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A crop disease without borders: Why wheat stem rust threatens your food security

Why this brief?

Drawing on recent evidence from the literature, this brief aims to inform policy makers and development agencies confronting the re-emergence of wheat stem rust (WSR), a fast-spreading crop disease once thought defeated. The brief describes how WSR can increase hunger worldwide through global wheat markets and presents the priority actions needed to mitigate this risk.

Key Messages

- **Wheat Stem Rust (WSR) is no longer a localized crop disease.** New strains are spreading across continents and overcoming resistance in widely grown wheat varieties.
- **International markets spread the impacts of WSR far beyond outbreak zones.** Even countries without outbreaks can face higher prices, lower food access and rising hunger.
- **By 2050, WSR could put an additional 1 to 2.6 million people at risk of hunger each year, over a no-disease situation, rising to as many as 10 million in a worst-case scenario.** WSR will impact primarily the most food-insecure populations worldwide.
- **Investing in wheat disease research and wheat resistant varieties is a global public good.** The benefits extend far beyond outbreak regions, but no single country has enough incentives to invest alone.

The challenge to address

Wheat is one of the world's most important crops, providing food and income for billions of people. However, wheat stem rust (WSR), a disease previously thought to be controlled, is re-emerging as a global threat. Since 1999, when a new and virulent strain of WSR was identified in Uganda, the disease and its variants have spread across Africa, the Middle East, and other parts of the world, causing yield losses reaching 80-100% in affected fields. Many wheat varieties currently grown around the world are no longer fully resistant to these emerging strains. WSR is no longer just a local problem. In today's interconnected food system, outbreaks in one region can disrupt global wheat supplies, raise food prices and increase hunger far beyond the areas directly affected. Yet most previous assessments focused mainly on production losses where outbreaks occur without considering how global markets spread the impacts of disease across borders. As a result, the global food security risks associated with WSR and the value of investing in resistance and disease management have likely been underestimated.

Methodology

The brief draws on a study in which eleven international wheat experts estimated the likely severity and frequency of yield losses to WSR across major wheat-producing regions under best-case and worst-case scenarios. These estimates were then incorporated into a global economic model to simulate how supply, demand, trade, and prices respond to WSR-induced production shocks across interconnected food markets.

Impacts

- **The role of international markets:** Higher global wheat prices from WSR-induced losses boost wheat production elsewhere and redirect exports to directly affected regions, partially offsetting their losses, but at the cost of reduced domestic wheat supply in exporting regions.
- **Global consequences of WSR:** WSR-induced losses are projected to increase the number of people at risk of hunger by 1 to 2.6 million per year over 2026-2050. In years when outbreaks occur simultaneously across major wheat-producing regions, this could rise to 10 million. Global wheat supply may fall by up to 20 million metric tons annually under these peak conditions.
- **Impact of WSR on directly affected regions:** Directly affected regions face the largest increases in hunger risk relative to their populations. WSR-induced yield losses lead to cropland reallocation that reduces wheat supply more than what direct yield losses alone would cause.
- **Impact of WSR beyond outbreak regions:** Regions with low direct exposure to WSR can also face substantial increases in the number of people at risk of hunger, as exports diverted to directly affected regions reduce wheat availability for their own consumers (Figure 1).

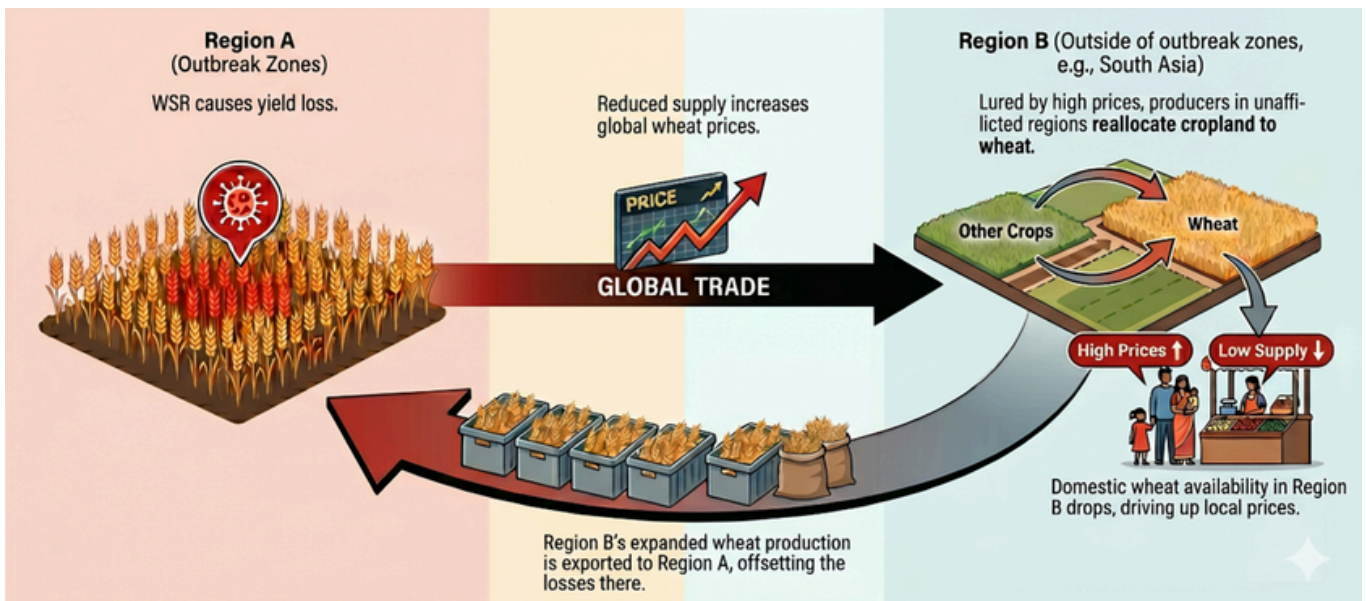


Figure 1. Conceptual illustration of how international markets can spread the impacts of WSR across national borders and beyond outbreak zones. Source: Generated with Gemini AI (16 June 2026)

Policy Implications

- **The findings show that WSR is not a localized agricultural disease issue, but a global food security risk.** International wheat markets transmit the impacts of WSR far beyond outbreak regions, meaning that development agencies and policy makers in regions not directly affected by WSR cannot treat this as someone else's problem. Their beneficiaries are still exposed through global commodity markets.
- **Sustained investment in WSR surveillance, resistance breeding, and fungicide access remains the only proven pathway for long-term WSR control.** Maintaining WSR at manageable levels requires continued research investment, while any increase in people at risk of hunger due to WSR represents the cost of falling short of that benchmark.
- **Food security programming in regions considered biophysically safe from WSR must still account for risks transmitted through global wheat market.** Policy design that ignores markets interactions will systematically underestimate the exposure of beneficiary populations to WSR-driven supply and price shocks.
- **The distribution of WSR impacts across regions creates a coordination problem for investment in resistance and disease management.** Because the benefits of WSR management are shared broadly through international commodity markets, the costs of research investment cannot be borne by a small number of actors. This strengthens the case for multilateral financing of WSR management as a global public good, and for collaborative actions among countries for WSR surveillance.
- **Global wheat markets are a key impact mediator.** Trade policy responses, such as export restrictions, would compound rather than absorb the impacts identified here. Maintaining undisrupted wheat trade during WSR-driven supply shocks is therefore a complement to research investment, not a substitute for it.

Recommendations & action points

- **Promote cross-country collaboration and increase multilateral funding for WSR surveillance, monitoring, and disease response systems**, recognizing that the benefits of sustained investment are shared globally through international commodity markets and that the burden of managing WSR cannot fall on a small number of actors.
- **Funding for WSR-related research needs to be framed as investment in global food security.** This will enable international research organizations, such as the CGIAR, to treat WSR as a priority within their wheat disease portfolios. Currently, the CGIAR has 27 fully active breeding pipelines to improve WSR resistance in 35 countries and protect around one third of global wheat area. Maintaining this existing capacity depends on continued donor support.
- **Policy makers should require integrated impact assessments** that capture both biophysical losses and market spillover effects before committing resources to crop disease response and food security programming.
- **Integrate WSR-induced price risks into food security early warning and program planning systems, social protection planning, and nutrition programs**, particularly in directly affected regions, and other regions with high dependence on wheat imports.
- **Coordinate international commitment to temporarily avoid trade-distorting measures during WSR outbreaks** and other global disease shocks, so as not to amplify market disruptions.

Correct citation

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