Tomorrow's Affairs
Analysis of today
Assessment of tomorrow

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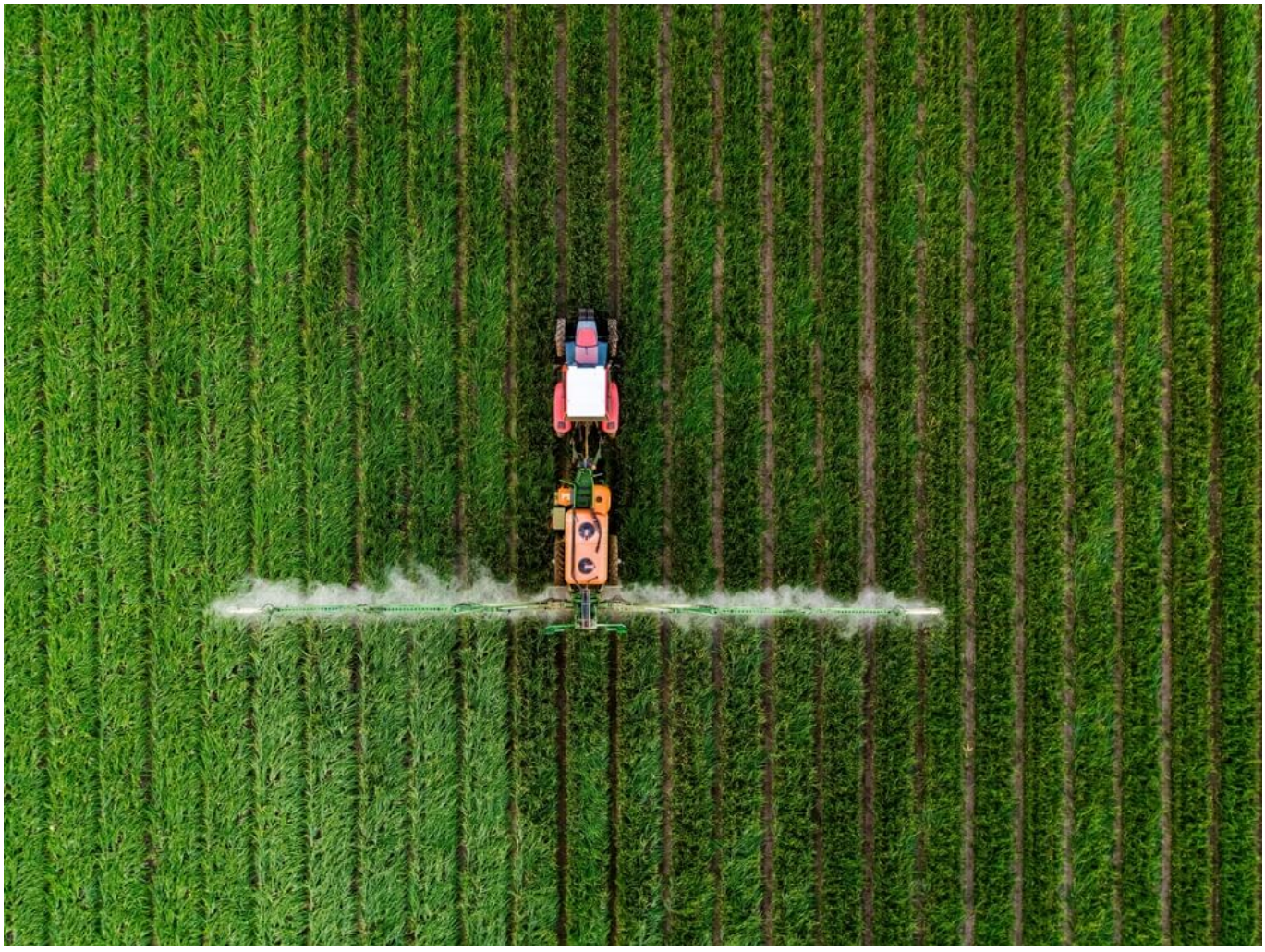
How can the world feed 10 billion people by 2050?



With the world struggling to feed eight billion people today, how will we feed ten billion by 2050?

Meeting the nutritional needs of a growing population requires not just a radical increase in food production – almost all of it plant-based – but also a more equitable distribution to ensure that no one is food-insecure.

That is a tall order. The current food system is already buckling. Roughly 673 million people go to bed hungry every night, and in 2025, we witnessed two famines (in Gaza and Sudan), each driven by conflict, climate shocks, and soaring food prices.

At the same time, 1.66 billion hectares – 60% of which are agricultural land – have been degraded by the very practices we rely on to feed the world.

Global hunger stems not from a lack of capacity to produce enough food, but partly from our failure to produce it efficiently and distribute it evenly.

Conflict and insecurity remain the dominant causes of hunger across 20 countries and territories, leaving nearly 140 million people facing acute food insecurity.

Disasters have inflicted an estimated $3.26 trillion in agricultural losses worldwide over the past 33 years – an average of $99 billion annually, or roughly 4% of global agricultural output; and recent supply-driven food-price spikes have pushed tens of millions of people into hunger almost overnight.

Worse, these are not one-off shocks. They represent the new normal.

For decades, the agriculture sector has responded well to rising demand by developing higher-yielding crops and using more of everything: more fertilizer, more pesticides, and more water.

Yet this trend has produced unnecessary waste, polluted rivers, degraded the soil, and released ever-more greenhouse gases (GHGs).

We need to find a better path, and science can show us the way. We already have the knowledge and the tools to optimize what we use and diversify what we grow.

Improved pesticide management

One priority is to improve efficiency. Between 1990 and 2020, fertilizer use rose 46% and pesticide use doubled.

But only 30-60% of fertilizer nutrients and 20-70% of pesticides are effectively absorbed; the rest washes into rivers, degrades soil, or releases GHGs.

> Improved pesticide management reduces chemical waste while safeguarding biodiversity

Fortunately, research shows that optimizing nitrogen use can boost yields by up to 19% and slash fertilizer use by 15-19%.

Improved pesticide management – through precision spraying, biopesticides, and residue monitoring – reduces chemical waste while safeguarding biodiversity.

Agroecological practices – such as intercropping, crop rotation, and integrating trees into farm systems – further enhance soil health, lower input dependence, and strengthen long-term resilience.

How to diversify the food system?

The next priority is to diversify the food system. Decades of productivity gains have fostered a dangerous dependency on just three crops.

Wheat, rice, and maize now provide most of the world's calories. Such reliance on monocultures creates profound vulnerability

to pests, diseases, and climate change.

The solution lies in the crops we have marginalized. Traditional and underused species – hardy millets, nutrient-dense legumes, indigenous fruits, robust yams – offer ample nutrition alongside other benefits such as climate resilience.

United Nations Food and Agriculture Organization initiatives like Future Smart Food (in Asia) and 100 Crops for Africa demonstrate how these "forgotten" crops can simultaneously expand diets, boost farm incomes, and restore degraded soils.

Finally, we must scale up effective technologies. Data analytics and precision-agriculture tools are already reshaping farming.

> Ongoing innovation must be incorporated into local practices, which calls for greater collaboration among governments, investors, the private sector, and farmers

Drones can plant seeds and deliver inputs with pinpoint accuracy. AI platforms can use satellite imagery to provide tailored, real-time recommendations.

Robots can detect weeds for targeted spraying, avoiding the need for blanket herbicide applications.

Digital soil tests and weather stations can guide day-to-day decisions, and blockchain systems can link smallholders to transparent and traceable markets.

Scaling these tools will require substantial investments in agricultural extension services (to promote best practices), major science-based policy shifts, and knowledge-sharing platforms to help farmers optimize inputs.

Likewise, ongoing innovation must be incorporated into local practices, which calls for greater collaboration among governments, investors, the private sector, and farmers.

Agriculture must produce more with less

The objective is clear: agriculture must produce more with less – more crop per drop, more calories per kilogram of fertilizer, and more nutrition per hectare – every season, everywhere.

That requires replacing one-size-fits-all industrial packages with resilient, context-specific systems finely tuned to local soils, water regimes, crops, and climates.

Even in the face of recurring conflict, drought, and market chaos, stable production and affordable prices are possible

Publicly funded research must lead where markets fall short to ensure equitable access to precision agriculture, while private innovation continues to scale up what works. Knowledge is no longer the bottleneck; political will and aligned incentives are.

Even in the face of recurring conflict, drought, and market chaos, stable production and affordable prices are possible.

Resilient soils, diversified cropping, and precision management hold the key. A world where nearly everyone eats well, farmers prosper, soils regenerate, waters run clean, biodiversity recovers, and agrifood systems emit minimal GHGs is not utopian.

It is the realistic reward for embracing a different agricultural model before the old one

collapses.

The only question is whether we use the knowledge, science, and proven tools already in hand.

Future generations will not ask whether the solutions existed; they will ask what took us so long to implement them. The choice is ours, and it starts with turning science into real-world practice.

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