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Talking Point

Dr Prem Warrior Centre for Agriculture and Bioscience International

Harness tech to secure food supplies

The human race is on a collision course with an unforgiving reality.

Without significant investment to meet the shortfall in agricultural technology, we will struggle to feed a global population of almost 10 billion people by 2050.

Surprisingly, we already produce enough food to feed the world, and predictions indicate we will continue to produce enough food between now and 2050.

So what is the problem? How can food security be within our grasp, and yet every year 36 million people die of hunger and malnourishment?

Simply put, food production and access to food are not equal across the globe. Food is not easily produced everywhere, it is not produced to an equally nutritious standard on a global scale, and it is not affordable to all.

In a nutshell, the integration of technology into farming practices is essential if we want to achieve zero hunger by 2050, as called for by the United Nations.

FOOD FOR THOUGHT

Two main issues affect our ability to produce the food we need and to keep what we produce: inadequate plant nutrition and crop losses.

Among the many constraints to agricultural productivity, poor or inadequate plant nutrition deserves the most attention in both the developed and developing world. Poor soil leads to poor crops and herein comes the importance of balancing the nutrients in the soil. The adage "you are what you eat" applies to plants too.

*** Food production and access to food are not equal across the globe**

We must also protect what we produce. Most alarming is the fact that, globally, we waste about 30-40% or more of the crops we grow to diseases, pests and rodents (mainly due to poor storage conditions).

Additionally, a quarter to a third of all food produced for human consumption is lost or wasted. More than 60% is wasted by consumers, but 87% is lost or wasted in production, storage and transport – that is to say, post-harvest losses.

These figures may not be so bad in the UK, but in sub-Saharan Africa, the lack of post-harvest technologies causes US$4bn in grain losses annually – enough to feed 48 million people. Agricultural knowledge and technology is simply not shared widely enough.

And we can add a third problem to the list: agricultural innovation has slowed down. Over the past decade, there has been a considerable reduction in the number of patents filed and granted for new agricultural technologies, especially new chemistries or inputs. We simply do not invent enough in this sector.

MAKING A MEAL OUT OF TECH

Telephone farming, digital agriculture, plant doctors, and triggering defence responses with plant pheromones are all possible ways in which technology can help feed the world today and tomorrow.

If the world's 1.4 billion agricultural workers can grow more and lose less of what they produce, they can begin to safeguard their incomes and livelihoods, creating sustainable farming futures.

We need a three-pronged approach to crop management that includes reducing crop losses through targeted investments, reducing post-harvest losses with implementation of post-harvest technologies and reducing food waste with better preservation and recycling efforts.

We have increased crop productivity substantially through genetic technologies. Additionally, new technologies, such as RNA interference and gene editing, may help us develop even better quality seeds.

We should also continue to invest in blue-sky technologies, such as nitrogen-fixing cereals or carbon-fixing plants, even though the idea may seem far-fetched at this time.

Currently, disruptive technologies in gene editing are starting to make their way onto the biotech scene.

Different to GMO, these technologies may help eliminate the need to introduce foreign genes. This is where we can learn from the pharmaceutical sciences and improve collaboration between the private and public sectors.

FUTURE-PROOFING FOOD

Adoption of new technologies continues to be the biggest challenge. Investment is essential, but very little is spent on understanding how we bring technology to the farmer.

In the immediate future, game-changing agricultural technologies will only find applications in developed countries; developing countries will have to wait.

To be accessible, and to benefit the developing regions where the majority of the hungry and ill-nourished people live, we will need partnership and engagement from multiple stakeholders. This includes the public and private sectors, academia, and non-profit entities such as the Centre for Agriculture and Bioscience International (CABI), together with continued funding and sponsorship from donors like the Department for International Development and the Bill and Melinda Gates Foundation.

Agriculture is complex. Food insecurity is not a disease or software glitch that can be addressed with one targeted vaccine or a simple piece of code.

We must diligently work towards integrating multiple solutions including agrochemicals, biotechnology and other inputs such as biologicals, biostimulants, and biofertilisers. It is only then that we can begin to address the challenges in our ecosystem that limit crop productivity and meet the challenge of feeding the 10 billion by 2050.