

SESSION 4.2:  
SOLUTIONS FOR RESILIENT FOOD AND NUTRITION SYSTEMS OFF-FARM

**Food systems solutions for healthier diets, better nutrition  
and health amidst climate change**

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**Abstract**

Food systems have a great potential to fulfill food security and nutrition for providing year-round healthy and affordable diets for all. Currently, however, our food systems have not yet delivered their full potential, leaving billions of people food insecure and unable to afford healthy diets; millions of children are stunted and wasted; and there is rising prevalence of obesity and non-communicable diseases. Hence, food systems in many parts of the world fail to deliver their missions! In the Asia-Pacific, the situation is exacerbated by population growth, urbanisation, changing consumption patterns, COVID-19, and the Ukraine war, and it is further complicated by climate change leading to unhealthy diets, poor nutrition and health, as well as unsustainable livelihoods and environment. Climate affects agri-food production which, however, is also a contributor to climate change. One-third of GHG emissions are generated from food systems. Climate change influences the entire food systems: poor soil fertility and reduced crop yield, biodiversity loss, pest diseases, reduced density and bioavailability of nutrients in foods, etc. Thus, climate change may increase malnutrition and health risks, deteriorate livelihoods and unsustainable environment. Sustainable and resilient food systems transformation coupled with nature-positive solutions, including climate-smart agriculture aligned with contextual ecosystem function, biodiversity and environmental conservation are warranted to ensure healthier diets and optimal health, and to mitigate and adapt the impact of climatic and food system interactions on diet, health and environment. Food systems transformation can harness the power of food systems to benefit humanity and the earth.



It is my pleasure to be invited by the Crawford Fund to speak at the Crawford Fund 2023 Annual Conference. This is the first time I have participated in a Crawford Fund conference. I'm impressed by the objectives of the Fund. I concur with Dr Cary Fowler, this morning, that the Crawford Fund is unique in the world, bringing together agriculturalists, people working in food security and nutrition, and also young people, to exchange ideas and experiences in improving food security and nutrition around the world using the food systems approach.

Today's topic is about agri-food systems solutions for healthier diets, better nutrition and health amidst climate change. I will talk about agri-food systems for healthy diets, nutrition and health, and a bit on the impact of climate change on the agri-food system, nutrition and health. We have heard a lot about how biodiversity loss threatens resilience of the agri-food system and the environment under climate change. Therefore, I will also touch on ways to make our agri-food systems work for health, nutrition and the environment.

I will suggest some key entry points for agri-food systems transformation. Because the agri-food system is so vast, with so many actors, drivers, and stakeholders, we need to start from the very beginning or we can do it bit by bit and join the dots together in order to transform or reshape our agri-food system for better food security and nutrition and the environment.

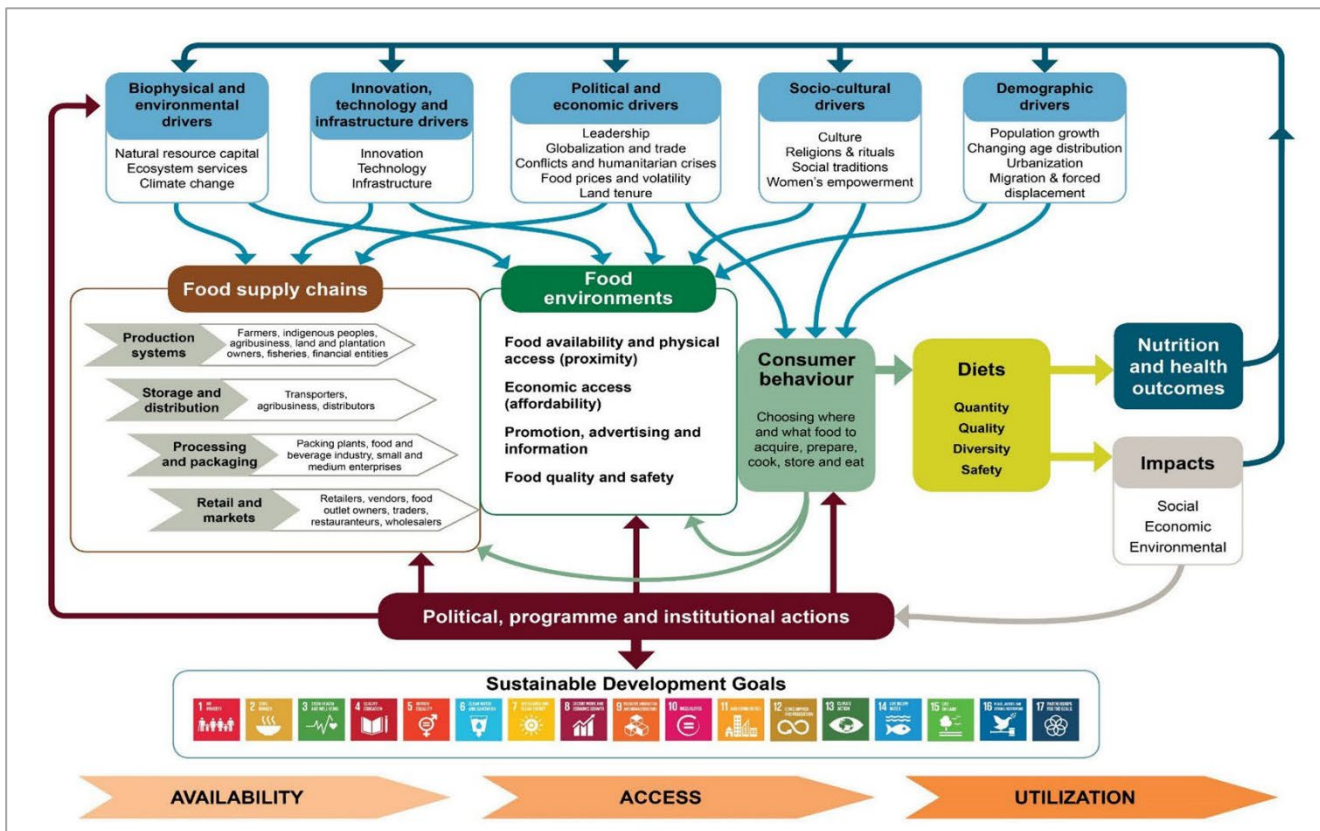


Figure 1. Potential of agri-food systems for healthy diets, nutrition and health to produce year-round nutritious food for healthy & affordable diets. *Source: CFW HLPE Nutrition & Food Systems 2017.*

An agri-food system is vast; it is like machinery (Figure 1). In order to produce healthy diets, we have different drivers and actors, and also various components: the producer, supply chain, food environment, and also our beneficiaries – the consumer who needs enough knowledge and skills to plan a good diet for themselves, their families and children for improved nutrition and food security. If any of these components are absent, or not connected, or the chain is being blocked, then the production of nutritious food for human consumption will be affected.

The current agri-food system fails to deliver its full potential for healthy diets and nutrition, and leads to billions of people being food insecure and unable to afford a healthy diet. As a result, millions of children are stunted and wasted. Over half the children in the world who are stunted and wasted live in the Asia-Pacific region. Figure 2 gives an overview of 2022 Asia-Pacific food security and nutrition situations. You can see a mega scale of hunger and malnutrition in this region. On the other hand, overweight and obesity are also rising rapidly, particularly in the Pacific region. This rapid upsurge of overweight and obesity needs urgent intervention.

According to the United Nations, countries in the Asia-Pacific are off-track to achieve the Sustainable Development Goals' targets for hunger and malnutrition (Figure 2). The average cost for a healthy diet in the Asia-Pacific is US\$3.98 per person per day which is unaffordable to 1.9 billion people (i.e. 44.5% of all the Asia-Pacific population) living in this region. We need to take urgent action to improve the appalling situation in the Asia-Pacific region.

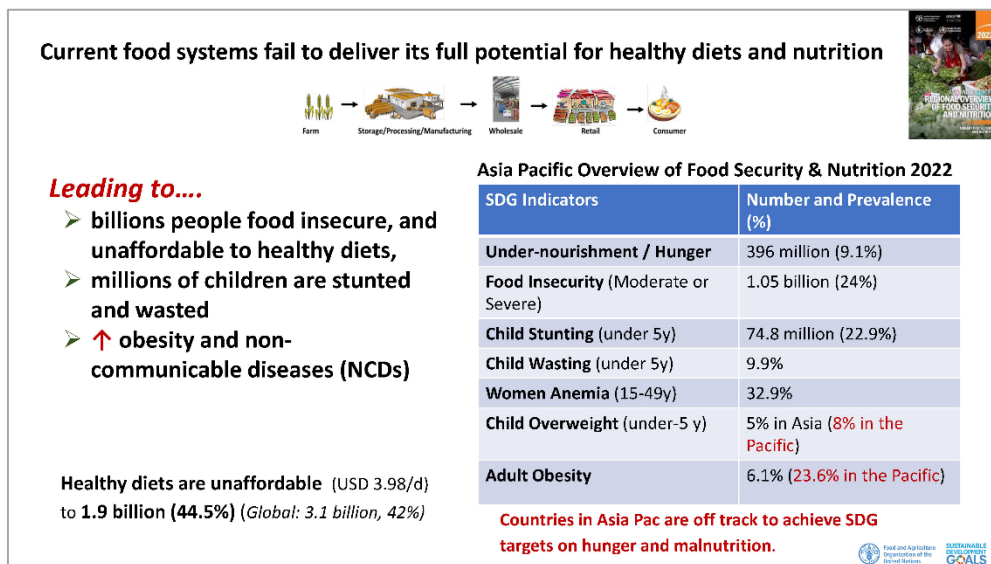


Figure 2. Source: FAO et al. 2023.

### Climate change and the failure of agri-food systems, nutrition & health

Climate change affects agri-food production; but the agri-food production system can also contribute to climate change (Figure 3).

The impact of food production on climate change and the environment is mainly driven by greenhouse gas emissions and food losses and waste. As we have heard in today's and last night's keynote addresses, intensive agri-food production for meeting the global demand for more foods

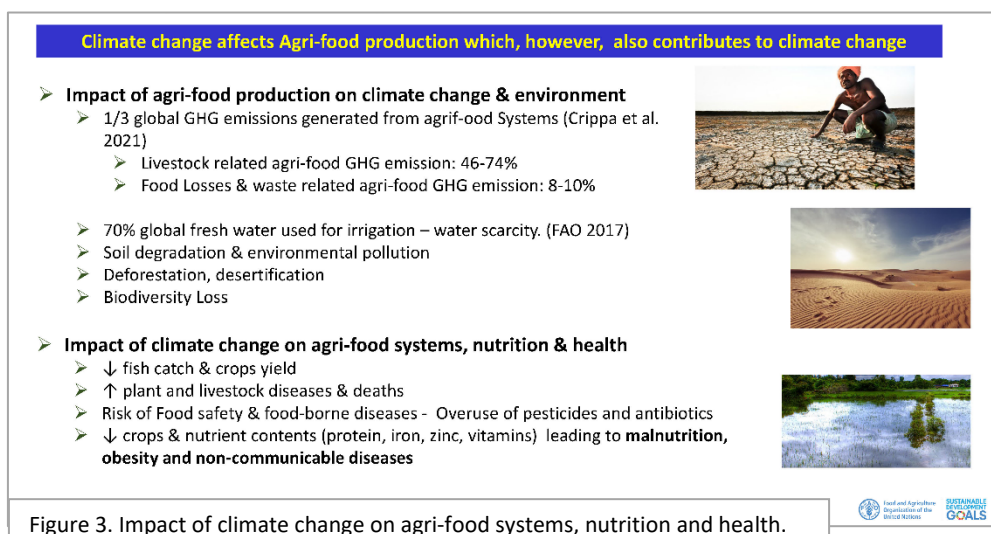


Figure 3. Impact of climate change on agri-food systems, nutrition and health.

exacerbates soil degradation, environmental pollution, deforestation, desertification and biodiversity loss. On the other hand, climate change affects agri-food systems, nutrition and health, reducing fish catch and crop yields, increasing plant and livestock disease and deaths, and adding more risks to food safety through food-borne diseases. Farmers overuse pesticides and antibiotics to boost yields, while the extra heat and carbon dioxide concentration in the atmosphere reduce the nutrient concentrations in food: protein, iron, zinc and vitamins in particular. Therefore, people need to eat more food to make up their nutrient requirements, i.e. more carbohydrate and more energy in the diet, which may result in more obesity.

Limited food diversity for human consumption contributes to biodiversity loss, resulting in less dietary diversity, and less resilience in agri-food systems: 75% of human foods are based on a narrow range of commercialised staple crops and animal foods, and the limited biodiverse food cultivation reduces the power of genetic diversity to support the resilience needs of agri-food systems and the environment in order to cope with climate threats. Making food and agri-food systems support nutrition, health and the environment

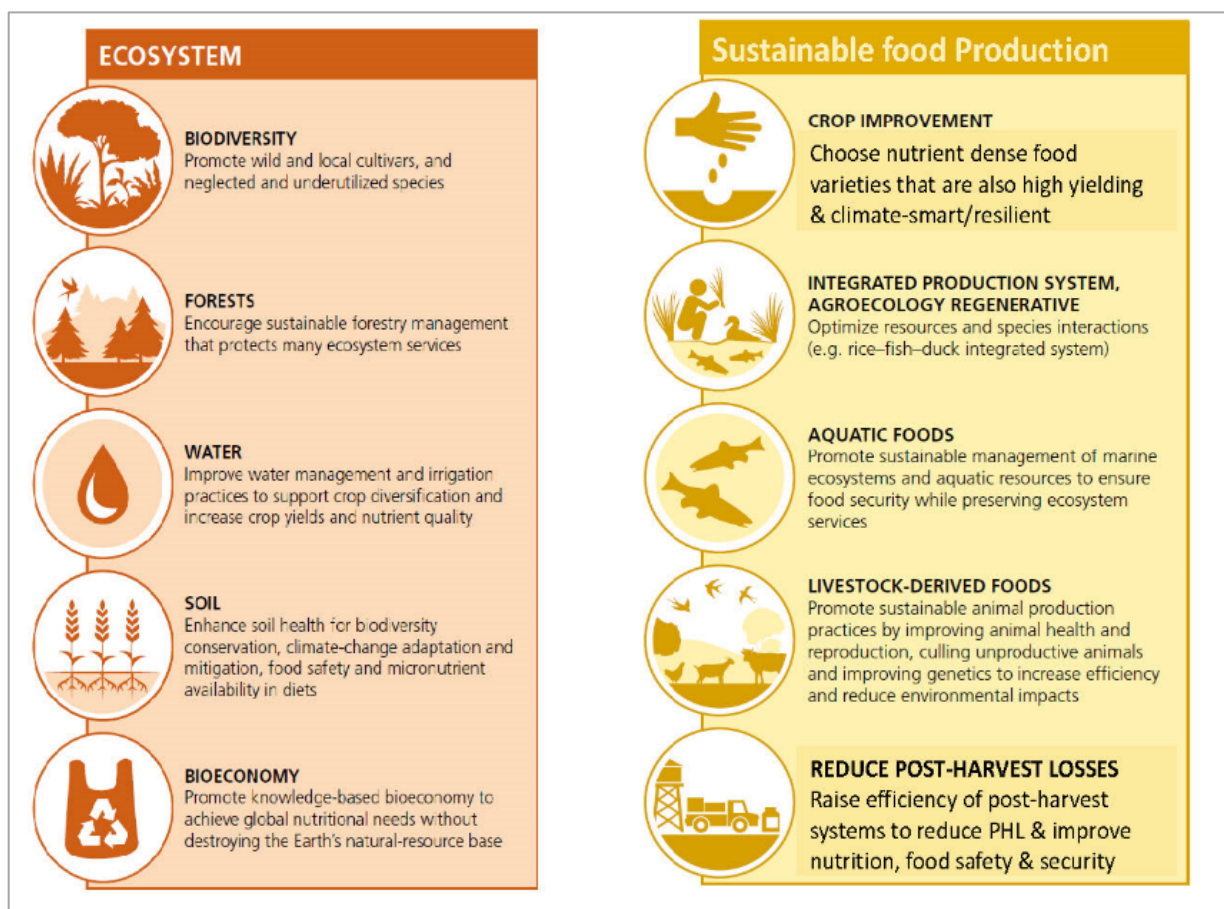


Figure 4. Key entry points for on-farm agri-food system transformation.

### **Making food and agri-food systems support nutrition, health and the environment**

Food is the strongest lever we have for optimising health and environmental sustainability, but currently it works against both of those. However, agri-food systems have the potential to enable solutions to climate change, biodiversity loss, healthy diets and better nutrition, food safety and health, animal and plant health, sustainable and resilient environments, and so on. Figure 4 shows ways of transforming agri-food systems *on-farm*, that previous speakers have already talked about.

Now, consider *off-farm* solutions, mainly in relation to **nutrition-sensitive food production and value chains**. For example, we need:

- nutrition-sensitive value chains, with better storage, processing and preservation that aim to retain the nutritional values of food, rather than investing in highly processed non-nutritious food; also
- shorter, localised value chains linking farmers to local markets and consumers; this should reduce running costs (middle-men, transportation, storage, etc.), GHG emissions, and food prices. It should improve food access by people, and urban links to peri-urban production for better food security and nutrition; and
- to reformulate food products that have low nutrient values – high in trans-fats and other fats, sugars and salt – for the prevention of obesity and diet-related non-communicable diseases (NCDs). We need to work with the private sector to produce food products with less sugar, salt and fats, and at the same time to improve their nutrient content.

**Agri-food policy** needs to be involved, via:

- infrastructure investment: a lot of developing countries produce nutritious food in one geographical area, but most of these foods cannot reach people living in other areas because of poor electricity and transport networks; this leads to more perishable foods that are nutritious being lost due to a lack of cold storage, and that also increases post-harvest losses as a consequence;
- better access to technologies and innovation, enabling family farmers to produce nutritious food at a lower cost and thereby maintain profitability: for example, via e-platform, e-commerce, blockchain; and Geographical Indications (GI) to preserve the local identity of food products so they are more sustainable and more profitable;
- government policy to stimulate income-generating economic activities while enhancing employment and social protection, in order to close the poverty gap and income inequality – such as through eco-tourism and GI; and
- public procurement for school meal programs: schools can be used as a medium through which to feed children with nutritious meals, and to promote nutrition education to children. Local farmers can also be trained to supply safe and nutritious food to schools.
- promoting urban farming, edible landscapes, vertical farming, school gardening programs and homestead gardening for better access to more affordable and nutritious food in urban areas.

Also, we need to create **consumer demand for healthier diets**, for example, by:

- establishing 'healthy-eating guidelines', to advise people what to eat, and to inform agriculture policy so that farmers can diversity their food production to feed and nourish people;

- nutrition education, via social and behaviour change communication (SBCC), public campaigns, mass media and social media, counselling, and ante-natal training in nutrition, etc.;
- nutrition-sensitive social protection schemes for vulnerable groups and mothers to access nutritious foods for feeding the children properly, perhaps by conditional cash transfer, community kitchens, cooking demonstrations, food banking, etc.;
- regulation and legislation on advertising and promotion of foods high in fat, sugar and salt, especially those targeting children and adolescents, and better labelling of foods to give guidance on nutritional values; and
- repurposing fiscal policies to promote nutrition-sensitive food production, healthy affordable diets, and trade policy to produce positive impact on diet and nutrition.

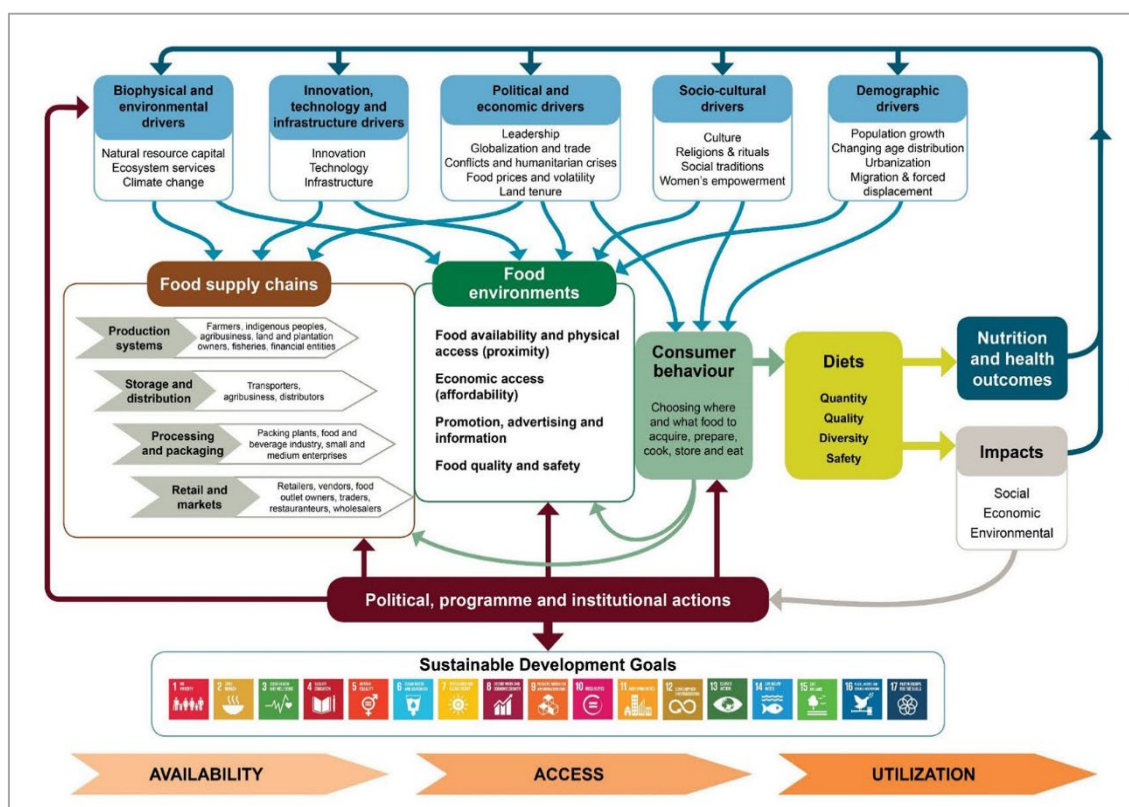


Figure 5. Agri-food systems transformation can harness its power to benefit humanity and the earth! (HLPE 2017)

## Challenges and opportunities

The **challenges** that we are facing are: the current agri-food systems fail to deliver their full potential for healthy diets and nutrition; and that climate change affects the whole agri-food system and threatens sustainability and resilience; and that biodiversity loss threatens agri-food systems and environmental resilience under climate change.

However, there are **opportunities** to make better use of the agri-food systems, and this would be the solution to our problem.

- We need to transform agri-food systems to be sustainable and resilient in order to increase dietary diversity (including food biodiversity) and nutritious food production.
- We need nature-positive agri-food production systems for environmental resilience and social sustainability under climate change.
- We need to develop effective policies and actions, and also R&D to address the challenges of climate change on agri-food systems and to mitigate and adapt the impact of climate change on diet, health and the environment.
- We need to create an enabling food environment – this is very important – to empower consumers to eat healthy diets, and for responsible consumption aligned with environmental sustainability.

## Conclusion

We need to be optimistic. If we can contribute in our own areas of expertise, and with concerted effort, we can collectively make agri-food system transformation possible, and harness its power to benefit humanity and planetary health (Figure 5).

## References

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Dr Lee co-ordinates food systems and nutrition related policy, programs and research in the Asia Pacific region of FAO. He supports countries to implement food systems and nutrition related programmes. Dr Lee is also interested in undertaking scientific and implementation research to generate evidence-based nutrition policies and programs. While working at FAO headquarters, Rome (2012–2018), Dr Lee headed the Nutrition Assessment and Scientific Advice Group at the Nutrition and Food Systems Division, FAO. He coordinated programs on nutrition assessment, human nutrient requirements and Codex scientific advice on nutrition. Before joining FAO, Dr Lee has been a faculty member at University of Surrey, UK, The Chinese University of Hong Kong and University of Newcastle, NSW, Australia. He is recognised for his research contributions to public health nutrition, nutrition and bone health in particular. Dr Lee holds a BSc in Human Nutrition from Trinity College, Dublin, Ireland, and a PhD from The Chinese University of Hong Kong. He is also a UK Registered Dietitian and Registered Nutritionist (Public Health).