Review of: "The Vicious Circle of Climate Challenges With Soil in 5 Continents Caused by Low Cognitive in the Process of Agricultural Revolutions in the World"

Augusto Zanella[1]

1 University of Padua

Potential competing interests: No potential competing interests to declare.

Dear Author and Qeios Editors, thank you for asking for my opinion on this article. Below are some comments and any suggestions for improving the article. The line numbers are missing, so I used the titles of the chapters and the figures as a reference for my recommendations (written in italics).

Abstract

SMM = ?

Please, precise in the text: SMM (Strategic Multidisciplinary Mode)

1. Introduction and Process Background

Before fig. 1, you write: The current alarming trend of climate change, which has been increasing on different continents of the world for the past about 50 years, according to field research in this field, the following components are the main factors of the process: 1-Misplaced land use change 2- type of tillage 3- Using chemical fertilizers 4- Amount of poisons used 5- Soil erosion 6- Severe reduction of crop rotation 7- Use of agricultural and household wastes 8- Soil porosity 9- Conservation irrigation method 10- Trend of small land ownership.

You are certainly right: Actually, these "components", published by many authors in these last decades, impact the soil biodiversity (life of the soil, the soil as a living ecosystem). It is this decreased biodiversity that then: (1) determines an irreversible loss of SOM; SOM which ended up in the air and which contributes to the greenhouse effect; (2) once the soil is depleted of SOM, it loses its organo-mineral structure (3), which then means an inability to retain water (4), which then leads to a new loss of fertility (5), which... explains the negative spiral (erosion, acidification…;) and, finally, a regression towards a very poor initial soil or even the original rock.

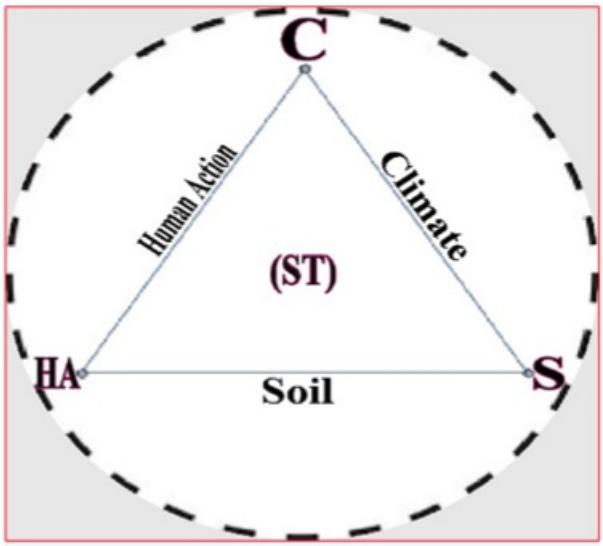


Fig. 1. The sustainability triangle strategy (STS) in operational decision-making in different parts of the world's agricultural soils.

In this context, all world scientists have shown a favorable opinion regarding the correlation of the 10 important components mentioned with climate changes in the realm of water and agricultural soil. And then, with a deep and exploratory look at these 10 global components and their relationship with the climate, we realize the common points in the basic life needs of the growing population of each of the 5 important continents of the world, that the inappropriate use of the mentioned components agriculture of countries is considered the main cause of global climate changes.

I agree, but: It is because there is more food produced in this way by agriculture that the human population increased in number! And not vice versa. Let me explain better: The 10 components (variables) indicated are correlated with climate change through changes imposed on the soil, undoubtably. However, humans changed (managed) the soil to eat more (which then meant population positive dynamic and growing in number), there was a desire to live better and this was achieved by making better use (for us) of the nature of the planet by exploiting the organic resources of the soil (appropriating the energy that was needed by the living beings on the soil). In doing so, we impoverished the soil drastically, with the consequences indicated (a generalized loss of fertility).

In this sense I agree with you that it is a "low cognitive" process, the collective scientific ignorance of the consequences of what was recommended as good agriculture even in universities around the world (the 5 continents of your article). I know this because they taught it to me, and I also practiced it with my father in our small family business.

Maybe you should make this point more clearly in your article: humans found how to produce more food by working the soil: they replaced the forests with cultivated fields and then tilled, fertilized, specialised them (monocultures). They ate better and grew in number, use up the Soil Organic Carbon and now that there are so many (8 billion) who have to eat, they can no longer go back and many of them see the created problem.

Before figure 2, you define this impactful agriculture, generally defined as "intensive or conventional agriculture" in the

papers, as "English agricultural revolution". You also say that it was more a discovery than an invention, induced by a combination of climate challenges, social and institutional settings, and market incentives (Tello, E., et all., 2017). *In other words: we till the soil, spread fertilizer (considered as food for plants), water correctly, and eliminate the living things that feed on the cultivated plants, and the result is more important production.*

(It worked: we could eat more; we grew in number and everything was fine. We did not see the soil becoming depleted)

1.1. Aim of the study (Climate and agricultural soils of the world from a strategic view)

ok

Materials and Methods from low cognitive

*7 lines before fig. 3 and 4:*For this purpose, in the operation of materials and methods according to strategic knowledge, we have used the two structures of weakness and process threats.

If I understand correctly, by “structures of weakness” you mean the 10 processes that have "impoverished" the soil (reduced soil biodiversity), while by “process threats” you mean the consequences on climate change. I think it is better to be more direct and always call these variables by the same name, so as not to confuse the reader.

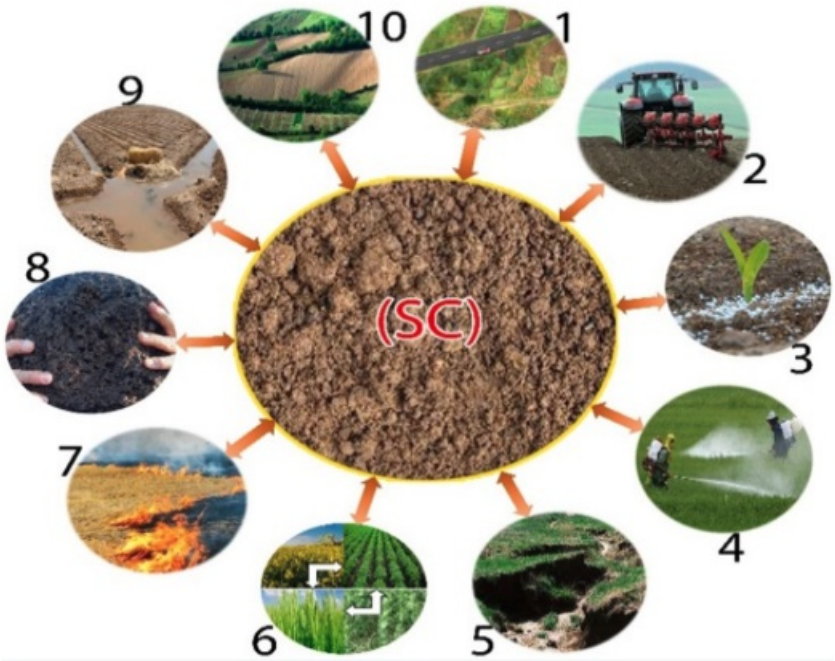


Fig. 3. The influence of ten selected components of anthropogenic research on the structure of biodiversity, physicochemical and texture of agricultural soils of the world.

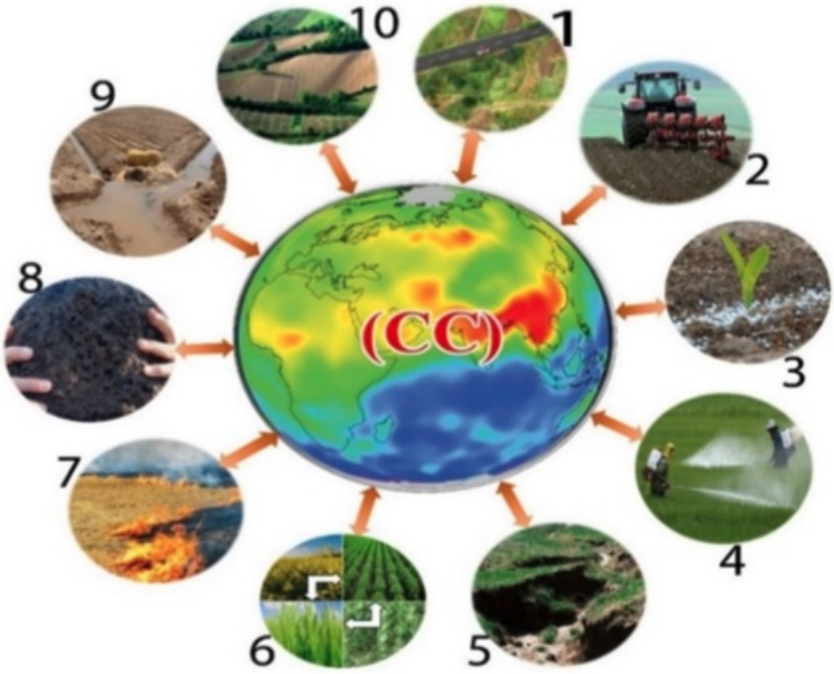


Fig. 4. Contrasting effect of ten selected components of anthropogenic research on the structure of climate systems in the process of global ecosystems.

Influence: (top, fig. 3) ON THE STRUCTURE OF BIODIVERSITY

(down, fig. 4) ON THE STRUCTURE OF CLIMATE SYSTEMS IN THE PROCESS OF GLOBAL ECOSYSTEMS

2.1. An in-depth look at the two main components of process change

OK

Before Tab. 1.

Our main point in this strategic research is that soil is the source of life and soil can lead to the destruction of all creatures in the world. Failure to understand the importance of soil in current agricultural systems will undoubtedly have serious consequences for the 9.8 billion people living on our planet (Kopittke, P.M., et al., 2019).

We can only agree on this crucial point. And certainly also on this (which confirms what was written above): it is a question of life in the soil, of soil biodiversity. I agree with you and Khangura et al. and many others that:

Organic matter and soil organic carbon are the two main components that drive soil biological and physicochemical diversity. As management practices have a profound effect on shaping microbial communities, agricultural soils in Western Australia are naturally low in SOC and are a potential threat to soil biodiversity today (Khangura, R., et al., 2023).

I would like to clarify: when we talk about SOM (Soil Organic Matter), we think above all of soil dead organic matter. In

reality, it is dead organic matter which is a food source for the living beings that develop in the soil. The two SOMs, dead and alive, are in balance: when one grows, the other also grows, and vice versa. When human action decreased dead SOM, they also decreased alive SOM. The increase in productivity occurred largely at the expense of dead SOM, which served to nourish the living SOM (especially microorganisms, which then nourished the rest of the pyramid).

Before Table 1, you write:

With such strategic thinking in this changing world that is managed by humans, it is considered necessary to form part of the statistical process information with a view to the global temperature trend in Tab. (1) as the main basis of historical analysis. And in this regard, the recording of other information was avoided.

I think that's true, unfortunately.

2.2. Evaluating the Effect of Research Articles on the World's Agricultural Soils System

You report:

When an effort is made in a target area, but the effectiveness of the target community is not satisfactory, we conclude that either the goal of researchers is not real, or our personal interests are involved. In this valley of knowledge, the top scientists and researchers of the world have come to the conclusion that why research articles on the effectiveness of agricultural soils are not a process in sync with climate stability and are more effective in personal improvement.

True, and I'm not surprised that you can prove it, stating that:

Based on a systematic review of 224 studies worldwide, the global assessment showed that human influence in the decision-making process of land use change has the greatest impact on soil erosion and climate change (Eekhout, J.P.C., and Vente, De-V., 2022). In order to become more familiar with the process of effectiveness of global researchers and thinkers, we have managed 730 research articles…..

and used 4 formulas to prove the ineffectiveness of the published works on the link between agricultural practices and climate deregulation (the works say that the soil is at the center of the issue and that we need to change the way we use it, in practice we continue as before).

Ok.

Traditional Conditions / Component type	Conventional Trend Stats	Number of review articles	Number of research articles	Number of references	Process effectiveness percentage
Corresponding author (Supervising professor)	510	411	99	5210	31.5
Corresponding author (PhD student)	151	45	106	111	44.5
Corresponding author (All)	69	33	36	421	24
sum	730	489	241	5742	100
(AEERAS)	-	-	-	-	**33.3**

Tab. 2. The conventional state of science production through the acceptance of joint articles by professors and PhD students in world universities in international prestigious journals.

I ran into a problem with the 4 formulas you used:

1. Components of the global strength of agricultural soils.
2. Components of global weakness of agricultural soils.
3. Components of the global opportunity of agricultural soils.
4. Components of the global threat of agricultural soils.

$$\mathrm{IFE(S)} = \sum_{i=1}^{21}(S1 \times R1) + (S2 \times R2) \ldots . (\mathrm{S}n \times Rn) = +4.02 \text{ Main objective (SA)} \quad (1)$$

$$\mathrm{IFE(W)} = \sum_{i=1}^{19}(W1 \times R1) - (W2 \times R2) \ldots . (Wn \times Rn) = -1.31 \text{ Main Objective (SD)} \quad (2)$$

$$\mathrm{EFE(O)} = \sum_{i=1}^{22}(01 \times \mathrm{R1}) + (O2 \times R2) \ldots . (\mathrm{O}n \times Rn) = +3.6 \text{ Main objective (SA)} \quad (3)$$

$$\mathrm{EFE(T)} = \sum_{i=1}^{23}(T1 \times \times R1) - (T2 \times R2) \ldots (Tn \times Rn) = -1.01 \text{ Main objective (SD)} \quad (4)$$

$$\mathrm{S} + (-\mathrm{W}) > 0 = 4.02 + (-1.31) = (+2.71) \text{ And } \mathrm{O} + (-\mathrm{T}) > 0 = +3.4 + (-1.01) = (+2.39) \quad (5)$$

$$\mathbf{C.I} = \mathrm{IFE(S)} - \mathrm{IFE(W)} \Rightarrow \mathrm{P.E} = \frac{\mathrm{C.I}}{\mathrm{Sn}} \times 100 = \%\ \text{Process Effectivness} \quad (6)$$

It is necessary to explain these formulas in the text (or with a legend different from the one reported under them in a smaller font, which is not directly linked to the formulas). You need to report what variables S, W, O, T and R mean in the formulas. Then also explain why the sum goes up to 21 for IFE (S), 19 for IFE (W), 22 for EFE (O), and 23 for EFE (T). These numbers must appear in Table 2 so that the reader can find the relationship between the table and the formulas. You must also explain formula n° (5) and say that formula n° (6) is connected to the last right column of Table 2. Perhaps all this appears in the publications you report in the text, but the reader of your article must at least understand the

formulas without going and looking for them elsewhere.

I would simply report in a legend below the formulas that: "S = ...; W = ... etc.; in formula 1, 21 is the number of times that,…". The formulas are sums and additions, and the reader will follow the reasoning well, including the profit and loss comparison of the formulas taken two by two.

2.3. A smart look at the existing industries by choosing the type of global sustainable model

You write:

Based on the principle of unity of procedure for the sustainability of global soil and climate components, targeting the operational path to the conclusion has been determined.

This sentence itself is well written, but the meaning is too complicated. You should present for those not accustomed to the concept what the "principle of unity of procedure" *is and also what* "targeting the operational path to the conclusion has been determined" *means in terms more accessible to everyone*

In these complex global goals, 4 intelligent predictions are simultaneously considered as best guesses or hypotheses. Such a predefined advantageous selection structure is managed in Tab. 3.

Best guess 1	Best guess 2	Best guess 3	Best guess 4
Continuing the global trend	Culture strategy of governmental powers	State subsidy strategy to the conventional process	Operationalize the model (SMM)
Polluting industry 1	Polluting industry 2	Polluting industry 3	Polluting industry 4
Consumer process industries	Service industries	Agriculture industries	Other industries

Tab. 3. The best strategies proposed in today's polluting industries, which have been managed with low cognitive in the shadow of Weak governments around the world.

Chapter 2.3. needs to be written in a more understandable way, and Figure 5 better explained. This also applies to the following chapter "2.4. Soils of the world as a very strong component of the climate system," and its Figure 5, where explanations and a legend are missing.

3. Global information outcomes and controversy

Considering that: 1) climate warming depends on soil biology connected to the physical-chemical characteristics of the soil; 2) politicians and planners in the world have not been able to stop climate warming, in chapter 3, and in particular with figure 6, you show that the vulnerability to the climate of the poor countries of the world is higher than that of the rich countries. You say that figure 6 is produced by the processing of data from IMF staff calculation based on 2015-18 data from the European Commission, the United Nations University Institute for Environment and Human Security, the University of Notre Dame, and the April 2020 World Economies Outlook, *following the model explained in the previous figure 5. There is a problem: figure 6 is easy to understand (poor countries are more exposed to risks), but it is not clear*

how you produced it (Adaptative capacity index = ?; Exposure index = ?).

In the text, 11 lines below figure 6, we can read:

This world is really strange! Any positive action will have a positive reaction from nature! And every negative action, nature will react negatively.

In nature, reactions have a direction which can be one of growth or decrease in biodiversity. Overall, in the long term and on the planet Earth, the reaction is an increase in biodiversity. Degrowth occurs when food resources, which may depend on climate change, for example, decrease. After the causes of food shortages disappear, biodiversity grows again. One might also think that the human species is effectively limiting the growth of biodiversity and that, by interfering with the normal functioning of the biosphere, Homo sapiens runs the risk of extinction. You give the example of water, but even unfair competition in the elimination of too many species with pesticides does not go in the good direction suggested by nature.

Please explain better what you mean by « any positive action will have a positive reaction from nature! And every negative action, nature will react negatively ».

3.1. Complementary Strategies of Soil vs. Climate

16 lines before figure 7, you present two identical formulas but with different numerical results. Where do those effectiveness numbers come from?

$$\text{Percent of effectiveness (CPAR)} = \frac{S.E}{S.S} \times 100 = \%E \Rightarrow \%E = \frac{2.71}{5} \times 100 = \%54.2$$

$$\text{Percent of effectiveness (CPEP)} = \frac{S.E}{S.S} \times 100 = \%E \Rightarrow \%E = \frac{2.39}{5} \times 100 = \%47.8$$

The reader tries to connect these formulas with the previous ones (Chapter 2.2) or with Table 2 (last column of it), but without success. If there is a link with the previous formulas or with Table 2, the author of the article must be more clear and explain it to the reader. What do the names CPAR, CPEP, and the acronyms S.E and S.S. mean?

The entire part after the two formulas, up to and including Figures 7-12, must be rewritten: it is unclear, and it is not clear how Figures 7 to 12 are produced, in particular what the ordinate variable is (% effectiveness? How is it ever negative? Why?) and what the blue line that follows the temperature represents (red dotted).

The increase in temperature and the increase in the use of pesticides on Figures 13 and 14 is rather clear, although it would be necessary to statistically prove that the two variables are correlated.

*After Figure 14, this sentence is not clear and needs to be reformulated:*Natural soils that are used in annual preparation operations by farmers with technical principles, the average soil temperature undergoes a balancing process on the

climate and soil due to the increase in organic matter, biological diversity, soil pH adjustment, and other components.) Francaviglia, R., et al., 2023; Sadaty, SA., 2022).

Even Table 4, which represents the heart of your article, is unclear. What are the variables placed in the columns of the table, and how was the correlation of these calculated with the 10 soil change factors reported in the first column? (to be added to the legend: 1-Misplaced land use change 2- type of tillage 3- Using chemical fertilizers 4- Amount of poisons used 5- Soil erosion 6- Severe reduction of crop rotation 7- Use of agricultural and household wastes 8- Soil porosity 9- Conservation irrigation method 10- Trend of small land ownership).

The author must take the time to explain what he has found. Intuitively, we are led to believe that this impact on the soil is actually important in explaining climate change, but it must be proven statistically with procedures that the reader must be able to follow.

As a conclusion, you report that: in this regard, from the analysis of the strategic process that led to Tab. (4), we conclude that about **58.5%** of the world's climate changes were related to our low cognitive understanding about the agricultural soils of the world and the products of agricultural revolutions.

58.5% is the sum of the PLUCCs linked to each anthropic action on the soil, but the acronym PLUCC does not appear among those reported at the end of the text (not even the other variables, PCC, CIDM), no explanations are given on the calculation of these numbers, and the reader would really like to know what these percentages mean. Please explain better the statistical analyses you performed, with the names of the variables and the values of the significance tests.

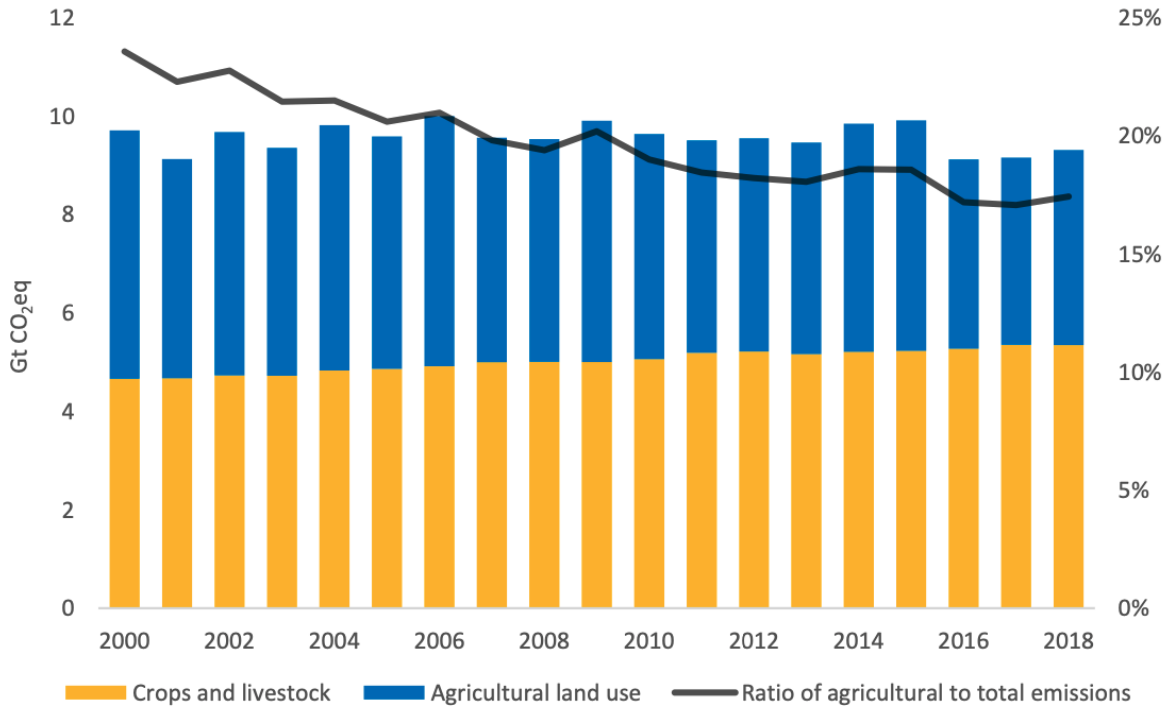
For comparison, at a planetary level, the global food-system emissions correspond to 15.8 GtCO2eq [1], equating to 30% of the world's greenhouse gas emissions[2].

[1]M. Li et al.*, "Global food-miles account for nearly 20% of total food-system emissions,"* Nature Food, *vol. 3, no. 6, pp. 445-453, 2022, doi: 10.1038/s43016-022-00531-w.*

[2] European Commission Directorate-General for Environment. "Field to fork: global food miles generate nearly 20% of all CO2 emissions from food. Issue 594: Food trade is key to achieving global food security, with internationally traded food making up 19% of consumed calories worldwide. But what is the environment.https://environment.ec.europa.eu/news/field-fork-global-food-miles-generate-nearly-20-all-co2-emissions-food-2023-01-25_en," ed. Science for Environment Policy, 2023, pp. 1-1.

In FAOSTAT ANALYTICAL BRIEF 18, (https://www.fao.org/3/cb3808en/cb3808en.pdf), emissions due to agriculture, global, regional, and country trends 2000-2018, rise to 20% :

Figure 1. Yearly emissions from crops and livestock and related land use, and share of agriculture in global GHG emissions from all sectors, 2000–2018



Source: FAOSTAT 2020.

Your estimates are at least double those of major online publications. You should explain why. It's something to seriously consider.

In the case of published studies, these are greenhouse gases or CO2 equivalents, a percentage of the total emitted. In your case, it is not clear what the 58.5% refers to.

In a study we are publishing right now (Tackling Climate Change: The Albarella Island Example), we built a model based on data collected on an island in Italy and then extended it to the entire planet. Once we eliminated all fossil energy emissions and replaced them with renewable energy, the part of emissions (CO_2 eq) due to human nutrition (agriculture, farm to fork) would correspond to 85% of the total emissions.

By this I mean that your 58.5% can be correct, if explained in a way that everyone can understand.

3.2. Conclusion and strategic decision-making in the world

The author presents conclusions consistent with what was stated in the previous chapters. They may be correct, but the author should explain how he calculated the correlations and percentages that statistically support these conclusions.

Thank you for your nice contribution to the study of the impact of agriculture on the climate.

We are all in this together, certainly, even with researchers who are no longer alive (your final good universal prayer), ;-)

All the best for your future research, good luck,

Augusto Zanella.