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New project aimed at fighting Wheat Blast with Earth Observation and Climate Data

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Wheat blast, a devastating fungal disease, threatens food security in countries around the world. Now, a new project led by CABI is using Earth observation data and climate forecasts to combat this threat.

The project targets wheat blast in India, Bangladesh, Thailand, Australia, and the UK. Wheat blast thrives in warm, humid climates and can cause yield losses exceeding 50% under favorable conditions.

Pascale Bodevin, CABI's Project Manager for the project, said, "Climate change has altered the way pests and diseases establish and spread around the world.

"Countries and habitats that would historically be deemed inhabitable by a species, are changing due to rising temperatures and changing precipitation patterns which are expanding the distribution of species into new areas.

"Likewise, the consequences of increased global trade and pathways have led to pests and diseases travelling between countries accidentally, widening the species' reach.

"Under these conditions, wheat blast is expected to spread mainly in tropical regions. A more humid and warmer climate in the future will likely increase the number of suitable areas for wheat blast in the Southern hemisphere.

"Capturing local data and validating it will enable the project to collaborate with an existing research programme in wheat blast management and extension and outreach programmes in Bangladesh.

“The project is also working with key stakeholders in India and Thailand to understand how information is currently communicated in these countries and evaluate the potential risk of the disease.”

Targeted Approach with Cutting-Edge Tools

Funded by the Science and Technology Facilities Council (STFC), the project brings together experts in Earth observation, remote sensing, and disease modelling.

- **Wheat Blast Risk Maps:** These maps will pinpoint areas at high risk of outbreaks, enabling farmers and governments to focus their resources on preventative measures.
- **Wheat Blast CLIMEX Model:** This innovative model predicts where and when the disease might occur based on weather data. Initial results show promise in identifying regions susceptible to future outbreaks.

Beyond Early Detection

The project goes beyond just early detection. The ultimate goal is to develop a comprehensive framework for managing wheat blast and similar biosecurity threats. This includes creating resources to help countries free from the disease prevent its introduction.

Research Focus Areas

- Classifying crops using satellite data, particularly in Bangladesh.
- Combining models to generate risk assessments for informed decision-making.
- Identifying unique signatures of wheat blast with high-resolution remote sensing technology.
- Understanding current practices for sharing wheat blast information in affected countries.

Future Developments

The project is continuously evolving. Researchers are refining models to account for various environmental factors that impact the disease cycle. Additionally, a real-time infection model is being developed specifically for Bangladesh to predict outbreaks.

Professor Darren Kriticos, Co-founder and Managing Director at Cervantes Agritech of Cervantes Agritech highlighted the importance of this work.

He said, “The systems that we are developing harness the strengths of EO data and process-based modelling and will help manage MoT in both the short- and long-term. In the short-term, high-risk areas can be targeted for surveillance and management.

“In the long-term, the high-risk areas can be targeted for deployment of resistant wheat varieties or in extreme cases planting other crops. The models we are developing here in Bangladesh can be rapidly and

easily deployed to other areas where MoT is a problem, and we will extend the system to other diseases."

The successful implementation of this project has the potential to revolutionize how we manage wheat blast and other agricultural threats, ultimately protecting crops and ensuring food security for future generations.