

# Climate goals require food systems emission inventories

**To the Editor** — The 26th session of the Conference of the Parties (COP 26) to the United Nations Framework Convention on Climate Change highlighted the need for more ambitious, global efforts to reduce greenhouse gas (GHG) emissions at the pace required to keep climate goals within reach. A side event of COP26, focused on options for a climate-neutral transition towards sustainable food systems and forest management, brought together experts from the European Commission (EC), the UN Food and Agriculture Organization (FAO) and the World Bank to discuss food sustainability and increasing consumption trends. The side event also marked the release of an updated version of EDGAR-FOOD<sup>1</sup> — a globally consistent food emissions database originally developed by the EC Joint Research Centre in 2021. Panellists agreed on the importance of having detailed information on food systems emissions — such as that found in EDGAR-FOOD and, more recently, in the inventory proposed by the FAO Corporate Statistical Database (FAOSTAT)<sup>2,3</sup> to inform policy design and effective mitigation efforts. Similar pledges were drawn at the youth4climate event (<https://youth4climate.live/>) that preceded the COP, at which EDGAR-FOOD was also presented and advocated for by young climate ambassadors. It was emphasized that the quantification of GHG emissions from food systems is a priority. Differences in the carbon footprints of developed and developing countries are opportunities to enhance food systems and the underlying dietary habits.

The latest version of the EDGAR-FOOD database, now available online<sup>4</sup>, is built on the EDGAR v6.0 GHG release<sup>5</sup>. It applies the same methodology as the original EDGAR-FOOD<sup>1</sup> and covers the period up to 2018. Among the important new additions, there are more accurate values for emissions of fluorinated gases<sup>6</sup>, updated agricultural activities and revised estimates of natural sources from FAOSTAT. The release of the new EDGAR-FOOD database, together with the new work in FAOSTAT, is part of the Sixth Assessment

Report of the Intergovernmental Panel on Climate Change (IPCC)<sup>7</sup>. These pioneering emission estimates, while providing the methodological basis for mapping activities belonging to food systems, currently rely on the literature and other sources that may not always fit national conditions.

Parties adhering to the United Nations Framework Convention on Climate Change (UNFCCC) regularly report sector-specific GHG emissions, thereby following the guidelines provided by the IPCC for GHG inventories<sup>8</sup>. Although food-related emissions are already embedded in the total reported GHG inventories, the calculation of food systems emissions is challenging since they are derived from a number of IPCC sectors.

Integrating sectoral food system GHG emissions shares into official GHG emissions inventories would enhance transparency and provide the information needed for the progress of national food system policies<sup>9</sup>, such as the European Union's Farm to Fork Strategy<sup>10,11</sup>. Developing a dedicated food systems annex of the IPCC Guidelines on National Greenhouse Gas Inventories will enable countries to identify effective climate actions, just like the shares of GHG emissions associated with other primary human needs (for example housing, comfort, and so on) would provide a database that links directly to people's lifestyle.

The new EDGAR-FOOD database shows that emissions trends from food systems are ascending, although not at the same pace as that of total emissions, which is consistent with the latest FAOSTAT estimates. In 2018, global GHG emissions from food systems accounted for ~17 Gt CO<sub>2</sub>eq (using Global Warming Potential values from the Fifth Assessment Report of the IPCC<sup>12</sup>), representing ~31% of the global total. Industrialized regions contributed ~4.5 Gt (a share of 24%), while developing regions — including China — produced ~12.4 Gt CO<sub>2</sub>eq from food systems (a share of 36%). □

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## Author contributions

M.C. and E.S. drafted the manuscript. All authors provided critical revision of the manuscript, provided final approval of the published version and agreed to be accountable for all aspects of the work. At the same time, the views expressed in this publication are those of the authors and do not necessarily reflect the views or policies of the FAO and EC.

## Competing interests

The authors declare no competing interests.