

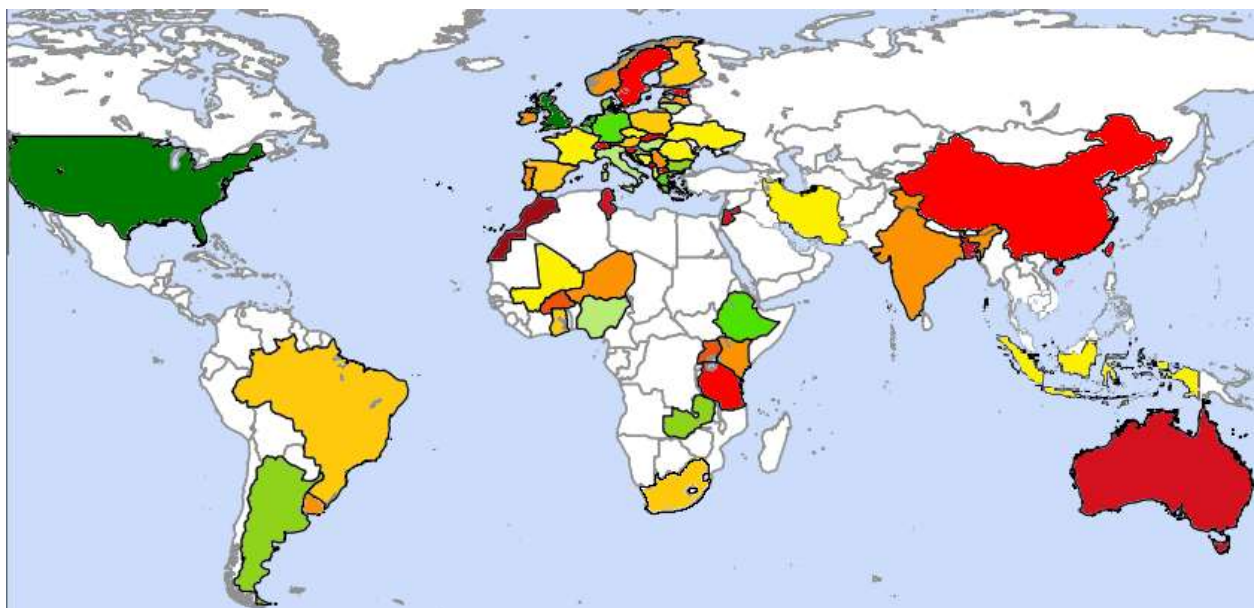
Summary Global Yield Gap Atlas

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The world must produce substantially more food to meet increasing demand for agricultural products. However, the regional implications of this challenge vary enormously across the globe due to large differences in both magnitude of the rise in demand and in the potential to increase food production to meet it. Measuring crop production performance at local to national scale in an objective manner, and any improvements due to policies and investments in the agricultural sector, is made difficult by large differences in endogenous biophysical factors such as climate and soil that have a large influence on crop yields, input requirements, and resilience to variable climate. Two performance metrics allow objective comparisons across such variation: (i) the yield gap, defined as the difference between current farm yield and the potential yield that can be achieved when crops are grown with optimal nutrient supply and protection against pests, and (ii) yield stability as quantified by the degree of year-to-year yield variation due to variation in rainfall and temperature.

Both of these metrics are evaluated in the Global Yield Gap Atlas (GYGA; www.yieldgap.org) across local-to-national and continental scales within an agronomically relevant spatial framework that allows quantification of comparative advantages with respect to yield potential and yield stability. GYGA is an international project initiated by researchers from University of Nebraska-Lincoln (USA) and Wageningen University (The Netherlands) in 2011. The Atlas has been developed for ca. 55 countries across five continents, and includes all major cereal crops. Recently, the crop list has been extended to include soybean, sugarcane, and potatoes. We are also adding information on water productivity and nutrient requirements. As the Atlas provides open access to all underpinning weather, soil and agronomic data, the database is a unique starting point for all sorts of scientific, strategic and applied questions. For example, GYGA can be used to improve impact assessment of past agricultural development investments because evaluating progress in terms of closing yield gaps and increasing yield stability from baseline levels avoids the bias from differences in climate and soil, and short-term weather patterns. The Atlas can also be used in a similar manner for ex ante impact assessment and prioritization of investments, as well as a foundation for studies aiming to explain and mitigate yield gaps and investigate impact of climate change, land use, and environmental footprint of agriculture.



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Applications of yield gap assessment

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