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A Bangladeshi farmer in his Wheat Blast infected field

Photo Credit: CIMMYT



Agricultural extension officers from the Department of Agricultural Extension are trained on the Wheat Blast Early Warning System

Photo Credit: CIMMYT

Using Digital Tools to Prevent Wheat Blast Infection in Bangladesh

Wheat Blast is a fungal disease that can have devastating impacts on production. The disease has impacted wheat fields in Brazil since 1984, and was found in Bangladesh in 2016, where it impacted over 15,000 hectares of wheat. In Bangladesh, Wheat Blast has the potential to reduce wheat production by 25-30% resulting in lost profits for farmers upwards of US\$ 13 million.

With support from USAID and Bill and Melinda Gates Foundation, the [Cereal Systems Initiative for South Asia](#), led by the International Maize and Wheat Improvement Center (CIMMYT), along with partners from academia, and both research and extension services, including EMPRAPA in Brazil, developed an Early Warning System (EWS) for Wheat Blast that is being deployed in parts of Brazil and on a national scale in Bangladesh.

The backend of the EWS receives hourly weather data from the Bangladesh Meteorological Department (BMD). This data is applied to an algorithm that considers temperature, relative humidity, precipitation, and the timing of crop phenological development within the cropping calendar to generate location-specific five-day warning forecasts. The warning forecasts are applied to 17 km x 17 km grids on a map – with information also delivered by email and by SMS – allowing extension agents to provide highly customized advice to their farmers to take disease preventative action when and where it is needed

In Bangladesh EWS began its roll-out in 2019, training around 800 extension agents on how to use the system. Extension agents then in turn can register farmers onto the system should they have their own mobile phone and wish to receive alerts directly. Users interact with the system in two primary ways, 1) a web based portal that extension agents can use to both view maps and read advisory messages, 2) emails delivered to extension staff's inboxes, and 3) in the form of an SMS message that delivered to extension staff and lead farmers. If conditions trigger a warning, the system can both equip extension agents with information they can share with their farmers on the correct types of fungicides to deploy and how to deploy them, or farmers receive SMS messages directly with those instructions.

There have been some challenges with the EWS, including the inability for the system to identify smaller instances of Wheat Blast. The models used to predict higher risk conditions are conditioned to predict larger outbreaks with significant yield and economic losses. This limits the issuance of warning to farmers that experience small-scale incidents of Wheat Blast, though these instances are rarely economically damaging

Despite these challenges, the Government of Bangladesh institutionalized the EWS into its extension agent networks in December 2019. CIMMYT plans is working to transfer administrative responsibility to the Department of Agricultural Extension (DAE) in the coming two years. As forecast data from BMD is provided free of charge, the ongoing costs for maintaining the platform are minimal. Hosting, general maintenance, and SMS messaging are key costs that will need to be considered by DAE, and CIMMYT has developed an expected annual budget to keep the EWS going.

The Wheat Blast EWS is a good example of combining strong agricultural science with the use of multiple digital channels, including data from weather stations, web based tools, and mobile phones, to ensure farmers have the right information at the right time to combat the devastating impacts of crop disease. Learn more at: www.beattheblast.net

