

Scientific opportunities for food and nutrition security



Malnutrition in its various forms—undernutrition and micronutrient deficiencies, as well as overweight and obesity—is a problem faced by all countries. Despite substantial advances in the improvement of nutrition in recent decades, large-scale problems persist.¹ The global challenges in attainment of food and nutrition security are compounded by pressures of growing and urbanising populations, climate and other environmental changes, and economic inequity and instability. There have been many reports about these issues—reflecting the complexity of the causes, the consequences for the public burden of disease, and the increasing concerns about sustainability—but also the potential of science and technology to bring change. In this Comment, we concentrate on these transformative opportunities. Science has already contributed greatly in tackling the problems of food and nutrition security but more is needed. The broad research agenda is becoming clearer² but, in addition to the specific priorities, it is important to recognise the value of basic research as the underpinning resource for all other inquiry.

The Sustainable Development Goals provide an important policy framework for understanding and meeting the challenges of malnutrition, and they mandate fresh engagement by science to resolve the complexities of evidence-based policies and programmes. Academies of science worldwide have a sustained history of interest in these areas. Recent reorganisation of the InterAcademy Partnership (IAP), the global network of science academies, brings new impetus to engage widely to strengthen the evidence base and ensure that the voice of science is heard in addressing controversies and societal priorities. An ambitious, pioneering project for IAP on food and nutrition security and agriculture uses a novel method that involves the four regional academy networks from Africa (the network of African Science Academies), the Americas (the Inter-American Network of Academies), Asia (the Association of Academies and Societies of Sciences in Asia), and Europe (the European Academies Science Advisory Council). Four parallel expert working groups proceeded from a common starting point—guided by a collectively agreed template of interconnected themes (panel)—to diverse analysis according to regional experience, evidence, and policy priorities.

These four groups are now publishing their reports, to identify both the knowledge gaps and how use of current knowledge can be improved, with two objectives. Firstly, engage groups of regional and national policy makers and stakeholders. Secondly, contribute resource to a coordinated fifth report, advising on inter-regional matters, local–global connections, and issues at the science–policy interface that should be resolved by intergovernmental institutions and other bodies with international roles and responsibilities.

Food systems are in transition. Our work emphasises the imperative to tackle both supply-side and demand-side issues: reduction of food waste as well as change to healthier and sustainable consumption patterns. There are inter-related issues for resource efficiency, environmental and economic sustainability, resilience, and the public health agenda. We aim to clarify where there might be current disconnects between objectives in different policy areas, where trade-offs are needed, and where synergies are possible, perhaps particularly in accruing co-benefits for health and the environment from actions on climate.^{3,4}

We hope that our reports will also provide distinctive insight on the social and natural sciences' frontiers in nutrition and diet as well as the importance of considering

Panel: InterAcademy Partnership's template of themes for food and nutrition security and agriculture

- Key elements in describing national and regional characteristics for food and nutrition security and agriculture
- Major current challenges and opportunities, and future projections for the region
- Strengths and weaknesses of science and technology at national and regional levels
- Prospects for innovation to improve agriculture
- Prospects for increasing efficiency of food systems
- Public health and nutrition issues, particularly with regard to effect of dietary change on food demand and health
- Competition for arable land use
- Other major environmental issues associated with agriculture at the landscape scale
- Effect of national and regional regulatory frameworks and other sectoral or intersectoral policies
- Implications for inter-regional and global levels

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variation in dietary requirements over the lifespan, on new approaches to innovation at the farm scale, in managing competition for natural resources while also capitalising on opportunities for the bioeconomy, and in delivering more efficient and equitable food systems than is currently available. We highlight the importance of generating, standardising, sharing, and using large datasets, alongside multidisciplinary research as a core part of the evidence base. There is urgent need to build global research capacity and to mobilise that research for innovation and to inform policy and practice.

We have not been disappointed in the IAP's expectations of diversity in analysis and recommendations from the four regions, and we regard this heterogeneity as a strength of the novel project design, providing the foundations for the current global integration phase of the IAP project. The regional reports will shortly be available from IAP and the regional academy networks. We now invite feedback

on these outputs and on what priorities should be emphasised in the global synthesis work.

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We declare no competing interests.

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- 2 Haddad L, Hawkes C, Webb P, et al. A new global research agenda for food. *Nature* 2016; **540**: 30–32.
- 3 Haines A. Health co-benefits of climate action. *Lancet Planet Health* 2017; **1**: e4–5.
- 4 Watts N, Amann M, Ayeb-Karlsson S, et al. The Lancet countdown on health and climate change: from 25 years of inaction to a global transformation for public health. *Lancet* 2017; published online Oct 30. [http://dx.doi.org/10.1016/S0140-6736\(17\)32464-9](http://dx.doi.org/10.1016/S0140-6736(17)32464-9).