RC 1 comments and responses.

The manuscript 'Positive tipping points for accelerating adoption of regenerative practices in African smallholder farming systems: What sustains adoption?' assesses the potential for successful adoption of Regenerative Agriculture in Sub-Saharan Africa. It introduces the concept of positive social tipping processes using existing frameworks and applies them to the example of the International Small group and Tree planting programme (TIST) in East Africa.

While RA adoption and the TIST programme is a very interesting example of a positive social tipping point and the manuscript has the potential to become an interesting publication, the manuscript in its current form lacks clear structure, clear definitions and coherent use of terminology. It requires fundamental reworking before publication.

The structure of the manuscript is not clear. Why do the authors start with the social tipping point framework by FOLU, then use Fesenfeld (2022) and finally move to Moore et al's (2015) concept of scaling? What is the connection between Moore et al and STPs and why is it useful to use them both?

RESPONSE:

Thank you very much for this observation. It is helpful to learn that we needed to do more to ensure that we more clearly communicate our conceptualisation and justification of the choice of concepts and their combination in the manuscript. We explain why these concepts and this combination further:

1. The framework for operationalisation of positive tipping points suggested by Lenton et al. (2022) and illustrated in the FOLU defines tipping elements and how the interactions between these elements could affect system states. Our choice of this illustration was for two main reasons, (1) to introduce the idea of enabling conditions and feedback loops as essential elements in triggering tipping points, (2) give the reader an insight into what constitutes these enabling conditions and feedback processes.

2. We think that fig. 1 in Fesenfield et al. (2022) does a good job in showing the system level effects of the interaction various enabling conditions and reinforcing feedback processes in time, leading to system level transition between states. However, to improve coherence and structural consistency of the manuscript, we choose to replace it with our own illustration, more focused on the conceptual framing used in the manuscript.

3. Moore et al.'s concept of scaling introduces three levels of scaling; scaling deep (impacting social norms), scaling out (impacting greater numbers) and scaling up (Impacting laws and policy). The framework for operationalisation of positive tipping points introduces the concept of reinforcing feedback processes playing a central role in driving the various dimensions and levels of scaling. It crucially observes that, if these processes are strong enough, scaling could be self-perpetuating (Global Tipping Points Report, 2023).

In the revised manuscript version, we shall introduce a section on conceptual framing (just after introduction). In this section we shall explain the relationship between these concepts and use this to set the tone for the rest of the manuscript.

The manuscript is not very well written and requires correction of typos and other language and grammar mistakes before publication. In addition, the manuscript's style (repetition of words, mistakes in referencing) needs to be improved.

RESPONSE:

The authors thank the referee for this critical observation. We shall review the document with the aim of identification and correction of typos, language and grammar mistakes that we could have missed during the earlier reviews.

Section 1:

Fig 1 which is directly copied from the FOLU report is not necessarily suitable to describe a positive social tipping process. Column 3 (conditions for systemic tipping points) is labelled as 'enabling environment' in the FOLU report (non peer-reviewed grey literature) but usually, positive tipping frameworks start with enabling conditions before reinforcing and dampening feedbacks lead to a tipping point. I would recommend using Fig 3 in Lenton et al (2022) or Fig 4.2.3 in the Global Tipping Point Report as framework instead.

RESPONSE:

Thank you referee for this fundamental observation. Figure. 1 was intended to introduce the tipping point elements to the reader. However, as the referee observes, its labelling does not show the sequence of actions in triggering the tipping points. To address this, we

1. introduce a section on conceptual framing to explain the relationship between the two main frameworks used in the manuscript, the positive tipping point framework illustrated in figure 1 and Moore et al. (2015) conceptualisation of scaling.
2. Replace the present figure 1 with a figure illustrating the relationship between these two concepts.

Section 2:

I wouldn't define economic competitiveness as an enabling condition. I would rather define it as social tipping element following Otto et al (2020). An intervention to create an enabling condition to reach economic competitiveness could be investments in R&D or extension services in the RA field. The examples of control variables for enabling conditions provided in the Lenton et al (2022) figure seem more suitable to me.

The categories economic competitiveness, accessibility, capability and cultural appropriateness are neither clearly defined nor coherently applied throughout section 2. For example, access to affordable credit is listed under 'capability'. Extension services are discussed in the competitiveness section. Each category needs to be clearly defined.

The role of information is not clear. Is it an additional category or does it run through the four other categories?

RESPONSE:

Thank you very much for this critical observation. This further highlights the lack of clarity and the inconsistency in definition and application of terminology which the referee has observed elsewhere. For coherence and consistency across the entire document, we adopt the naming in Lenton et al. (2022) in the appropriate places within the document. We also substantially revise the text in these sections to improve clarity and consistency of definitions. The elements under control variables for enabling condition (in the positive tipping points framework) will be merged into the following four categories (price/cost, complementarity and performance, Desirability and symbolism, Accessibility/Convenience, Information, social networks and capability) reflect their interdependencies in regenerative agriculture systems.

Section 3:

Fig 2: Apparently this figure is adapted from Fesenfeld (2022) but the reference is missing in the bibliography and thus, I cannot evaluate it. Also, the four categories (economic competitiveness, accessibility etc) are, according to the text, interacting in Fig 2, but they are not even referenced in Fig 2.

RESPONSE:

Thank you for this critical observation which further highlights the need to review the manuscript and address referencing gaps across the entire document. However, to improve the consistency and coherence across the entire manuscript, we shall not be using this figure any more and substituting it with one that aligns better with our revised structure. Despite these changes, we shall make the appropriate referencing and address any gaps that we could have missed in the earlier review processes.

The section is titled 'reinforcing feedback processes' but they are not discussed in detail in the section. Fig 2 is not well described in the text. It is not clear how Moore's (2015) definition of scaling is linked to the Fesenfeld et al. transition diagram.

RESPONSE:

Thank you very much for this observation. To address this, we

1. Introduce a section on conceptual framing to explain the relationship between the two main frameworks used in the manuscript, the framework for operationalisation of positive tipping points illustrated in figure 1 and Moores et al. (2015) conceptualisation of scaling.
2. Replace the present figure 1 with a more appropriate figure illustrating the relationship between these two concepts.

Section 8:

Why is a causal loop diagram used to describe the positive feedback loops? Who developed it and on what basis? Was it developed together with TIST farmers? Or based on a literature review? This is all very unclear.
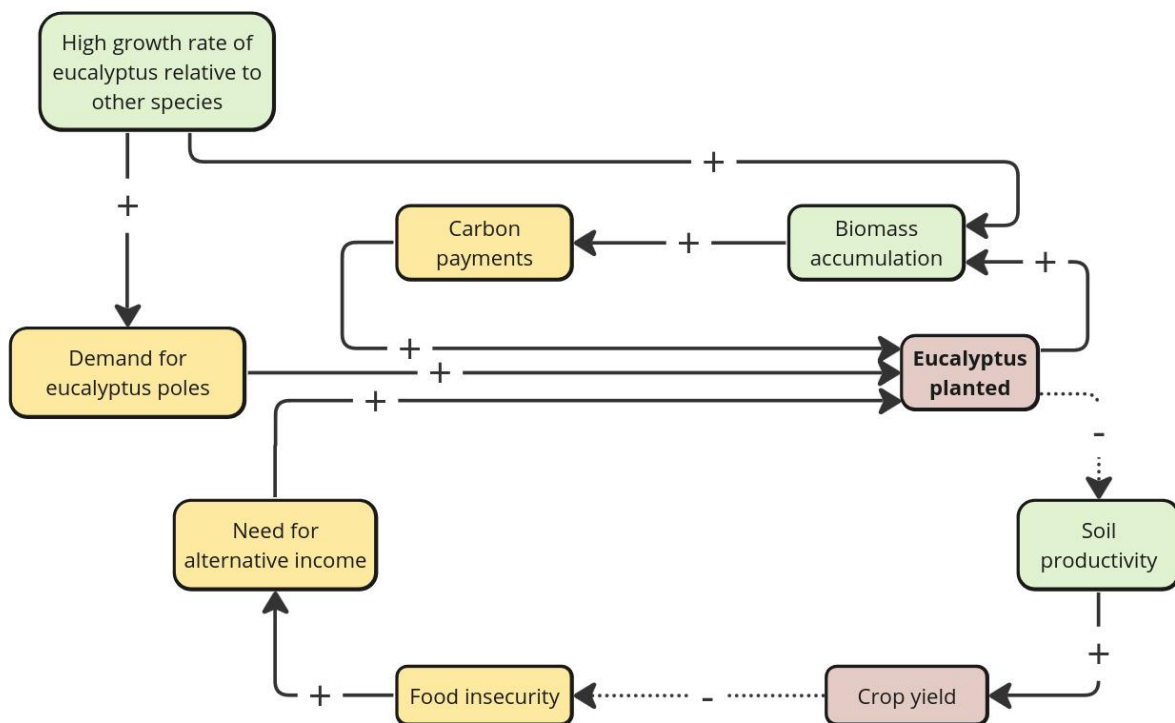
RESPONSE:

Feedback loops emerge from a cause-effect relationship. The purpose of this illustration is to easily present these relationships to our potential readers. The causal loop diagram (fig. 4) was developed by the authors based on literature (peer reviewed and grey) on TIST.

Fig 5 is labelled 'reinforcing feedback loops' but shows dampening feedback loops as well. The negative link between 'decreased soil productivity' and 'decreased crop yield' is incorrect. More decreased soil productivity leads to more decreased crop yield. Further, a rapid growth of trees leads to a decrease in soil productivity. The link needs to be positive or the label needs to change to 'soil productivity'. The entire figure needs to be reworked.

RESPONSE:

The authors thank the referee for this critical observation. We have since reworked figure 5 and see the revised figure below

Again, how is Fig 6 linked to the positive social tipping framework? Who has developed the figure, based on what information? Why is the layout different to Figs 5 and 4?

RESPONSE:

Fig 6 was developed by the authors based on literature (peer reviewed and grey) on TIST. The lay-out is different because the focus of this figure is to show transitions across scales rather than a highlighting the internal dynamics that affect these processes which is the focus of fig 4 and 5.