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Dear Dr. Dongyu,

We, the undersigned, are writing to express serious concern over the FAO's recent report [*Pathways towards Lower Emissions*](#) (hereafter referred to as the *Pathways* report), following the significant methodological errors and inappropriate sources of evidence identified by academics Paul Behrens and Matthew Hayek¹, whose research was distorted in the report, affecting the integrity of its conclusions. We set out recommendations related to the *Pathways* report and the upcoming 2050 *Roadmap* report, the need for transparency in the GLEAM methodology, and engagement on the nutritional adequacy of different healthy sustainable diets.

1. Methodological errors in the Pathways report

We support Behrens and Hayek's call for the report to be retracted, methodological errors rectified and for the FAO to use more appropriate and up-to-date studies that look into the emissions reduction potential of dietary shift. As part of this process, the FAO should engage with independent academics and experts from civil society to ensure the robustness of this report.

The numerous errors in the *Pathways* report have the cumulative effect of erroneously downplaying the emissions mitigation potential of dietary change towards lower consumption of animal products – Behrens and Hayek indicated that **the FAO has likely underestimated the emissions mitigation potential of dietary change compared to a business-as-usual (BAU) 2050 scenario by a factor of between 6 and 40²** - based on Clark et al.'s (2020) modelling, the direct emissions mitigation potential from dietary change in line with the EAT-Lancet diet is closer to 3.10 Gt CO₂ equivalent per year, rising to 6.22 Gt CO₂eq per year if the carbon sequestration potential from ecosystem restoration on spared land is factored in, compared with a 2050 BAU baseline³.

We do not repeat the *Pathways* report errors here at length, as these are analysed in detail in Behrens and Hayek's original letter, but summarise them in the Annex to this letter.

It is extremely concerning that such basic failures of analysis made it into a published FAO report without being flagged during the peer-review process – indicating the need for a comprehensive investigation of how these serious errors and systemic biases were allowed, and an overhaul of the FAO's internal review processes to ensure improved methodological rigour in future reports. We are calling on the FAO to publish a full methodology and a list of authors and reviewers for its future reports.

The FAO's estimate that dietary change has the potential to reduce livestock emissions by only 0.19-0.53 Gt CO₂-eq per year compared to a BAU 2050 baseline are completely out of step with the conclusions of other United Nations institutions and general scientific consensus. The International Panel on Climate Change (IPCC) found, with high confidence, that a shift to more plant-based diets could mitigate GHG emissions by between 0.7 – 8 GtCO₂-eq per year, with higher reductions in meat and dairy leading to higher emission reductions⁴. For instance, the IPCC cites a study which estimates that a flexitarian diet (75% of meat and dairy replaced by cereals and pulses, with only one portion of red meat a week) would reduce global emissions by approximately 5 GtCO₂-eq per year⁵ - over 9 times higher than the FAO's estimate. Since this study uses current levels of meat and dairy consumption as a baseline, emissions mitigation would be considerably higher compared to a BAU 2050 projection. A recent survey⁶ of over two hundred climate scientists and food and agriculture experts, over half of whom have authored IPCC reports, found that:

- Global livestock emissions need to be reduced by 50% by 2030 and 61% by 2036, with faster and deeper reductions in higher-income countries, in order to limit global warming in line with the Paris agreement;
- 78% of the experts surveyed said that absolute global livestock numbers need to peak by 2025;
- Reducing human consumption of livestock products and reducing the number of livestock animals were ranked as having the biggest potential for reducing livestock emissions, whilst intensification of livestock was rated as the measure with lowest potential.

Other global institutions have also backed more ambitious action on dietary change and livestock systems - such as the World Bank's recent report *Recipe for a Liveable Planet* which recommends a shift away from subsidies for red meat and dairy production⁷, and the Task Force on Reactive Nitrogen of the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution recommended that halving European meat and dairy consumption is one of the best ways to reduce European nitrogen pollution⁸.

2. Influence of Pathways on the upcoming 2050 Roadmap report

In light of the above, we ask whether the FAO intends to use the *Pathways* report analysis to inform its upcoming 2050 Roadmap report, and the recommendations therein. If this is the case, we have grave concerns that the serious errors in the *Pathways* report will, unless rectified, seriously compromise the credibility of the *Roadmap* report, and of the FAO itself. The *Roadmap* is a report of great significance which will have global influence on governments' and companies' plans to reduce emissions from food systems, and it is therefore of utmost importance that it maintains the highest standards of scientific rigour – which are conspicuously and egregiously absent in the *Pathways* report calculations of the emissions mitigation potential of dietary change. These concerns have also been voiced by FAIRR, a global investor network with a membership of \$70 trillion in collective assets of support, which has stated that “concerns raised by the authors [Behrens and Hayek] extend beyond just the one paper” to the 2050 *Roadmap* report⁹.

We thus recommend that the release of the 2050 Roadmap be delayed until the FAO has engaged in serious dialogue with experts and civil society in a reflective process to assess what went wrong in the *Pathways* report – and adopt more robust, inclusive and transparent processes in the creation of the next instalment of the 2050 Roadmap report. In its response to *The Guardian's* reporting on the Behrens and Hayek request for a retraction of the *Pathways* report, the FAO said it would “look into the issues raised by the academics and undertake a technical exchange of views with them.”¹⁰ **We urge the FAO to honour its commitment and schedule a technical exchange**

promptly with Behrens and Hayek, and to engage with other independent academic experts and civil society to ensure its future calculations are robust. We are concerned about reports by former FAO officials claiming that they have been sidelined by the FAO for espousing dietary change as a solution to reducing livestock emissions, following lobbying from livestock businesses and high meat-producing countries – and urge the FAO to ensure an open and objective engagement with experts¹¹.

3. The need for transparency in the GLEAM methodology:

More broadly, we are surprised that the FAO's GLEAM estimates for the total emissions from livestock globally have declined significantly over time due to revisions to the model, despite considerable growth in livestock production volumes during this period. GLEAM estimates of total global livestock emissions have declined from 7.1 GtCO₂-eq per year (14.5% of total anthropogenic greenhouse gas emissions) in 2013's *Tackling Climate Change Through Livestock*¹² to 6.2 GtCO₂-eq (12% of global emissions) in GLEAM 3.0 (2023)¹³. The *Pathways* report attributes this to "differences in methodology, input data and global warming potential (GWP) values" and gives topline explanations of data sources, but greater transparency of the calculations is required. **We call on the FAO to publish 1) the data sources and calculations used to arrive at the GLEAM statistics and 2) the identities of experts involved in production of the GLEAM figures, with disclosure of any potential conflicts of interest.** Hayek has stated that there is an "alarming lack of validation" from verifiable atmospheric data for the FAO's GLEAM data¹⁴. **We thus call on the FAO to collaborate with academic experts to cross-check modelled estimates of livestock emissions against verifiable atmospheric data, to ensure the accuracy of GLEAM statistics.** The scientific rigour of GLEAM is particularly important in light of the global influence of GLEAM, which is used by many countries and companies in national and corporate reports.

4. Dietary change and nutrition:

Finally, **we urge the FAO to increase its engagement with nutritional experts and other UN agencies, such as the World Health Organisation, to investigate further the evidence behind the nutritional adequacy and benefits of healthy diets containing less animal products and more plant-based foods, including in the Global South.** As noted in the Annex, the official dietary recommendations of many countries support lower-meat diets as nutritionally adequate – for instance, Danish guidelines recommend that 350g meat per week is adequate¹⁵.

We welcome your response to these queries and recommendations. Following your written response, we would also be happy to offer a meeting to discuss the points raised.

Sincerely,

Logos of organisational signatories:





Full list of organisational signatories:

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Annex - Errors in the *Pathways* report:

The *Pathways* report includes numerous errors, all of which have the cumulative effect of erroneously downplaying the emissions mitigation potential of dietary change towards lower consumption of animal products. Of particular concern are the serious methodological errors which appear to have been committed – which are mostly calculations erroneously comparing fundamentally incomparable data in a way which leads to extremely inaccurate results:

- Double counting meat emissions to 2050 – once in the BAU baseline projections for increased meat consumption by 2050, and then again in the estimation of emissions mitigation potential of dietary change which erroneously factors in both projected increases in meat consumption in some countries and decreases in others;
- In the calculation of net changes in livestock emissions as a result of dietary change, erroneously including emissions from increases in vegetable, fruit and nut consumption which are unrelated to substituting meat and dairy in diets;
- Mixing different baseline years in its analysis - emissions savings compared to current diets are falsely represented as potential emissions savings compared to 2050 BAU projections;
- Inappropriately comparing emissions reduction of nationally recommended diets (NRDs) to a total emissions quantity from an incomparable paper.

In addition to these methodological errors, the FAO has made a series of highly inappropriate, narrow and distorting modelling choices:

- Conflates sustainable healthy diets with nationally recommended diets (NRDs) – most of which do not factor sustainability into their design.
- Fails to model the emissions mitigation potential of the many available models of sustainable healthy diets which do factor in emissions and other sustainability criteria (such as the EAT-Lancet diet);
- Ignores the opportunity cost of livestock production and the associated opportunities for carbon sequestration on land spared by dietary change;
- Within the limitations of NRDs, makes choices which further limit their potential, such as:
 - Uses NRDs which have since become obsolete – with many having since been updated to recommend lower meat consumption. Some examples include:
 - Spanish Guidelines from 2022 now recommend 0-3 meat portions/week¹⁶
 - German guidelines from 2024 now recommend no more than 300g meat per week¹⁷
 - Danish from 2021 guidelines recommend that 350g meat per week is adequate¹⁸
 - China has also systematically decreased recommended levels of meat intake over time, with the latest 2022 revision recommending only 300-500g meat per week¹⁹.
 - Uses the mid-range rather than the lower-range value for meat intake from NRDs – thus failing to accurately represent the potential meat reduction, even within the out-of-date NRDs.
- Uses a study which assumes very high emission intensities for increases in plant-based products;
- Uses a single (inappropriate) study, ignoring the large scientific literature available on the emissions mitigation potential of sustainable diets.

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