**Introduction**

* General:
  + The introduction is a bit too "one-sided". It it is important to also mention some of the positive aspects of animal production (e.g. contribution to economies, livelihoods, nutrition, soil fertility, …) -- as these would need to be taken into account as "opportunity cost" if livestock production was to stop. This is very much in line with the concept of one of the key references cited in the introduction of the paper, Hayek et al., who also explicitly refer to the "carbon opportunity cost" of using the lands for extensive food production .
  + A wide range of sectors and processes contribute to global emissions and there is thus not one single solution (or even sector to improve) in order to tackle climate change. This point needs to be clearly stated.
* line 4: I do not find these figures in Hayek et al. and Strassburg et al. Can you specify page/line numbers?
* p.5, last two lines: The figures mentioned in Hayek et al. and Strassburg et al. are lower.
* p.5, line 4: Can you clarify how the figure of 1,400 Gt was arrived at?
* p.5, line 6: The statement "warming is cumulative" needs a bit of nuancing, as it is only applicable to long-lived climate pollutions (i.e. not to methane).
* p.5, line 5-8: Some more detailed explanation underpinning the statement that "this understates impact of dietary change on global warming" would be helpful.
* p.6, last line second last paragraph: "assuming that all other sources of emissions remain constant at 2019 levels" - this seems a fundamentally wrong assumption, as the reduced production of food/nutrition/manure/income as a result of eliminating animal agriculture would need to be compensated for.

**Results,**

* General: This section also contains quite a bit of methodology. The manuscript would benefit from having all the details provided here integrated in the methodology section.
* second paragraph: Please indicate the data source of the total human emissions.
* p.7 biomass recovery: This explanation is missing in the methods section. Using this figure is also flawed, as Hayek et al calculates the potential sequestration associated with converting land to native/natural state while some of the land will have to be converted to cropland for plant-based food production.

**Methods,**

* General:
  + It would be helpful to start the methods section with an overview, ideally with schematic.
  + There is a mismatch in the current methodology between steps that are "rough estimates" with steps that are worked out through complicated formulas that seem to imply high precision. Kindly address.
  + The methodology combines many different steps, all associated with large uncertainties. I believe the authors would need to address a few related points: (i) each of the separate uncertainties need to be clearly stated (methodology) and quantified (results); (ii) an estimate of the combined uncertainty needs to be included; (iii) this needs to be extensively discussed in the discussion session.
* p.18, last paragraph: Can you clarify to what the emission data was scaled?
* p.20, emissions from agriculture: Please, state explicitly which sector(s)' data you used.
* p.19, diet-linked emissions:
  + Please indicate which of the soybean scenarios from Behnke et al. were used (and the actual figure) for replacing the emissions associated with livestock production with emission associated with soy bean production when modeling reductions in livestock consumption? As the treatments in Behnke et al. are somehow "best practices" with e.g. low fertiliser rates and very localised, I doubt it is realistic to use this as a global GHGe estimate. Please, use a more globally representative data source and confirm that the number used is a realistic global GHGe estimate, by comparing with a number of other sources (across different agro-ecologies, systems, geographies).
  + Can you clarify if a similar replacement (animal product replaced by soy bean) for the landuse estimates is also carried out? If not, I believe this is an adjustment that should be made, thereby also keeping in mind that in large areas used for animal feed production (e.g. the arid rangelands), plant-based protein production would require larger areas of land than animal-based protein production.
* p.20, Emissions projections:
  + BFD: write in full
  + BAU scenario: fixing emissions at 2019 level is not realistic, as "reductions are likely to be achieved through e.g. increasing agricultural efficiency, reducing food waste, limiting excess consumption, increasing yields, and reducing the emission intensity of livestock production" (as mentioned in the introduction).
  + Can you provide some more detail about the **carbon recovery rate** (magnitude and assumptions; 30 vs 50 years)?
* Estimating global non-anthropomorphic emissions:
  + Aren't these emissions already taken into account somewhere in the FAOSTAT "Environment\_Emissions\_by\_Sector\_E\_All\_Data\_(Normalized)"
* Projections of atmospheric gas levels (p.25):
  + What is the data source of the starting levels?
* Computing emission and land carbon opportunity cost, Factor of 2:
  + as the terrestrial sinks are already included in the calculation of atmospheric C concentration, isn't this double-counting?
* Computing Carbon Emissions Budgets for RF 2.6 and 1.9:
  + Please explain why RF 2.6 and 1.9.
  + "RF calculations used in climate models", which climate models are being refered to?
  + "the RF as calculated above" - which calculation exactly does this refer to (to "the complete RF output of MAGICC6" or to the calculations described in the Radiative Forcing section)?
* aCO2eq:
  + first sentence: How were the CO2 emission equivalents computed?
  + "simulations described above" - please, specify where exactly is "above", i.e. which simulations are referred to?
* Product equivalents
  + line 25: "per protein" missing.
  + p.26: Please compare the calculated value of 470kg CO2 eq/kg beef with some values in the literature - e.g. the FAOSTAT data source you used for estimating the overall emissions from agriculture - and explain where the huge difference is coming from.

**Discussion,**

* p.15: Apart from calories, protein and fat, it is also worth to say something about micro-nutrients.
* treatment of methane: The long-and short-term warming effects of methane and CO2 are very different and there is an ongoing debate as to how to weigh the methane emissions; it would be worth saying something about that in the discussion.
* perspectives: Please include a short discussion on the social and political feasibility of eliminating animal production completely.

**Figure 1:** The conversion factors for methane and nitrous oxide used here are not standard. Please, adjust.