



Greenhouse cultivation at Panuka Farms, a small horticulture business in Zambia. PHOTO CREDITY: LINK MEDIA/ WORLD BANK

Achieving safe food in food-insecure countries

By Dr Nancy Njeru

Food security and food safety are closely linked, yet they are often treated as separate challenges. Food security exists when all people have physical, social, and economic access to sufficient, safe, and nutritious food for a healthy and active life. Food safety ensures that food will not cause harm when consumed as intended. In a well-functioning food system, these goals should reinforce one another. However, in many low- and middle-income countries, limited consumer awareness, weak regulatory systems, and inadequate incentives for food safety investments create a

gap between food availability and food safety.

In food-insecure settings, households often prioritise food availability over safety. When food is scarce, consumers may knowingly eat contaminated food or lack the ability to assess food safety risks. Farmers and traders may also hesitate to discard moldy grain, contaminated produce, or spoiled food because of the economic losses involved. While formal markets may reject unsafe food through testing and quality control measures, these products frequently enter informal markets where oversight is limited. As a result, unsafe food becomes a hidden contributor to malnutrition, disease,

and poor health, particularly among vulnerable populations.

Aflatoxins provide a clear example of the food safety–food security nexus. Produced by *Aspergillus* fungi, these toxic compounds commonly contaminate staple crops such as maize, groundnuts, and sorghum. In sub-Saharan Africa, where maize is a dietary staple, aflatoxin contamination is widespread and has been linked to acute poisoning, liver cancer, immune suppression, and childhood stunting. Kenya has experienced several major aflatoxicosis outbreaks, including the 2004–2005 outbreak in Eastern Kenya that caused more than 100 deaths. Yet because discarding





contaminated grain can worsen hunger and cause significant financial losses, contaminated food often continues to be consumed.

The problem extends beyond aflatoxins. Other mycotoxins such as fumonisins, ochratoxins, deoxynivalenol (DON) and zearalenone contaminate staple foods worldwide. Long-term exposure to these toxins can impair growth, weaken immunity, and reduce productivity, ultimately affecting both public health and food security. Effective mycotoxin control therefore contributes not only to safer food but also to improved nutrition, health, and economic resilience.

Pesticide use represents another important intersection between food safety and food security. Pesticides help farmers control pests and diseases, increasing yields and reducing crop losses. However, improper use—including excessive application, use of banned chemicals, and failure to observe pre-harvest intervals—can leave harmful residues in food and contaminate the environment. In many developing countries, limited farmer training, weak regulatory enforcement, and inadequate residue monitoring increase these risks. Although pesticides can improve food availability, unsafe use threatens consumer health, jeopardises export markets, and affects livelihoods and national food security. This highlights the need for safer pest management practices and responsible pesticide use.

Antimicrobial resistance (AMR) is another emerging challenge with significant implications for food safety and food security, particularly in livestock systems. Antimicrobials are essential for preventing and treating animal diseases, but their overuse and misuse contribute to the development of resistant microorganisms. These pathogens can spread through food, the environment, and direct human contact. Resistant infections are more difficult and costly to treat, leading to increased illness, deaths, and economic



Food security is a moral imperative while also increasing stability across the world - but millions of people are still going hungry. PHOTO

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losses. Consequently, AMR threatens livestock productivity and food system sustainability while posing a major public health risk.

Addressing these challenges requires integrating food safety into food security interventions. Unsafe food cannot contribute to sustainable food security. For mycotoxins, interventions should begin before harvest and continue throughout the value chain. Pre-harvest measures include resistant crop varieties, good agronomic practices, crop rotation, soil health management, irrigation where feasible, and biological control technologies such as Aflasafe. These approaches reduce fungal infection and toxin production in the field.

Post-harvest interventions are equally important. Timely harvesting, proper drying, sorting and removal of damaged grains, hermetic storage, improved transportation, and routine testing help maintain food quality and prevent contamination during storage and handling. Research shows that combining pre-harvest and post-harvest measures achieves greater reductions in aflatoxin contamination than either approach alone.

Research and policy must support this integrated vision. Governments should strengthen surveillance systems for mycotoxins, pesticide residues, and antimicrobial resistance to generate reliable data for risk management.

Investments in agricultural research should prioritise climate-resilient crop varieties, biological control technologies, rapid diagnostic tools, and affordable food safety monitoring systems. Extension services should incorporate food safety into agricultural advisory programmes, while consumer awareness campaigns should empower households to make informed food choices.

At the policy level, One Health approaches that recognise the links among human, animal, plant, and environmental health should be promoted. Public-private partnerships can accelerate the adoption of safer technologies and create incentives for producing high-quality, safe food.

Ultimately, food security cannot be achieved by increasing food quantity alone. Food contaminated with toxins, harmful residues, or resistant pathogens undermines health, nutrition, and economic development. Countries facing food insecurity must therefore integrate food safety into agricultural production, storage, processing, and policy systems to ensure that food is not only available but also safe, nutritious, and capable of supporting sustainable development.

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