Reply to comment by Rigolot on “Narratives Behind Livestock Methane Mitigation Studies Matter”
Jinfeng Chang, Shushi Peng, Yi Yin, Philippe Ciais, Petr Havlik, Mario Herrero

To cite this version:
Jinfeng Chang, Shushi Peng, Yi Yin, Philippe Ciais, Petr Havlik, et al.. Reply to comment by Rigolot on “Narratives Behind Livestock Methane Mitigation Studies Matter”. AGU Advances, 2021, 2 (4), 10.1029/2021AV000549 . hal-03517784

HAL Id: hal-03517784
https://hal.science/hal-03517784
Submitted on 8 Jan 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License
Reply to Comment by Rigolot on “Narratives Behind Livestock Methane Mitigation Studies Matter”

Jinfeng Chang1,2, Shushi Peng3, Yi Yin4, Philippe Ciais5, Petr Havlík2, and Mario Herrero6

1College of Environmental and Resource Sciences, Zhejiang University, Hangzhou, China, 2International Institute for Applied Systems Analysis, Laxenburg, Austria, 3Sino-French Institute for Earth System Science, College of Urban and Environmental Sciences, Peking University, Beijing, China, 4Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA, USA, 5Laboratoire des Sciences du Climat et de l’Environnement, LSCE/IPSL, CEA-CNRS-UVSQ, Université Paris-Saclay, Gif-sur-Yvette, France, 6Commonwealth Scientific and Industrial Research Organization, St Lucia, QLD, Australia

Key Points:
- The simultaneous pursuit of both production and demand side strategies is needed for livestock methane mitigation
- Production efficiency gains imply necessary transformation of society and economy in addition to technology improvement
- Comprehensive assessment of a large scale reduction of livestock production and its impacts on multi-dimension sustainability is needed

Supporting Information:
Supporting Information may be found in the online version of this article.

Citation:
Chang, J., Peng, S., Yin, Y., Ciais, P., Havlík, P., & Herrero, M. (2021). Reply to comment on Rigolot on “narratives behind livestock methane mitigation studies matter”. AGU Advances, 2, e2021AV000549. https://doi.org/10.1029/2021AV000549

Received 9 AUG 2021
Accepted 27 SEP 2021

Peer Review The peer review history for this article is available as a PDF in the Supporting Information.

Author Contributions:
Conceptualization: Shushi Peng, Yi Yin, Philippe Ciais, Petr Havlík, Mario Herrero
Writing – review & editing: Shushi Peng, Yi Yin, Philippe Ciais, Petr Havlík, Mario Herrero

‡ These authors contributed equally.

© 2021. The Authors.
This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

Abstract A comment by Dr. Rigolot acknowledged the scientific value of our recent study on livestock methane emissions and mitigation potentials, while highlighting that our study should better "cultivate synergies between production and more ambitious demand-side efforts." The author’s comment questioned our narrative to be inadvertently (not intentionally) contributing to a "climate delay discourse" in several ways that might hinder ambitious mitigation efforts. This is indeed a welcome perspective that merits further comment.

The spirit of our paper is actually well aligned with Dr. Rigolot’s comment. The challenge of tackling climate change is of the extent that no options can be left unused. We stated in our original paper that "promoting balanced, healthy, and environmentally sustainable diets in most countries can mitigate future livestock methane emissions," and "efforts on the demand-side ... as assumed in the TS (toward sustainability) scenario (FAO, 2018), will not be sufficient to mitigate livestock methane emissions without parallel efforts to improve production efficiency.” Thus bringing the supply side solutions prominently forward is needed to re-balance “opposite narratives, highlighting the importance of reducing animal product consumption to a minimum, without respect to the mitigation potential from the production-side.” As stated in our original paper the simultaneous pursuit of both strategies is needed.

There are also some minor considerations to the interesting typology of “discourses of climate delay.”

“Push non-transformative solutions” While we acknowledged that diet change can be transformative in lifestyle, the production-side transformations underlying the assumed improvements in greenhouse gas emission efficiency are from many perspectives profound too. Production efficiency gains imply necessary transformation of society and economy in addition to technology improvement. More efficient practices/technologies can become available and affordable through further research and development, while technological change at large scale is after all largely dependent on societal transformation and vice versa. For example, one of the solutions proposed to increase production efficiency “transition of livestock production systems from extensive rangeland systems to mixed crop-livestock systems, and through improving livestock management within the existing systems” would require substantial transformation of land-use and land management that involves transformative shifts in agricultural and farm structure and livelihoods. Many farmers tend to stick with what they know works for them and perhaps worked for their elders. Adopting new technologies and management practices can involve many socio-economic impediments. For instance, in the developing world, resources (e.g., financing) and knowledge for moving to more intensive management systems may be severely lacking, as well as incentives at sectorial level, for example, for the (ongoing) intensification of beef production in Brazil (Vale et al., 2019). In the developed world, re-integrating livestock and crop systems also requires learning new things, additional investment and taking on new risks. Policies and efforts for knowledge and technology transfer, capacity-building, and creating financial incentives are important for such profound transformation (Gerber et al., 2013).

“Surrendering (to change is impossible)” As scientists we have to recognize that our understanding and the empirical foundations of the behavioral change needed to deliver sufficient diet shifts remains limited.
this perspective the risk remains, that in a few years from now only a fraction of the today’s assumed mitigation potential from diet shift will still be considered realistic, as it already happened with several mitigation options, such as large-scale afforestation or BECCS. Hence the need to continue advocating for supply side options simultaneously. However, in spite of new technologies and management practices, it is a fact that efficiency gains have been observed in many regions over the past two decades (as shown in Figure 3 of our original paper), although further large-scale deployment will require profound socio-economic transformation of livestock production systems (see above).

“Redirecting responsibility” While in developed countries the emissions are decreasing over the past two decades, the recent increase in emissions is largely coming from developing countries which benefit from the common, but differentiated responsibilities, and respective capabilities (CBDR-RC) granted through the Paris Agreement based on equity principles (also in other sectors). As pointed out by Dr. Rigolot, we discussed the possibility that the emission intensity per kg of protein in developed countries may increase again in the future through moving toward grass-fed beef. This could partly offset the past efforts on the mitigation. Our study found large mitigation potential in developing countries, but we do not redirect responsibility for climate mitigation toward those countries. Reducing per capita meat and dairy consumption for overconsumption people should be promoted for climate and environmental sustainability. In the meantime, more efficient financial and regulatory schemes and effective transfer of technologies to developing countries are needed for pursuing mitigation in all sectors, as planned in the Paris Agreement. Efforts in developed countries to achieve climate neutrality in the combined land use, forestry and agriculture (AFO-LU) sector by 2035 (European Commission, 2021), and in developing countries, such as China’s carbon neutrality pledge (XinhuaNet, 2020), are emerging. However, when pursuing domestic mitigation measures, it is important to avoid redirecting emissions from domestic agricultural sector through boosting import from elsewhere.

“Emphasizing the downsides of climate policies” Though we agree that emissions mitigation need immediate actions all over the world from a climate emergency perspective, in a political economy, and democracy, policies need to be widely acceptable. Comprehensive assessments of a large scale reduction of livestock production and its impacts on the three dimensions of sustainability (economic, social, and environmental) would be as much needed as well as the studies into the behavioral change to design acceptable holistic (production and consumption) mitigation pathways for the livestock sector. Socio-economic acceptability and environmental impacts both need to be considered during climate policy-making.

Conflict of Interest
The authors declare no conflicts of interest relevant to this study.

References
European Commission. (2021). Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulations (EU) 2018/841 as regards the scope, simplifying the compliance rules, setting out the targets of the Member States for 2030 and committing to the collective achievement of climate neutrality by 2050 in the land use, forestry and agriculture sector, and (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review. Brussels, 14.7.2021. COM/2021/554 final. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0554

FAO. (2018). The future of food and agriculture—Alternative pathways to 2050.

Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., et al. (2013). Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO).

Vale, P., Gibbs, H., Vale, R., Christie, M., Florence, E., Munger, J., & Sabaini, D. (2019). The expansion of intensive beef farming to the Brazilian Amazon. Global Environmental Change, 57, 101922. https://doi.org/10.1016/j.gloenvcha.2019.05.006

XinhuaNet. (2020). Retrieved from http://www.xinhuanet.com/english/2020-09/22/c_139388644.htm

Acknowledgments
The authors thank Dr. Eric A. Davidson for the valuable comments and suggestions. Jinfeng Chang is supported by the Strategic Priority Research Program of the Chinese Academy of Sciences (Grant No. XDA26010303). Philippe Claess acknowledges support from the CLAND Convergence Institute of the French National Research Agency (ANR-16-CONV-0003). Mario Herrero acknowledges funding from the Bill and Melinda Gates Foundation through the MERLIN project (INV-023682).