



HUNGER'S TIPPING POINT



AN URGENT CALL TO TRANSFORM FOOD AND NUTRITION SECURITY



TOWARDS A WORLD WITHOUT HUNGER

MEETING THE CHALLENGE OF FOOD AND NUTRITION SECURITY

AN URGENT CALL FOR RESEARCH AND INNOVATION

Today, 700,000,000 people are food insecure and desperately poor. About half that number don't know where their next meal is coming from. **And 60,000,000 children under the age of five are stunted**- cognitively and physically impaired for life - due to nutritional deficiencies.

Yet as difficult and as uncomfortable as it might be to imagine, **humanity is headed towards an even more food insecure, unstable world by mid-century than exists today, worsened by a vicious cycle of conflict and food insecurity.**

Climate change is projected to decrease the productivity of most major staples when substantial increases are needed to feed a world which will add another 1.5 billion people to its population by 2050. For maize, the major staple for much of Africa, the picture is particularly dire with decreasing yields projected for virtually its entire growing area. Increasingly common extreme weather events associated with climate change will only make matters worse. Moreover, additional factors such as soil erosion and land degradation, biodiversity loss, water shortages, conflict, and policies that restrict innovation, will drag crop productivity down even further.

Today's challenges of access to food will be exacerbated by production challenges tomorrow. We are not on track to meet future food needs. Not even close. While much can and needs to be done to improve the flow of food to those in need, food production and accessibility must rise sharply and sustainably by mid-century, particularly where hunger and malnutrition are most severe.

There is hope. Agricultural R&D has long been essential to increasing food production. Since the Green Revolution of the last century, our understanding of biology and genetics has increased greatly. However, requisite productivity increases are now hampered by lack of investment in basic and applied research, and by regulatory barriers prohibiting distribution and use of research advancements. Incremental agricultural productivity improvements will be insufficient to meet future needs. By failing to prioritize agricultural R&D and its dissemination today, we tie our farming systems and our fate to the past and to ever increasing use of diminishing non-replenishable resources to feed humanity.

Agricultural research enjoys extremely favorable returns on investment when all its benefits are considered, but there are multiple market failures when it comes to providing the people of the developing world with a nutritious diet in a manner that is resilient, environmentally sustainable, and cost-effective. The benefit of enabling healthy, productive, and secure lives for billions of people has returns that flow broadly through the global economy. While some of the market failures can be addressed with current technologies, within appropriate regulatory and "pricing" frameworks (such as the pricing of carbon and water), full success in meeting the world's nutritional needs will also require advances in basic research. Society sponsored research will be the foundation of the innovation that drives a successful food system of the future.

We must take bold action to change course. We must be prepared to pursue high risk, high reward, scientific research with the goal of transforming our food systems to meet the nutritional needs of everyone sustainably. These will be planet-friendly “moonshot” efforts leading to substantial, not just incremental, leaps in food production for food and nutrition security. Beyond research, success will require science-based policies, regulations, and incentives that are enabling and aligned with this goal, including those pertaining to AI, computational biology and advanced genomic techniques.

Reversing our current trajectory towards a tragic mismatch of global food supply and demand by mid-century requires definitive action now.

We are advocating for transformational efforts across the food value chain, from inputs to production to the post-harvest phase. Building on recent advancements in biology and genetics, moonshot initiatives that could be considered include: enhancement of photosynthesis in crops such as wheat and rice, biological nitrogen fixation of major cereals, transformation of annual to perennial crops, development of new and overlooked crops, innovations in diverse cropping systems, enhancement of fruits and vegetables to improve storage and shelf life and to increase food safety, and the creation of nutrient-rich food from microorganisms and fungi. Also critical will be the study and development of strategies to make certain that the fruits of these scientific research initiatives reach and benefit those most in need.

The scale of ambition and research we are advocating will require mechanisms to identify, recommend, coordinate, monitor and facilitate collaborative implementation of the proposed food security moonshots.



As leaders in science and innovation, we ask you to join us in sounding the alarm, raising collective ambitions, and advocating for research moonshots to ensure the world's future food and nutrition security.

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