

Calestous Juma: Africa needs its own Green Revolution based on science and technology

[Editor's note: The author of this article, Calestous Juma, a professor at Harvard University, died on Friday, December 5, 2017 at the age of 64. Juma was a passionate advocate for biotechnology in Africa and a proud supporter of the Genetic Literacy Project. He wrote [this article](#) for the GLP in 2014.]

A quarter of the world's hungry people are in sub-Saharan Africa and the numbers are growing. Between 2015 and 2016, the number of hungry – those [in](#) distress and unable to access enough calories for a healthy and productive life – [grew](#) from 20.8% to 22.7%. The number of undernourished [rose from](#) 200 million to 224 million out of a total [population](#) of 1.2 billion.

Conflict, poverty, environmental disruptions and a [growing population](#) all contribute to the region's inability to feed itself.

Screen Shot at PM e
Calestous Juma

To tackle hunger, the continent needs to [find new](#), integrated approaches. These approaches – discussed [at a recent](#) Harvard conference – must increase crop yield, enhance the nutritional content of people's diets, improve people's health and promote sustainability.

This may sound like a mammoth, perhaps insurmountable task. But Africa can learn from the experiences of the [Green Revolution](#), set into motion by the US in the 1960s. The initiative was launched in response to major famines and food crises in the 1940s and 1950s. It was a complex exercise which demonstrates the power of science, technology and entrepreneurship in solving global challenges.

The Green Revolution [is estimated](#) to have saved up to one billion people from starvation. Africa needs to stage its own version if its to help save its people from hunger. Its lessons are instructive because of the need to approach the hunger crisis as a [complex problem](#) – and not just to raise crop yields or aggregate food production.

The Green Revolution model

Geopolitics was the biggest impetus for the Green Revolution. The US and the Soviet Union were locked in the [Cold War](#). The Soviets championed a model of collectivised agriculture; the US dreamed up and implemented the Green Revolution.

Its focus was on increasing yields using improved rice, wheat and maize varieties. This was achieved by bundling the new varieties with fertilisers and pesticides.

Collaboration was a crucial part of the project's success. A global network of [15 agricultural research centres](#) was created to localise crops that were bred in the US and Japan to countries like India and the

Philippines.

But perhaps most importantly, political will was brought to bear. Countries recognised that there might be nutritional and environmental risks involved in adopting the technology being offered by the US. But they knew that the consequences of subsequent famines would create national security crises.

India, Mexico and the Philippines dramatically increased their food output. But the focus on yields left the same regions with poor nutrition, ecological degradation and farmers displaced by land consolidation.

There is no [geopolitical stimulus](#) for action today. But there may be a way to tap into political will. Economic development is at the top of Africa's development agenda and African leaders recognise that they can hardly grow their economies without raising agricultural productivity.

This is the perfect moment to start tackling the continent's hunger crisis.

How it can be done

This is not a task for one sector of society alone. Ending hunger in Africa will involve bringing together key players such as government, academia, industry and civil society. We must see what has already been done and what is already working; we must interact and learn continuously from each other.

African countries such as [Nigeria](#) and Ethiopia, that have increased their food production, relied on a system wide approach – not the traditional reliance on isolated projects. The measures include investing in rural infrastructure, improving technical training of farmers, leveraging new technologies, upgrading food processing and expanding local market access. Ethiopia went further and created the [Agricultural Transformation Agency](#) to better coordinate this strategy.

Learning must happen from across sectors. For instance, what can the transition to clean energy teach us about transitioning to “cleaner”, healthier, more nutritious – food? It has inspired [a shift](#) to new technological applications that increase energy use while reducing ecological effect.

A comparable scenario can be envisaged for transitions in food systems to; reduce [nutritional deficiencies](#), curb the spread of non-communicable diseases (such as [obesity](#)), and protect the environment through practices such as [sustainable intensification](#).

Fostering energy transitions also involves diversifying and conserving energy. Similar approaches to expand food sources and reduce [food loss and waste](#) will need to part of food transitions.

Technical experts

[Norman Borlaug](#), a scientist who spearheaded the Green Revolution and won the Nobel Prize in 1970, also laid the groundwork for some of what can be achieved in Africa.

In his later years, Borlaug led studies seeking to improve indigenous African crops in a bid to help expand

the continent's food baskets. He chaired a committee of the US National Academy of Sciences that added an earlier study on [grains](#).



This kind of work needs to be expanded systematically to

include other food sources such as [livestock](#), fisheries, and insects.

For all of this to happen, universities must get involved in producing new generations of technical experts, policymakers and practitioners. These are the people who will support food transition and safeguard Africa's food future. And this doesn't require reinventing the academic wheel: for instance, engineering schools that focus on solving social problems have the opportunity to expand their roles from supporting manufacturing to including agriculture.

This is already being done by institutions such as the Massachusetts Institute of Technology. In many other cases new universities will need to be created as was done in Costa Rica in 1990 with the founding of [EARTH University](#), possibly the world's first sustainable development institution of higher learning.

Africa's complex hunger challenges can only be addressed by taking into account emerging concerns about nutrition, health, non-communicable diseases, food loss and waste and environmental projects. These are also [global challenges](#), making Africa's efforts relevant to the rest of humanity.

Calestous Juma was a professor of international development at the Harvard Kennedy School.

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