



**CHALLENGES AND OPPORTUNITIES IN FOOD AND NUTRITION SECURITY:  
THE VISION OF THE ACADEMIES OF SCIENCE  
The InterAcademy Partnership (IAP) Analysis  
of Food and Nutrition Security**

**Executive Summary**

All countries face the problem of combatting the burden of malnutrition as part of their efforts to achieve the Sustainable Development Goals. A project organised by IAP and involving the four regional academy networks has assessed a wide range of science opportunities for tackling food and nutrition security, with the objective of providing access for all to a healthy and affordable diet that is environmentally sustainable and culturally acceptable. The four regional reports have been published and a fifth, global report is being finalised, where IAP emphasises emerging points that include: (1) taking a food systems perspective to deliver health and well-being, (2) understanding food production and utilisation issues with regard to efficiency, sustainability and resilience, (3) capitalising on recent scientific advances in the biosciences and other disciplines, (4) emphasising the transformation to healthy diets, (5) addressing the nexus food-energy-water-health, and (6) promoting activity at the science-policy interfaces and reconciling policy disconnects.

All countries face the problem of combatting malnutrition in its various forms: undernutrition and micronutrient deficiencies as well as overweight and obesity. Latest data from the United Nations indicate worrying trends in food and nutrition security that must be tackled. Science has the potential to find sustainable solutions for national and global food systems relating to the complex interplay of issues spanning health, nutrition, agriculture, climate change, ecology and human behaviour.

Academies of science within the InterAcademy Partnership (IAP) have a substantial history of interest and achievement in these areas and are committed to engage widely to strengthen the evidence base at global, regional and national levels. We aim to facilitate learning between academies and other stakeholders and to show how academies can contribute to sharing and implementing good practice in clarifying controversial issues, developing and communicating the evidence base and informing choice of policy options. We utilised the convening, evidence-gathering and analytical functions of academies to explore scientific opportunities with regard to:

- (i) Acting on the available scientific knowledge and data to support responsible innovation, improve robust policy development and coherence and shape public understanding of the challenges.
- (ii) Building global scientific capacity and partnerships to identify new research priorities and close knowledge gaps.

The present work by IAP, the global network of science academies, brings together established regional networks of academies, forming a new collaboration to ensure that the voice of science is heard in addressing societal priorities. The first phase of our IAP project on “Food and Nutrition Security and Agriculture” was designed to comprise four parallel regional academy network working groups (in Africa, Asia, the Americas and Europe) each consisting of experts from across the region, drawing on excellent science, and proceeding from a common starting point represented by an agreed IAP template of principal themes. Reports from these four regional groups were published in late 2017 - mid 2018. In the second phase of the IAP project, the outputs from these four regional assessments, together with analysis of their similarities and differences, are being used as resource to generate a fifth, globally-focused report.

The Sustainable Development Goals (SDGs) provide a critically important policy framework for understanding and meeting the challenges but require fresh engagement by science to resolve the complexities of evidence-based policies and programmes. We define the desired outcome for food and nutrition security as access for all to a healthy and affordable diet that is environmentally sustainable and culturally acceptable. The major global challenges for delivering food and nutrition security are compounded by the pressures of a growing population, urbanisation, climate change and other environmental change, economic inequality and market instability. A coherent strategy to tackle the challenges must encompass both supply-side and demand-side elements: we take the integrative food systems approach to include all the steps involved, from growing through to processing, transporting, trading, purchasing and consuming. Issues for resource efficiency,

environmental sustainability, resilience and the public health agenda are examined, while also taking account of the local-global interconnectedness of systems.

In considering the triple burden of malnutrition (undernutrition, micronutrient deficiencies and overweight with obesity), we explore a wide range of scientific opportunities. We highlight the consistent importance of supporting basic and applied research, connections across disciplines and with cutting-edge technologies, linkage to education, training and outreach, the concomitant needs to collect and share big data, and the imperative to address impediments delaying the translation of research to innovation. Upgrading scientific infrastructure is vital but it is also important to engender more collaboration between countries, to share scientific expertise and facilities and help build capacity in emerging economies. New trans-regional research efforts are warranted, accompanied by commitment to trans-regional engagement between the scientific and policy communities on the SDGs, climate objectives, and related issues.

Conclusions are not yet finalised for endorsement by IAP but emerging points include:

- Developing sustainable food and nutrition systems, taking a systems perspective to deliver health and well-being, with research priorities, for example, in food processing, reduction of food losses and ensuring market resilience.
- Understanding food production and utilisation issues, covering considerations of efficiency, sustainability, and diversity of resources, with research priorities, for example, in evaluating impacts of climate change, issues for new farming structures, and new food sources.
- Capitalising on opportunities coming within range in the biosciences and other rapidly advancing sciences, with research priorities, for example, for novel breeding techniques and precision agriculture.
- Emphasising transformation to a healthy diet, with research priorities, for example, for understanding consumer behaviour and private sector innovation.
- Addressing the linkages food-energy-water-health, with research priorities, for example, to assess trade-offs between different ecosystem services.
- Promoting activity at the science-policy interfaces and reconciling policy disconnects, for example, with regard to the priorities for global capacity building in generating and sharing research, promoting public-private partnerships and developing flexible and proportionate regulation of innovation.

Agriculture and food systems are vital vehicles for achieving SDGs. However, collectively, there is need to be more ambitious in identifying the scientific opportunities for sustainable and healthy diets. Agriculture and food systems are in transition in an uncertain and rapidly-connected world: living within planetary boundaries and having healthy populations, requires new approaches to food systems. There is need to build critical mass in research and innovation, and to mobilise those resources in engagement between the scientific community, policy makers and other stakeholders. IAP is encouraging and supporting its academies and regional networks to continue catalysing discussion and action in pursuit of these priorities.

## ENDORISING NETWORKS



A handwritten signature in black ink that reads 'Yoo Hang Kim'.

Prof. Yoo Hang Kim  
President AASSA



A handwritten signature in black ink that reads 'Thierry Courvoisier'.

Prof. Thierry Courvoisier  
President EASAC



A handwritten signature in blue ink that reads 'Jeremy McNeil'.

Prof. Jeremy McNeil  
Co-Chair IANAS



A handwritten signature in black ink that reads 'Mostapha Bousmina'.

Prof. Mostapha Bousmina  
President NASAC



A handwritten signature in black ink that reads 'Volker ter Meulen'.

Prof. Volker ter Meulen  
President IAP