



FEED THE FUTURE

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

Welcome! We are delighted you could join us. A few reminders for today's webinar.

- Please **mute** your microphone and **turn off** your video.
- Please enter all questions into the chat. We will collect these to address in the discussion session at the end.
- The webinar is being recorded and will be made available after the webinar. The discussion session will not be recorded.

Thank you



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The Food Safety Network

Bringing the best of Food Safety Practices to the World

Participating Agency Program Agreement (PAPA)

Online library of
best practices

Rapid needs
assessments for
USAID Missions

Coordinated U.S.
government
expertise

Links to animal
and plant health
and food safety

Online interactive
sanitary and
phytosanitary
training

Agrilinks.org/activities/food-safety-network

October 1, 2016 to September 30, 2021



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WHEAT, PRAY, LOVE – HOW USDA/USAID WHEAT PRODUCTIVITY ENHANCEMENT PROGRAM REINVIGORATED PAKISTAN'S WHEAT SECTOR

December 15th, 2020



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HIS EXCELLENCY DR. ASAD MAJEED KHAN

Ambassador of the Islamic Republic of Pakistan to the United States



- Dr. Khan presented his credentials as Pakistan's Ambassador to the United States of America to President Donald J. Trump on January 11, 2019.
- Served as Pakistan's Ambassador to Japan from August 2017.



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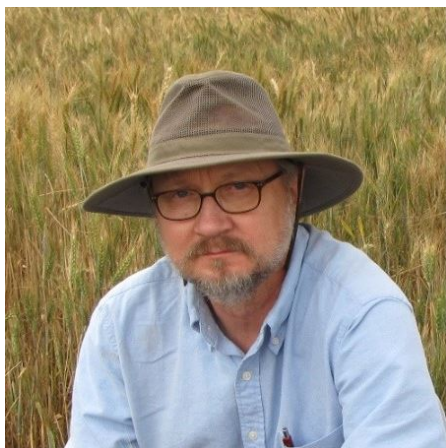




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OUR SPEAKERS



Dr. David Marshall
USDA Agricultural Research Service
Research Leader and Location Coordinator



Eric Brownstein
USDA Foreign Agricultural Service
CPEP program manager



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Wheat Productivity Enhancement Program (WPEP)

Wheat is the most important crop in Pakistan. It is grown on about 9 million hectares (22 million acres) 80% of farmers. Wheat accounts for about 60% of total daily caloric intake of the average Pakistani.

Goals:

- Greater internal cooperation & infrastructure
- Wheat rust surveillance
- Genetic diversity
- Accelerated variety release & Seed multiplication
- International Collaboration
- Improved agronomic management
(USDA-CIMMYT-ICARDA-PARC)



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Global Disease Spread of Wheat Stem Rust Ug99



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Regardless of type of invading organism – must
Arrive – Survive – Thrive
to become a problem. Otherwise:

**Rust
epidemics
can be
similar in
spread to a
wild fire.**



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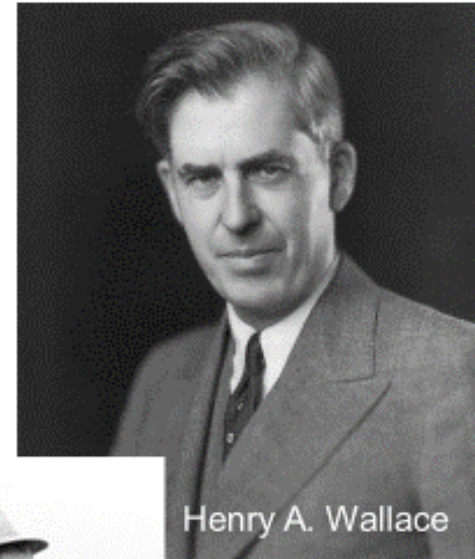


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The Wheat Stem Rust Story

- 1943 – Formation of MAP (Mexican Agricultural Project) of Rockefeller Foundation
- Objective was to breed higher yielding wheat varieties with resistance to stem rust.



Henry A. Wallace



Norman E. Borlaug



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The Wheat Stem Rust Story

- USDA global wheat collection trips (including Japan in 1946).
- Orville Vogel (USDA) at Pullman, WA (WSU) crossed 'Norin 10' x 'Brevor'; sent to Borlaug in 1952.
- Borlaug crosses 'Norin 10' x 'Brevor' with Mexican wheat lines having improved stem rust resistance
- MAP and Borlaug develop and release 10 improved wheat varieties between 1962-67.
- Wheat yields in Mexico, Pakistan, and India increased tremendously.
- Combination of improved genetics with N-fertilization resulting in the 'Green Revolution'.



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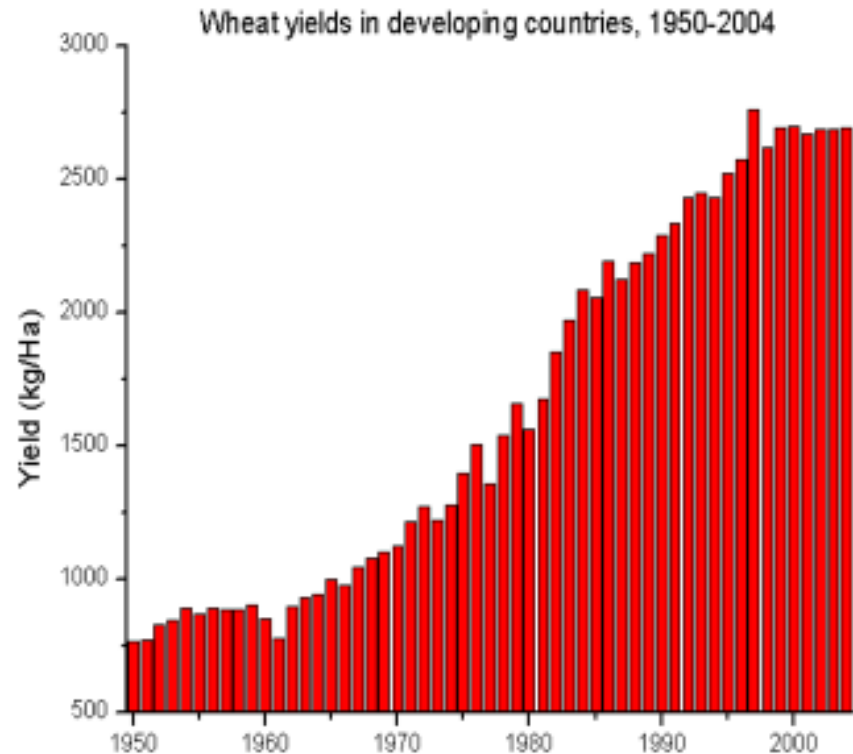
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The Wheat Stem Rust Story

➤ **1965-1995 – International Cooperation and Germplasm Exchange;**

➤ **USDA-ARS and CIMMYT establish many International Wheat Screening Nurseries; Introduction of 1BL.1RS rye translocation (*Sr31*). 'Veery' wheat germplasm and varieties in early 1980s.**

➤ **1999 - Virulence to *Sr31* (and other genes) in Uganda – named Ug99.**



Source: FAO



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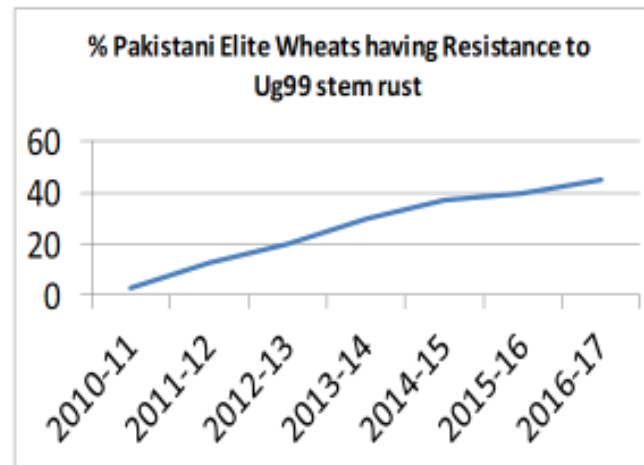


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WPEP 2010-2020

1. Greater cooperation among Pakistani wheat researchers - National Uniform Trials,; Travelling Wheat Seminar; Annual Wheat Planning Meeting.
2. Annual rust survey – Rust lab in Murree.
3. Scientist Exchange and training.
4. Genotyping and Phenotyping incorporated into the National Wheat Improvement Programs
5. New, diverse, and unique wheat germplasm cooperatively developed and selected in Pakistan and the U.S.
6. 50 rust-resistant, high-yielding wheat varieties under WPEP; Including Borlaug-2016; NIFA-Aman; Jauhar-2016; Ujala-2016; Pirsabak-2015; and Pakhtunkhwa-2015.



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WPEP Impact

- Infrastructure (building upgrades in Muree, Faisalabad and Islamabad)
- Equipment (field, lab, greenhouse)



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**WPEP Test and Develop Rust Resistant,
High Performance Wheat Varieties for Pakistani farmers**

Borlaug-2016

Adaptability area: Rainfed and Irrigated areas of Pakistan

Sowing date: 1st to 30th Nov. (Irrigated areas)
20th Oct. to 15th Nov. (Rainfed areas)

Days to maturity: 143/ Medium duration.

Plant height: 103 cm

1000 seed weight: 48 g

Resistant: Stem/Yellow/Leaf Rusts

Chapati Quality: Good


Seed Rate: 50kg/acre (irrigated), 60 kg/acre (Rainfed & late).

Fertilizer requirement: DAP+Urea @ 1 bag at sowing
Urea 1 bag, at 1st or 2nd irrigation

Irrigations: 4-5 (Sandy soil), 3-4 (Clay soil)

It has better adaptability for late sowing.

Yield: 7200 Kg/ha
(Potential)



Wheat Productivity Enhancement Program, (WPEP) for Pakistan

USDA/USAID funded WPEP for Pakistan is an outcome-driven science collaboration which enhanced and protected the productivity of wheat in Pakistan through research partnership that led to the identification and dissemination of new, high yielding, disease-resistant wheat varieties and optimal crop management practices.

Stamp
Here

Every year 9000 CIMMYT developed wheat lines introduced and tested in the country to identify the best varieties for commercial cultivation in Pakistan.

With the support from USDA, in the last 5 years Pakistan national wheat research institutes together with CIMMYT developed and released 30 wheat varieties and associated production technologies contributing to improving food security.

www.wpepforpakistan.org
www.rusttracker.cimmyt.org



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WPEP enhance efficiency of national programs through introduction of modern agricultural machinery

Wintersteiger combine harvester/seeding machine

- 8-row precision spaced planter of field trials.
- provides exact seed/fertilizer placement and a very high planting capacity
- Planting speed of over 4 km/h, save 30% time
- Absolutely no seed mixing between plots
- Best germination results
- Very accurate depth control by the openers
- Resultantly, the quality of yield data generated improved and led to faster release of new varieties.



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With the support from USDA, WPEP imported new Winter steiger combine harvester & seeding machines and 11 National Plot Planter with seed and fertilizer hoppers to replace outdated 30 years old irreparable machines thus upgraded Pakistan's wheat research infrastructure and increase quantity/precision of varietal performance data.

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www.wpepforpakistan.org
www.rusttracker.cimmyt.org



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Moving Forward:

- Promote the WPEP-established infrastructure (Rust Survey, Internal Cooperation, Molecular Marker Assisted Selection, New Varieties, etc.) as the **drivers for economic development**
 - Essential Traits & Biosecurity
 - Impact of Innovation – Market Access
 - Public-Private Partnerships focusing on Unique Germplasm



Farmers and Extension workers training on wheat rusts identification and management in Sindh



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CLOSING

Most large-scale disease and insect problem over the last 100 years has been solved through sustained international cooperation, collaboration and exchange of germplasm and its subsequent use. It's the sharing ideas and technology, and collaborative research that will solve agricultural problems.



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Thanks to Real Heroes – the Pakistan Breeders, Pathologists, Agronomists:

- Pakistan Agricultural Research Council
- Wheat Program, NARC, Islamabad
- Cereal Disease Research Institute, Murree, Karachi, Islamabad
- Wheat Research Institute, AARI, Faisalabad
- Regional Agricultural Research Institute, Bahawalpur
- Barani Agricultural Research Institute, Chakwal
- Nuclear Institutes for Food & Agriculture, Peshawar
- Baluchistan Agricultural Research & Development Center, Quetta
- Agricultural Research Institute, Quetta
- Wheat Research Institute, Sakrand
- Nuclear Institutes for Agriculture, Tandojam
- Cereal Crops Research Institute, Pirsabak



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Thank You!

The recording for today's presentation will be made available at

<https://www.agrilinks.org/events/wheat-pray-love-how-usdausaid-wheat-productivity-enhancement-program-reinvigorated-pakistans>

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