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Introduction to Food Security and Sustainability: Knowledge, Communication, Politics

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The Task Force on Environment, Sustainability and Climate (TFESC) of Academia Europaea investigates ways of enhancing global science policy communication on the topic of food security and sustainability. This Focus reports the initial outcome of this investigation in the form of three articles. First, given the complexity of the link between food security and sustainability, and in particular the two-way relation between the impact of food production on sustainability, on the one side, and of ecological degradation on food security, on the other, we explored the ways in which new Integrated Assessment Models (IAMs) can provide more comprehensive knowledge on the question. Second, even though knowledge and awareness of the link between food security and sustainability have grown, this has by and large not yet translated into significant transformations of attitudes and actions by consumers. In this light, we analysed the implications for communication strategies. Acknowledging the necessity of global coordinated action, third, we analysed the experience of the Intergovernmental Panel on Climate Change, which is often hailed

as a model for a global science–policy interface that provides the necessary link between producers of relevant scholarly knowledge and office-holding policymakers. This introduction explains the background to the TFESC investigation and outlines the reasoning in the three following articles.

Food insecurity has been a recognized global problem at least since the middle of the twentieth century, expressed in the founding of the Food and Agriculture Organization (FAO) of the United Nations in 1945. Since then, the FAO monitors and measures hunger and undernourishment and develops proposals for enhancing food security. There have been periods in which significant progress was made in combatting hunger worldwide, but during and since the COVID-19 pandemic and aggravated by recent violent conflicts, not least the wars in Ukraine and Palestine, the situation has worsened.

More recently, the focus on food and agriculture has been widened by including the ways in which food is being produced, traded, packaged, consumed and also lost and wasted, often in ways that are harmful for human life on the planet and for the habitability of the planet overall. Recent authoritative reports have underlined the connection between food security and sustainability:

> Food insecurity and sustainability are widely recognised as among the most significant global challenges facing humanity in the 21st century, linked to a range of other challenges including malnutrition, biodiversity loss, climate change, soil degradation and water quality. (Science Advice for Policy by European Academies 2021: 10; see also, among other reports, Institut d'Estudis Catalans 2023; Zukunftskommission Landwirtschaft 2021)

Such assessments confirm not only the wide consensus about the significance of the issue, but also the urgency with which concerted transformative action is required:

> There is a broad scientific consensus that our current food system is unsustainable and a major driver of climate change, biodiversity loss and environmental degradation (including in those environments on which food production is critically dependent). Radical system-wide changes are urgently needed to correct this. (European Commission, Group of Chief Scientific Advisors, 2023)

It is fair to say that improving food security was one of the driving forces of human history overall. One might even add that the planetary limits to food security were recognized more than two centuries ago. Famously, or maybe infamously, the limited availability of land on the planet, needed to feed human beings, was the central concern for political economist Thomas Robert Malthus in his 1798 reflections on the 'principle of population', not least because most land was 'already possessed' (Malthus 1798: 63). Half a century ago, the Club of Rome report *Limits to Growth* (Meadows *et al.* 1972) also brought population growth and agricultural

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production together, inaugurating a modelling exercise that also considered non-renewable resource depletion, industrial output and pollution generation.

Not least because of the wide discussion it generated, this report keeps being referred to as an early comprehensive diagnosis of the upcoming exhaustion of non-renewable biophysical resources against the background of what is now called the 'Great Acceleration' of resource use and environmental degradation (Steffen *et al.* 2015). Since that moment it has also become increasingly clear that food security must be thought of in the broader frame of global sustainability. As a recent overview argued, it is quite conceivable that global food production can reach a level that is sufficient for the peak human population that is expected to be reached at some point during the ongoing century. However, 'major concerns arise when these outputs are related to environmental factors' (Smil 2021: 271).

Considering the relation between food security and broader ecological sustainability, it is important not only to underline that certain ways of increasing food production lead to greater environmental degradation, but also that, vice versa, environmental degradation – in particular climate change with increasing frequency of droughts, floods and soil degradation – endangers food security. Thus, as the quotations above indicate, food security and sustainability are not only connected with each other, but they are also intricately linked to those key ecological concerns, which are biodiversity and climate change.

These latter two issues are recognized as complex and urgent concerns that can only be addressed through concerted global action based on adequate knowledge and communication strategies. The creation of the Intergovernmental Panel on Climate Change (IPCC) in 1988 and of the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) in 2012, the latter to some extent inspired by the experience of IPCC, are testimony to such recognition. Initiatives focusing on food security also exist beyond FAO with its more traditional remit, such as the International Panel of Experts on Sustainable Food Systems (IPES-Food; see, for example, IPES-Food 2023), created in 2015, or the High Level Expert Group, created by the European Commission in 2021 not least to assess the prospects 'towards an international platform for Food Systems Science'. However, they do not (yet) have the authority that comes with the initiative or endorsement of the United Nations Organization as is the case with IPCC and IPBES.

Looking at these three topics of high global concern together, namely climate change, biodiversity and food security and sustainability, several insights impose themselves. Of those three, only the latter (food security) brings material well-being directly together with the ecological concern for sustainability. But this connection, too, has only been made in recent debates. As Bilandzic, Evans and Solymosi underline (in this issue), the consistent 'dualistic framing' of the issue of food still remains a desideratum. At the same time, as mentioned above, food has not yet received the same recognition as an issue of urgent global action as climate change and diversity have, for which global institutional fora have been created.

Of these fora, IPCC is widely seen as a success and has found broad recognition as such, including the award of the Nobel Peace Prize in 2007. The clarity and precision

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with which global warming can now be related to carbon dioxide emissions and, thus, to the burning of fossil fuels, is largely due to the framing and global communication of the state of scholarly knowledge on the matter as pursued by IPCC over the past 35 years. This is why it has been seen as a model to follow in global science–politics interactions about biodiversity, food security and sustainability. Reflection on the IPCC experience was indeed a starting point for the deliberation in the Academia Europaea (AE) Task Force on Environment, Sustainability and Climate (TFESC), which resulted in the contributions to this Focus.

Recognizing the setting of a target of climate action in terms of a single measurable indicator, namely limiting the temperature increase of the atmosphere to 2°C, ideally 1.5°C, as a key to global climate debate over at least the last decade, TFESC explored whether a similar indicator could not be developed for food sustainability, possibly then supporting the creation of a UN-sponsored IP on Food. However, not only did we find that the issue of food security and sustainability does not lend itself to the elaboration of such an indicator, despite such an attempt by means of the human trophic level (HTL, see Bonhommeau *et al.* 2013), which is referred to in the UN Sustainable Development Goals (SDG). But a closer study of the IPCC, moreover, comes to associate the increasing focus of policy-relevant climate knowledge, as achieved by the IPCC, with bringing into sharper relief the political problems of effective climate action and new forms of resistance to such action (see Bremer and Wagner, in this issue).

Within the IPCC, these experiences led to reflections on the achievements and limits of the model, among which arise the following two themes: on the one hand, the relation between the climate information and modelling when exploring the 'physical science basis' of climate change to the kind of knowledge that is required for strategies of mitigation and adaptation, which needs to be world–regionally differentiated and address concerns of global justice. On the other, the relation between climate change knowledge focused on temperature increase and the knowledge required for assessing issues of biodiversity, food security and sustainability. In this light, work on Integrated Assessment Models (IAMs) has moved from the integration of climate and economic data towards the modelling of agriculture and food data as well as the integration of the latter with the former (Koundouri *et al.* in this issue).

This *European Review* Focus reports on the initial outcome of the AE TFESC investigation into ways of enhancing global science policy communication on the topic of food security and sustainability in the form of three articles. First, given the complexity of the link between food security and sustainability, and in particular the two-way relation between the impact of food production on sustainability, on the one side, and of ecological degradation on food security, on the other, we explored the ways in which new IAMs can provide more comprehensive knowledge on the question (see Koundouri *et al.* in this issue). Second, even though knowledge and awareness of the link between food security and sustainability have grown, this has by and large not yet translated into significant transformations of attitudes and

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actions by consumers. In this light, we analysed the implications for communication strategies (see Bilandzic, Evans and Solymosi, in this issue). Acknowledging the necessity of global coordinated action, third, we investigated the experience of the IPCC, which is often hailed as a model for a global science–politics interface that provides the necessary link between producers of relevant scholarly knowledge and office-holding policymakers (see Bremer and Wagner in this issue).

In sum, our findings show considerable ambivalence, arguably largely due to the complexity of what we may well call the current global ecological emergency. On the one side, success in knowledge generation and communication has been possible by narrowing the focus, the temperature target with regard to climate action being the key example. On the other side, such narrowing has had unanticipated consequences, of two kinds: first, the sharpening of the question made concerted action more difficult. One might say: success in knowledge generation and communication does not easily lead to success in politics and de-facto changes in policies and behaviours that reduce emissions and habitat loss. Second, the connection between the key dimensions of the ecological emergency was lost from sight, leading to largely separate debates about climate, biodiversity and food. The conclusion cannot be to overcome or deny this ambivalence; it has to be acknowledged. Rather, work on increasing insights into complexity needs to be combined with enhancing the efficacy of remedial action. We hope that the articles in this Focus contribute to raising awareness of this ambivalence and to addressing it.

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