

What to Expect in the Next Green Revolution?

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ABSTRACT

A green revolution is much needed and long overdue. Here's what scientists and researchers need to focus on.

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Introduction

On the brink of World War 1, scientists throughout Europe were already embroiled in a debate regarding food supply shortages. During that point in time, it was well known that plants require nitrogen to grow and that large-scale farming disrupts the nitrogen cycle during harvests. Hence, the soil's nitrogen content had to be replenished. Guano (animal droppings) was known to be a great fertilizer, but its imports were dwindling, and Europe didn't have an abundance of land to grow crops on and feed its people. Fortunately, Fritz Haber had discovered the Haber cycle during that time, enabling nitrogen-rich ammonia to be produced for fertilizers.

This led to the first major green revolution that changed the landscape of agriculture. Since then, we've experienced multiple green revolutions as science and technology progressed, but another one might be just around the corner.

Why is Another Green Revolution Coming?

In the '60s and '70s, biotechnology and selective breeding helped the world fight starvation by producing higher yield crops. Notably, the efforts of the agrobiologist Norman Borlaug in wheat cultivation prevented famines in large parts of the world. Since then, no major agricultural revolution has happened that has changed the course of the world; however, we are now facing a similar pattern, and a green revolution is long overdue. Climate change threatens to curtail crop yields while, at the same time, rising populations demand more sustenance.

What Should a Green Revolution Focus On?

In The United Nations estimates that the world's population will increase to around 10 billion in 2050, with Asia and Africa remaining the most populous regions. Controlling population growth is out of the question as it would require a measure of policy by the region's government to curtail. On top of that,

these regions harbor population centers that are the most vulnerable to climate change. Hence, a green revolution will need to focus on working to mitigate the effects of climate change on agriculture



Figure 1.

An image of a field of wheat with the sky in the background

Biotechnology

Biotechnology is perhaps our biggest weapon against climate change. It equips us with the tools and techniques to edit gene configurations within organisms. This knowledge will come in handy when producing strains of crops that are drought-resistant, or on the flip side, flood-resistant, to fight the uncertain weather patterns ahead of us.

Microbiology

The pandemic has taught us that a virus has the potential to wreak havoc on a global scale. Similarly, plants are also living organisms that are prone to microbial attacks, and a viral attack right at the world's supply can have drastic consequences.

Crops do not have genetic variation. Their seeds are produced in such a way that prevents them from reproducing sexually; hence every generation of crops is genetically identical. This increases the likelihood of plants attaining an infection by a vector that may decimate an entire field. Therefore, researchers need to preemptively work on producing strains that are resistant to diseases so that such an incident never happens.