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27th September 2024

Dear Ms Crawford and Mr Tiensin,

Thank you for your response to our joint-letter by international organizations and experts concerning the FAO's recent *Pathways* report.

We thank you also for your kind invitation to join the FAO Livestock Environmental Assessment and Performance (LEAP) Partnership. Please could you clarify whether this invitation is extended to all individual and organisational signatories of our joint-letter, and the process for joining?

However, we are dismayed that your response fails to address the concerns highlighted in our letter – stating, despite the clear evidence we have presented, that "there are no serious methodological issues in the report that would warrant a revision or retraction". In light of the inadequacies of the FAO's response, we would like to reiterate our request for the FAO to have a dedicated meeting with Prof Paul Behrens and Dr Matthew Hayek to give adequate time to specifically discuss the critical errors they have identified in the *Pathways* report regarding dietary change. We would additionally like to request a separate meeting, with the signatories of our joint-letter, to discuss the errors and reflect on what can be done to prevent such errors arising in future.

We are also dismayed that your response ignores many of the most significant errors identified by Professor Paul Behrens and Dr Matthew Hayek. In their rebuttal of the *Pathways* report, Prof Behrens and Dr Hayek categorically state that it "seriously distorts the findings" of papers of which they are co-authors[1]. It is not acceptable for the FAO, a respected UN institution, to gloss over these serious errors as a "rough estimate", when the data and policy recommendations it provides are so internationally influential. A higher standard of scientific rigour is required, particularly in analysing the emissions mitigation potential of one of the most powerful tools available to reduce livestock emissions – dietary change. Many of the scientific experts who are signatories of our letter could assist the FAO in arriving at a more accurate estimate – and the FAO could also draw on the abundant scientific literature on the topic.

The FAO's response mentions that it has received a letter from a group of scientists led by Prof Dr Giuseppe Pulina (University of Sassari), Dr Jean-Francois Hocquette (INRAE), and Prof Dr Peer Ederer (GOALSciences), in support of its conclusions. We request that you share this letter with us for evaluation and, in the interests of transparency, make this letter public.

We are also concerned that the FAO did not respond to our calls to revise its processes to ensure greater transparency and accountability. We reiterate our call for the FAO to adopt more robust, inclusive and transparent processes in the creation of the next instalment of the 2050 *Roadmap* report, and all future reports. To achieve this, we recommend that the names of all FAO report authors and members of advisory committees be published alongside disclosure of potential conflicts of interest – such as work for the livestock industry – and drafts of reports be made available for public scrutiny and feedback ahead of finalisation. We reiterate our call for 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.

The core issues with the *Pathways* report, which your response fails to address, fall into two main categories: serious methodological errors and inappropriate methodological choices. We set these out in detail below:

1) Serious methodological errors

The FAO's response ignores most of the serious methodological errors raised by Prof Behrens and Dr Hayek – errors which seriously misrepresent even the comparatively less ambitious emissions mitigation potential of shifting to nationally recommended diets (NRDs). These methodological errors move beyond the realm of subjective modelling choices into basic mathematical errors. We thus reiterate our call for the FAO to retract the *Pathways* report, since these errors are unjustifiable and have a potentially very large distorting effect. We urge the FAO to acknowledge and respond to each of these errors in turn, restated below:

- **Mixing baseline years in analysis, underestimating meat reduction to meet NRDs:** The FAO mixes different baseline years in its analysis - emissions savings compared to current diets from Behrens *et al* (2017) are falsely represented as potential emissions savings compared to 2050 BAU projections in the FAO's *Pathways* report. This means that the FAO is likely to be significantly underestimating the reduction in animal product consumption which would result from aligning its 2050 BAU scenario with NRDs, and the associated emissions mitigation potential. To illustrate how much difference this could make, in Behrens *et al* (2017) the projected change in emissions for China to align with its NRD is relatively small, because current per capita meat consumption is moderate. However, if the FAO is assuming in its 2050 BAU scenario that meat consumption would significantly increase in China, then considerably higher reductions in meat would be required to align China's 2050 diet with its NRD – with associated, significantly higher, emissions savings.
- **Double counting emissions from increases in meat consumption:** Beyond underestimating decreases in meat emissions, the FAO also erroneously double counts *increases* in animal product emissions to 2050 – once in the FAO's BAU baseline projections for increased animal product consumption by 2050, and then again in Behrens *et al* (2017)'s estimate of the emissions mitigation potential of dietary change, which factors in both projected increases in animal product consumption in some countries and decreases in others, compared to current consumption levels. The FAO's response mentions that "we can assume that their [Behrens *et al*] calculated reduction in emissions may not fully represent the potential emissions increase in low-income countries due to the increase in their consumption of animal protein". However, it appears that the FAO 2050 BAU scenario already factors in projected increases in meat consumption for all countries, including low-income countries – it would therefore be bad practice to unnecessarily double-count these under dietary change. Moreover, Behrens *et al* (2017) do calculate a significant increase in emissions from additional meat and dairy consumption in many of the countries studied. For instance, they model an increase in dairy emissions in the US, South Africa, Japan, Poland, South Korea, Norway and Sweden, and an increase in meat emissions from India, Indonesia, and Romania. The FAO's double-counting of these emissions artificially offsets and obscures emissions reductions due to shifts to lower-meat diets compared to the 2050 baseline. Finally, if the FAO 2050 BAU scenario assumes significant increases in meat consumption in countries like India, then adjusting from the FAO's baseline of 2050 to the NRD is likely to require

reductions in meat consumption rather than the increases in meat consumption that Behrens *et al* (2017) model from a 2016 baseline.

- **Factoring in emissions from fruit, vegetables and nuts unrelated to replacing meat consumption:** Behrens *et al* (2017) also factor in significant increases in emissions due to increased vegetable, fruit and nut consumption. Much of this projected increase in fruit, vegetables and nut consumption is required to address global micronutrient deficiencies *regardless* of changes or not to animal product consumption, and is unrelated to substituting for meat or dairy in diets. Because the FAO's *Pathways* report narrowly examines the BAU emissions from livestock by 2050, and potential measures to reduce these livestock emissions – increases in emissions from additional fruit, vegetables and nuts are only relevant where these are substitutes for the reduction in animal product consumption. Despite this, the FAO erroneously factors in these increases in emissions due to meeting global nutritional needs, in a way which artificially offsets and obscures the total emissions savings of shifts to lower-meat diets. The FAO response has not addressed this serious error.
- **Comparison with greenhouse gas estimates from agrifood systems by Tubiello *et al*., 2021:** We welcome that the FAO "acknowledge this inconsistency in methodology" and clarifies that "excluding both pre- and post-production greenhouse gas emissions from Tubiello *et al*. would alter the range from 3% to 8%". However, the FAO doubles down on the estimate of 4%, on the basis this falls within the range of 3-8%. 4% is towards the lower end of this range – half what the potential maximum mitigation potential would be at 8% - and therefore is not an accurate representation of the emissions mitigation potential of dietary change to NRDs. More importantly, this is before the cumulative impact of all the other modelling errors made above is factored in, which would significantly increase the final estimated emissions mitigation.

2) Inappropriate, narrow and distorting modelling choices

We are grateful that your response addresses some of the issues raised with the *Pathways* report modelling choices. However, the FAO response doubles down on its decisions, ignores some of the most distorting modelling choices raised, and insufficiently addresses others. We thus reiterate our call for the FAO to re-evaluate these modelling assumptions in the *Pathways* reports and future reports:

- **The opportunity costs of land potentially spared through dietary change:** The FAO fails to respond to the criticism that it has omitted the emissions mitigation potential of alternative uses of land spared through dietary change to lower meat and dairy consumption. As noted in Prof Behrens and Dr Hayek's letter to the FAO, this has an extremely significant impact on results – for instance, based on scientific papers modelling a global shift to the EAT-Lancet diet, potential carbon sequestration on spared land would result in nearly 3.12 $GtCO_2$ per year through 2050 – which would be additional to direct emissions savings of 3.10 GtCO2e per year, leading to a potential doubling in emissions mitigation impact[2].
- **Updates to Nationally Recommended Diets:** The FAO's response acknowledges that Denmark, Germany and Spain have updated their Nationally Recommended Diets, but claims that together these "represent less than 2% of the global population", and therefore will have an insignificant impact on results. However, your response ignores the fact that, as highlighted in our original letter, China has also systematically decreased maximum recommended levels of meat intake over time, with the latest 2022 revision recommending only 300-500g meat per week[3]. China accounts for over 17% of the global population[4]. In addition, since the time of writing, Germany and Austria have also updated their Nationally

Recommended Diets – Germany to recommend no more than 300g of meat per week[5] and Austria to recommend only 2-3 portions of meat and fish per week[6]. These are provided only as examples and are not an exhaustive list of countries having updated their NRDs.

- **Using the mid-range rather than the lower-range value for meat intake from NRDs:** The FAO has failed to address this criticism. Given the wide range of recommended meat and dairy intake in NRDs, this has a significant impact on the resulting emissions mitigation potential.
- **Failure to model more ambitious reductions in meat and dairy:** The FAO responds that it has not considered diets lower in meat and dairy because this would "raise concerns about the food security and nutrition of smallholder farmers and pastoralist communities, as well as affordability". Pastoralist communities and smallholder farmers who rely on their own livestock for their food security are based primarily in lower income countries in the Global South. Thus, whilst these are very valid considerations for low-income countries, they should not be used as an excuse to oppose more ambitious dietary change in high and upper-middle income countries whose citizens are overconsuming animal products most, and bear a disproportionate responsibility for climate change. More ambition in these countries would help mitigate the worst impacts of climate change, disproportionately experienced by the Global South, including pastoralists and smallholders. Many models for the reduction of meat and dairy consumption, such as the EAT-Lancet diet[7], already allow for some increase in meat and dairy consumption in low-income countries. On affordability, many studies have shown that transition to lower meat diets in high and upper-middle income countries result in net cost savings – for instance, one study found that healthy and sustainable diets are potentially 22–34% lower in cost in upper-middle-income and high-income countries on average[8].
- The FAO also claims that it cannot model more ambitious reductions in animal product consumption because "there is no global database on dietary preferences and no policy instrument that supports the adoption of alternative diets based on balanced environmental, economic, and social criteria". We would like to request clarification on what the FAO means by this statement. Many countries do collect data on current production and consumption of animal products, and there are numerous policy tools which countries are beginning to put in place to support lower animal product production and consumption – including public procurement[9], retail targets for increased plant-protein[10], ending meat promotions[11], restrictions on meat advertising[12], support for livestock farmers transitioning to lower livestock numbers[13], funding to stimulate supply and demand for plant-based foods[14], subsidy reform[15], and emissions taxes on agriculture[16]. Such policies can be designed in ways to ensure a just transition and access for lower-income groups[17]. The FAO suggested similar policies in *Livestock's Long Shadow* including subsidy reform, beef taxes, and correcting for environmental externalities[18]. The FAO also seems to selectively focus on data-gaps and trade-offs to dismiss reductions in meat consumption, whilst overlooking the considerable uncertainties and trade-offs arising from livestock intensification and expansion. There is also incomplete data on the impacts of livestock intensification[19], which can carry significant negative environmental, economic, and social trade-offs – such as pandemic risks, industry concentration, animal welfare, pollution of air, water and soils.
- **Conflation of Nationally Recommended Diets with sustainable and healthy diets:** The FAO makes the case for NRDs being the most appropriate diet to model, but the FAO does not respond to the issues raised that its report conflates the NRDs with "sustainable and healthy diets"[20], despite the fact that the vast majority of NRDs do not factor sustainability into their design. Indeed, a recent study found that the majority of current NRDs are highly

inconsistent with limiting global heating to 1.5°C, even if all other emissions from every other sector were reduced to zero[21]. The FAO cannot draw conclusions about the limitations of sustainable healthy diets on the basis of NRDs which are not sustainable.

We welcome your response to these queries and recommendations, and the proposed meetings to discuss further.

Yours sincerely,

Organisational signatories:

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