Disease Crop Modeling Advances and Challenges for Large-Scale Simulation Studies: Introduction to the session

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Outline

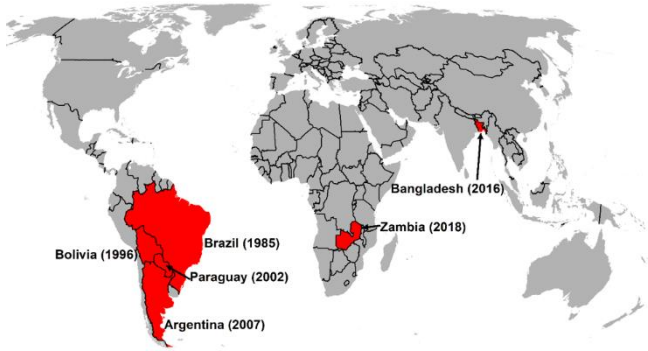
- Crop disease and food security
- Challenges
- Advances and opportunities
  - Minimum data requirements using FAIR principles
  - Integration of disease and crop growth models
  - Successful applications of crop disease modeling new technologies
  - Multidisciplinary approaches such as crop growth modeling integration with pests and disease modeling (e.g. Large scale simulations, warning and forecasting systems, crop damage assessments tools, etc.)

Crop Disease and Food Security

- Crop diseases are a major cause of hunger and social upheaval threatening food security

- It is estimated that crop pests and diseases are responsible for direct yield losses ranging between 20 and 40% of global agricultural productivity and regularly menace global food security (Savary et al., 2019)

- More than half of all emerging diseases of plants are spread by an introduction (Bebber et al., 2013).



Wheat blast has expanded rapidly since it was initially discovered in Brazil in 1985. (Map: Kai Sonder/CIMMYT)

Scientists observe wheat blast in Zambia's Mpika district. (Photo: Batiseba Tembo/ZARI)

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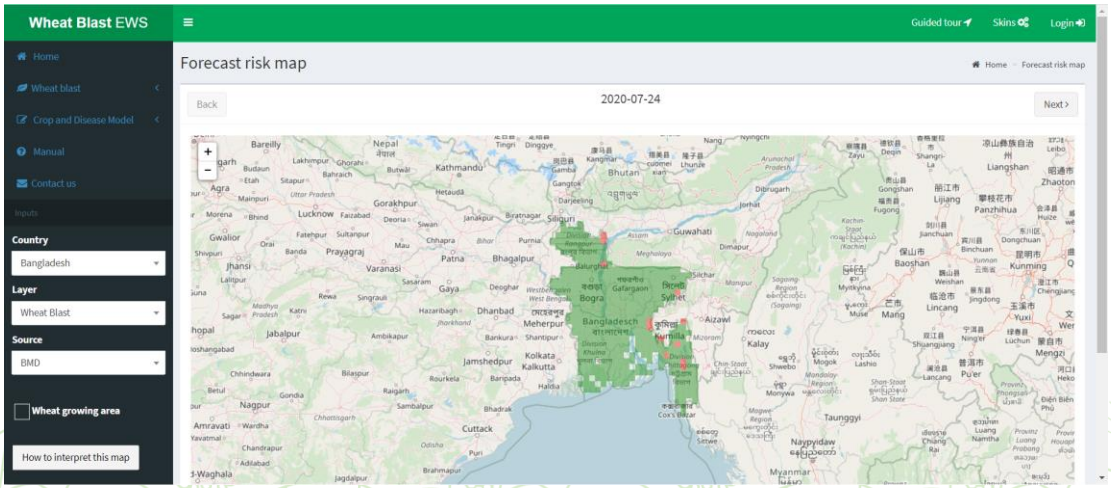
Challenges

- Data type, quality, and ways to share following the FAIR (**F**indability, **A**ccessibility, **I**nteroperability, and **R**euse of digital assets) principles

- Clear definition of **minimum data requirement** for crop and disease modeling simulations in the context of different research purposes

- Improvement of crop and disease assessment and monitoring tools (data quality and accuracy)



http://beattheblastews.net/model/forecastmap

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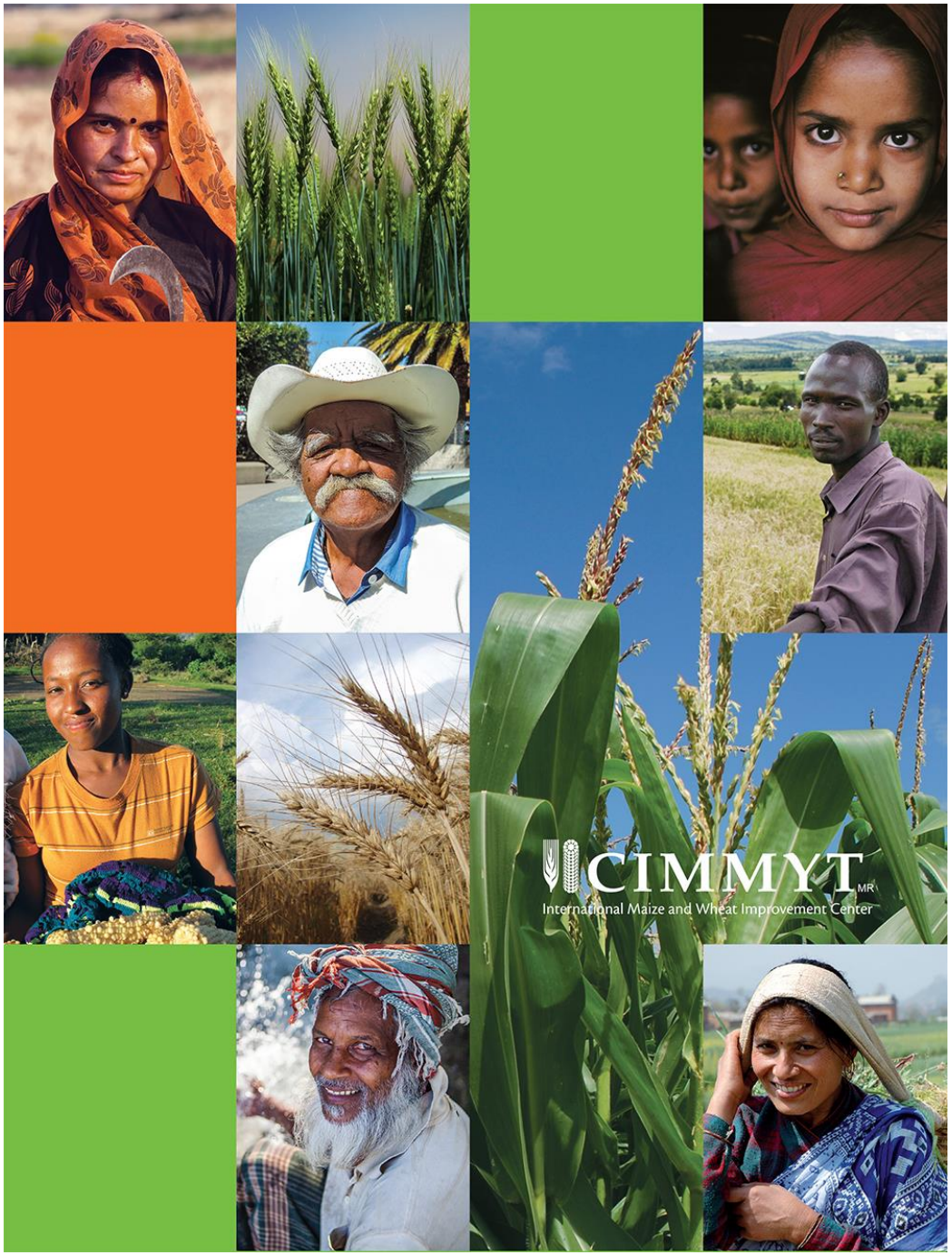
Advances and opportunities

- Many global networks becoming available to monitor and contain crop disease outbreaks
- Upscale new technologies and ground field data to regional assessment impacts
- Open-source data sharing initiatives
- Weather data been more accessible in space and time
- New disease monitoring technologies (e.g. remote sensing and satellite data, disease damage monitoring tools, crop and disease modeling interactive simulations, etc.)



Thank you for your interest!

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