU are located in the Flint Hills, the last remnant of contiguous prairie in the nation. I propose that both universities pool their resources and expertise to develop a center of excellence in Prairie Conservation Genetics Initiative (PCGI). The PCGI will draw on the expertise of: the Konza Prairie/Agronomy group at K-State in ecological and range management research; WGRC expertise in experimental genetics and *in situ* conservation; and the expertise of scientists from the University of Kansas in conservation genetics research. PCGI will work with ranchers, commercial and governmental organizations and homeowners, to conserve and enhance prairie genetics, both on site and elsewhere. It also will produce a cadre of highly trained scientists who will travel the world to tackle the problems of biodiversity loss and environmental degradation that threaten the very existence of life on earth.