GLOBAL BURDEN OF CROP LOSS

Locations Worldwide

Dates 01/04/2019 - 31/12/2027

Summary

Given the pressures of climate change and growing global population, losing less of the crops that have already been sown on land or under cultivation presents an important opportunity to enhance food security. While there is increasing recognition of potential gains from curbing post-harvest losses and consumer food waste, pre-harvest losses remain poorly understood. The Global Burden of Crop Loss (GBCL) aims to fill this gap by providing trusted, data-driven metrics on crop loss across different regions and crops. By analysing global data, assessing the impact of pests and diseases, and leveraging advanced technology, GBCL aims to equip decision-makers with the insights they need to take evidence-based action. With a clearer picture of where, how and why crop losses occur, policymakers, researchers and investors will be better positioned to implement solutions that improve agricultural resilience and food security globally.

The problem

Every year, up to 40% of crops are lost before they are harvested due to pests. Despite its impact on food security and economies, pre-harvest loss remains poorly quantified, making it difficult for policymakers and investors to take targeted action. While post-harvest losses and consumer food waste are now widely recognized challenges, in-field losses have received far less attention.

To tackle this challenge effectively, decision makers require a better understanding of the scale and the factors contributing to these losses. However, data on the actual losses, spatial patterns and drivers of loss are often outdated, lacking in granularity, not shared, or missing altogether.

Current assessments typically focus on a single driver of losses, such as a single pest or drought, and research usually focuses on a limited number of pests and

geographies, often in isolation or based solely on expert views. As a result, available information is potentially subject to personal bias, or fragmented, outdated, or missing altogether, making it difficult to understand the true scale of the problem.

Furthermore, the information is critically without quantification of how much of our food supply we are losing, where we are losing it and what we are losing it to. Actors across the plant health system lack clarity on how to take effective action and on which interventions to prioritize. Therefore, there is a need for better data to enable better-informed policies, management and investment strategies.

What we are doing

The Global Burden of Crop Loss (GBCL) aims to support plant health by providing actionable estimates of crop losses to inform decision making locally, nationally and globally.

Following an inception phase, a conceptual framework of the GBCL was established. This framework aims to define “attainable yield in context” (AYIC), meaning the achievable yield given the local climate, water availability, expected nutrient inputs and predominant local agronomical practices. The crop loss envelope is calculated as the difference between the AYIC and the actual production as reported by the FAOSTAT.

For this purpose, a large-scale collation, cleaning and integration of global field observations data was initiated. For maize alone, this has produced over 200,000 unique maize yield observations globally. These data underpin the methodology simulating attainable yields using a wide set of climatic, environmental and socio-economic variables.

The project is also engaged in extensive data collection to assess the impact of pests and diseases on global crop yields. Data is collected from published field trial datasets and information reported in scientific and grey literature. In collaboration with partners, CABI is exploring automated text mining techniques to streamline data collection.

A robust framework to amalgamate diverse data sources is being developed which will enable estimated losses to be dissected and primary contributing factors identified.

Furthermore, the scope of the project extends to leveraging Earth Observation technology for monitoring the impact of major natural disasters and detecting biotic pressures through a combination of Earth Observation, machine learning and process-based models.

Results so far

GBCL will focus on estimating the economic burden of crop losses in three major cereals – maize, wheat and rice – while also developing regional assessments for key tropical crops, including cassava, cowpea and banana.

The core objective is to deliver global and regional country-level economic burden estimates for the selected crops. This will include:

1. In-depth case studies that refine crop loss assessment methods and attribution frameworks, offering a clearer picture of where and why losses occur
2. A review of how to adopt a gender lens on crop loss and economic burden analysis across two case studies
3. Support to develop and disseminate the estimates – GBCL will develop a robust data management plan and infrastructure capable of handling diverse and extensive datasets to inform its models effectively
4. A sustainable business model, encompassing governance and financial considerations to ensure the initiative’s long-term viability

Finally, the project will focus on dissemination and uptake strategies, including the publication of open-access papers, the development of an interactive dashboard and proactive policy engagement efforts to tailor materials and support decision-making processes effectively.

Through these collaborative efforts, GBCL aims to improve the global understanding of crop losses, ultimately contributing to more informed decision-making and resilient and sustainable agricultural systems worldwide.

Further information about our work on the Global Burden of Crop Loss can be found here.

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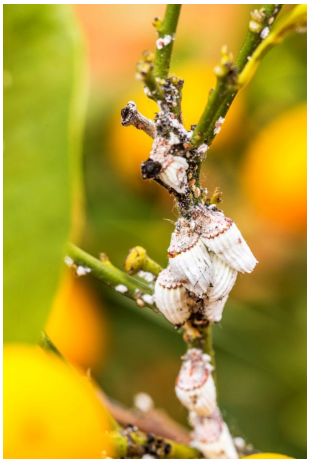


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