

REVIEWERS COMMENTS AND RESPONSES OF THE AUTHORS

COMMENTS TO THE AUTHORS – Authors response (yellow marked) Editor/Chief editor Landbauforschung

We will accept your manuscript incorporating major revisions based on the comments of the reviewers. Perhaps our idea how a position paper should be structured can help with the revision:

Arrangement of Position Papers

- Title (main message, e.g. , “Properly managed ruminants produce lesser greenhouse gases”)
- Author(s)
- List of keywords (3-10 keywords)
- Description of problem
- Possible solution
- Conclusion
- References (max. 40)

We'd also like to hint to our "Instructions to Authors" (to be found at https://www.landbauforschung.net/fileadmin/landbauforschung/LBF-Instructions_to_authors_200129.pdf)

Of course the sections are not mandatory and can be modified according to your preferences. But in a position paper we don't need a classical abstract. Rather you should describe the problem and your motivation to take a clear position from the beginning on. So I'd like to motivate you to focus on your position and the needs for change or new approaches in a concise way throughout the text. The revised version of your manuscript will be evaluated again by the Chief editor and, if necessary, by the reviewers.

REVISION – RESPONSES OF AUTHORS

Dear Reviewers,

Thank you for your thorough review of our paper and your helpful comments and suggestions for the improvement of the text. We appreciate the time you spent on revising our article. Below, please find our answers to your comments, with citations of the parts we altered according to your recommendations.

Thank you for considering our revised paper for publication.

With best wishes,

((Editor: Names deleted for peer review process))

Reviewer # 1:

Overall comment:

This is an interesting and well written manuscript, which is probably worth publishing after some revisions.

Thank you!

Overall impression:

It is somewhat unclear whose vision this is. Is the vision of a group of independent researchers (representing a scientific vision) or is it the vision of the CEE countries? I suggest that you make it very clear whose interests and views you describe. There are some major points where I think the paper needs to be strengthened or where the text needs to be expounded (see below).

Thank you for pointing this out. We highlighted in the abstract and also in the introduction section *The decade of agroecological transition in the EU's agricultural policy*, that these views are formulated by the authors of this paper, who are coordinators of the Agroecology and Sustainable Yields Thematic Working Group of the BIOEAST Initiative.

Detailed comments and need for revisions:

Line 67: replace societal movement with social movement

It has been replaced: "The term agroecology started to outgrow its scientific borders from the 1980s when it evolved into a social (and later a political) movement fostering a set of agroecological practices."

Line 60-75: I think it is important to stress that the field of agroecology in most contemporary definitions encompass the entire system of agriculture which includes relevant elements of social science and economics. So the social movements related to agroecology grew out of a scientific field that was already highly interdisciplinary and included social science. Here are some useful sources:

- Steve Gliessman: Defining Agroecology. *Agroecology and Sustainable Food Systems*. Volume 42, 2018 - Issue 6 <https://doi.org/10.1080/21683565.2018.1432329>
- Holt-Giménez, E.; Altieri, M.A. Agroecology, food sovereignty, and the new Green Revolution. *Agroecol. Sustain. Food Syst.* **2013**, *37*, 90–102.
Agroecology is "knowledge intensive (rather than capital intensive), tends toward small, highly diversified farms, and emphasizes the ability of local communities to generate and scale-up innovations through farmer-to-farmer research and extension approaches"

Thank you very much for the literature sources, we have included them in the text. We highlighted that agroecology as a science has been interdisciplinary even before the agroecology social movement: "It is important to emphasize that agroecology as a science has been interdisciplinary right from the beginning, encompassing beside natural sciences also social and economic aspects since it placed traditional agriculture practiced by smallholders and family farms in centre of its investigations (Holt-Giménez and Altieri 2012)."

We also made smaller clarifications in today's agroecology definition to emphasise its broadening scope on the food system and its stakeholders.

Line 111: I think it is misleading to talk about "economy vs. environment". It depends to a large extent on the time horizon we are discussing. In a short time perspective (say roughly 3-5 years) there might be an economic tradeoff between environmental goals and economic benefits. But in longer time perspectives the tradeoff disappears, and in the long-term there is a severe reversal of the tradeoff (i.e. undermining the environmental conditions results in economic decline of agriculture).

We also need to include other than economic tradeoffs – current conventional agricultural drives many social problems, such as high debts and stress in farming communities.

For example: The agricultural treadmill "implies that a minority of early non-risk-averse adopters reap the benefits of new agricultural technologies, while the majority of farmers are forced to adopt in order to reduce their costs under increasing competition and falling prices. As an illustration, the majority of small farms in the USA, approximately 90% of all farms, had negative profits in 2016, in sharp contrast to the 3% of large and very large farms" Crews, T., Carton, W., & Olsson, L. (2018). Is the future of agriculture perennial? Imperatives and opportunities to reinvent agriculture by shifting from annual monocultures to perennial polycultures. *Global Sustainability*, *1*, E11. doi:10.1017/sus.2018.11.

Thank you for pointing to this important aspect. We differentiated the economic argument and added the social dimension to it. Thank you for recommending the paper of Crews et al. (2018): "it is evident

that the BIOEAST SRIA needs to overcome the currently practiced subjugation of agriculture to short-term economic benefits and societal trade-offs. The SRIA needs to set a new vision on **agroecology, as a sustainable growth model**, specific to the unique economic, social, environmental and cultural challenges and characteristics of the CEE macro-region. It thus needs to address increasing socio-economic and environmental externalities that are deeply rooted in the current agricultural treadmill (Crews et al. 2018)."

Line 118: Replace "techniques" with "practices", because agroecology implies a much broader change than new technologies.

It has been changed and replaced: "Therefore, agroecology today incorporates the entire food system with all of its participants integrating the above mentioned broad socio-economic dimensions, principles, sustainable agricultural practices, and production systems that aim to reduce the impact of agriculture on the environment, such as organic farming, conservation agriculture, permaculture, etc."

Line 139-148: I feel some inconsistencies here:

- 1/ The comparison of EU15 and CEE in terms of yield is problematic. It may very well be so that the 6.5 t/ha in EU15 is too high – given that this production is only possible by using practices that are unsustainable in the long term. There is currently a big interest in the observed plateauing/declining of wheat yields in EU15 (e.g. Ray, D. K., Ramankutty, N., Mueller, N. D., West, P. C., & Foley, J. A. (2012). Recent patterns of crop yield growth and stagnation. *Nature communications*, 3(1), 1-7.)

Thank you for pointing out that the original argument was too brief and gave ground for inconsistencies, therefore we expanded this argument using your comments and kindly suggested literature:

The low agricultural productivity in the region, which is 39.6% of the EU average (BIOEAST 2018). This is most apparent in the so-called yield gap in cereal production between the EU-15 and CEE countries. EU-15 produce an average of 6.5 t/ha, while the average cereal yield in the CEE region is 5.2 t/ha (ECSTAT 2019). Although, it may very well be so that the 6.5 t/ha yield in EU15 is too high – given that this production is only possible by using practices that are unsustainable in the long run – and there is currently a large interest in the observed plateauing/declining of wheat yields in EU15 (Ray *et al.* 2012), Salamon *et al.* (2017) claim that yields by 2026 in the CEE region are projected to increase significantly, with 15-50%, especially in cereals. An economic growth opportunity that CEE countries are keen not to miss, however, which needs to be carefully analysed and addressed so that environmental and social dimensions of agriculture are not suppressed for the sake of economic growth.

2/ Same here, labour productivity in CEE is lower than in EU15 – but perhaps this is because a higher use of unsustainable practices in EU15 (herbicides, heavy machinery, more uniform agricultural landscape, i.e. bigger fields, which is detrimental to ecosystem services such as pollination and pest control, overuse of fertilizers (mineral as well as manure) leading to extreme levels of surface water eutrophication and dead marine zones, etc)

We extended the argument: The labour productivity in agriculture is 20% lower in the CEE region than the EU average, which can be traced back to lower technological, infrastructural and organizational development of the region (EUROSTAT 2019). At the same time, this might also mean that CEE countries use less herbicides, heavy machinery, have a less uniform agricultural landscape, which is beneficial to ecosystem services such as pollination and pest control. Lower application rates of fertilizers (mineral as well as manure) lead to lower levels of surface water eutrophication and better conserved marine zones, etc. Here again, we are confronted with setting EU-15 as a role model, while acknowledging the need for alternative solutions, to avoid negative environmental externalities.

3/ the comparison of earnings between countries is misleading, they need at least to be normalized using the overall level of earning between countries. Another comparison could be to

look at difference in earnings between sectors. Perhaps also look at the distribution of earnings, level debts etc

We have extended the argument, to make clear that the figures are only broad indications: The difference between EU-15 and CEE countries is also apparent in the below average gross hourly earnings in CEE countries' agricultural sector: 3-6 euro/hour in CEE compared to the 16 euro/hour EU average (CEPS 2013). These figures should be normalized using the overall level of earning between countries, or analysed in more detail, looking at the earnings within different sectors of agriculture in both regions. However, even without a more differentiated comparison, the broad figures themselves indicate why CEE agriculture has such a disproportionately low share in the EU agricultural turnover.

My general point is: be careful using E15 as a role model for agriculture!!

Thank you for this useful point, we tried to emphasize this is the above revised arguments and also with Horváth et al.'s argument. However, we would like to describe that even though the negative impacts of intensive agriculture are widely known, the economic status of EU-15 remain a role model for the CEE countries, and especially dominate politics.

Line 166: I find the discussion about organic vs. conventional a bit superficial and the reference to Mäder is almost 20 years old.

Since organic agriculture is a controversial field it is important to be nuanced. To just use the 80% difference in yield is misleading. There are two comparatively recent relevant papers I would recommend.

Reganold, J. P., & Wachter, J. M. (2016). Organic agriculture in the twenty-first century. *Nature plants*, 2(2), 1-8.

Seufert, Verena, and Navin Ramankutty. "Many shades of gray—The context-dependent performance of organic agriculture." *Science advances* 3.3 (2017): e1602638.

We have revised the argument, thank you for the literature suggestions: Organic agriculture shows positive results in terms of some environmental and social metrics such as local agrobiodiversity, providing better livelihood for farmers, greater farmers' employment or encouraging cooperation among farmers (Reganold and Wachter 2016). However, it is important to point out that its yield performance compared to conventional practices varies on a wide range (high differences between cereal or horticultural crops) and its overall productivity is highly context-dependent (Seufert and Ramankutty 2017).

Line 171-173: Very old reference, especially for a field like precision agriculture and AI.

It has been replaced by a more recent one, where the general argument is the same.

Reviewer #2:

Short summary of the aim of the paper, its main findings and conclusions

This peer review evaluates a position paper entitled The BIOEAST countries' Vision of Agroecology, which formally according to the length, keywords, and general article structure complies with the journal requirements. The paper describes the work-in-progress of 11 Central Eastern European (CEE-11) countries represented by the BIOEAST initiative. The rise of the concept of agro-ecology and its interpretation among the CEE-11 countries is a challenging issue. As such, the main topic of the article fits in with the specific issue of Landbauforschung.

General comments on strength and weaknesses of the paper and on possible improvements

Among strengths, they are linked to the addressed issue of agro-ecology in relation to Common Agricultural Policy (CAP) and the potential for strategic research and innovation agenda (SRIA) in the CEE-11 countries. There is room for improvements in the paper structure and additional clarifications.

Detailed comments referring to the line numbers, figures and tables

The structure of the paper can be improved as there are places with flaws. For example, which countries belonged to the BIOEAST appears on page 3, lines 95-97. However, the acronym BIOEAST appeared already at the beginning of the paper but remained unexplained.

Thank you for pointing this out. It has been clarified. We added the countries and the acronym explanation of BIOEAST to the abstract and to the introduction as well.

It is not common to use references in the abstract. In addition, the use of abbreviations is inconsistent throughout the paper from the title, abstract, keywords, and the rest of the paper. When the acronym first time mention, it would be useful to write out completely and later consistently use only abbreviations.

The inconsistent abbreviation usage has been changed. Now, all abbreviations are explained when first mentioned, most of them in the introduction section. They are used in the same manner throughout the paper (this applies to the abbreviations BIOEAST, CEE, EU-15, EU.)

In the first section, there is missing at least a paragraph addressing the aim/motivation for this position paper.

Thank you for this comment, the introduction section now contains the aim of the position paper: "The current paper aims to describe the position of the authors, who co-coordinate the Agroecology and Sustainable Yields Thematic Working Group of the so-called BIOEAST Initiative. The BIOEAST thematic working group comprises 11 Central Eastern European countries (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) with the aim to define their common vision and strategic research and innovation agenda on agroecology."

Some concepts and terminology needs clarifications. For example, how widespread are industrialized agricultural systems or resource-intensive agriculture?

We made some clarifications in the footnote to give more context on how widespread large scale industrialized agriculture is: „2.9% of all farms in the EU (304,000 farms) are large-scale enterprises and they account for the majority (55.6%) of the EU's total agricultural economic output, whereas 3.0 million farms are small-scale, and account for 67.6 % of all farms in the EU. Large farms use app. 52% of all agricultural land in the EU. Operating a large farm often results in the decline of agricultural diversity and the rise of input-intensive practices (EUROSTAT 2016)."

How important are specificities among the CEE-11 countries? For example, when talking about farm structure, particularly on page 5, lines 191-194, it can be supported by some reference to previous research, e.g.: Typology and distribution of small farms in Europe: towards a better picture. Land Use Policy, 2018, vol. 75: 784-798.

Thank you for the comment, we added the reference, noting that further research is needed for a more differentiated picture on the farm structure specificities among CEE countries: "However, this argument needs to be further supported by a more detailed analysis of farm structure specificities among the CEE countries, as their characteristics are far from homogeneous within the macro-region (see Guiomar *et al.* 2018)."

What is the future of the "living laboratory" (pages 5-6, lines 206-209)? Are there any successful SRIA projects or applications as a result of this initiative? Is there any problem of the continuity and sustainability of such initiatives?

28th of May we received the first positive evaluation of a Horizon2020 project (AgroEcoLLNet-Prep) related to an agroecological living lab application, where BIOEAST also contributes to foreseen policy development. As the BIOEAST SRIA is still work in progress, this project is also preparatory, and will only pilot some implementation activities. Once the SRIA is finalized, the next phase of implementing it e.g. through Horizon Europe projects and especially the Agroecology Partnership may begin. We

highlighted this in the text: Moreover, the BIOEAST thematic working group on Agroecology and Sustainable Yields is represented by its coordinators in the Horizon 2020 preparatory action *Strengthening the European agro-ecological research and innovation ecosystem*, aiming to develop the framework for a European network of agro-ecological living labs and research infrastructures (EC 2019). Within this keystone project of the European agroecological transition, we coordinate stakeholder engagement and the creation of a pilot network of agroecology living labs, where the living lab approach may be tested and developed under real life conditions.

Short check if all conclusions are justified and supported by the results

Conclusions are very brief. What can be the reasons or motivations for importance and participation in regional scientific cooperation? What can be the major constraints? What can be the follow up as a challenging issue for the future?

We expanded the conclusion section as follows: “This position paper is aimed to present the diverging interpretations of agroecology within the international agricultural and food policy debate with a special focus on the EU, and the Central Eastern European countries. More importantly, the paper emphasizes the relevance of creating a joint vision on agroecology and a Strategic Research and Innovation Agenda specific to the unique economic, environmental and social aspects in the CEE region. However, this vision needs broad political willingness to be implemented in practice across the macro-region, which stirs several questions mainly concerning the future financial support allocated or available to the BIOEAST SRIA objectives given the unstable political stance on agri-environmental issues in the CEE countries. Still, the vision of agroecology for the BIOEAST countries points out that for the CEE region, agroecology represents an opportunity to create innovative, regional solutions for an environmentally, but also economically and socially sustainable agricultural system, but only if fragmentation of agricultural policies can be avoided, and a system-based approach, including strong socio-economic arguments is achieved.”

Short check of the need for tables and figures, and the adequacy of the references

References should be re-checked for their compliance with the journal guidelines.

We have checked references again for inconsistencies.

Short check if title, highlights, and abstract are matching the scope given for the specific issue of Landbauforschung

They are matching the scope given for the specific issue of Landbauforschung. The abbreviations used need to be checked for their consistency.

We have checked abbreviations to avoid inconsistencies.

Recommendation

major revisions needed

FINAL ACCEPT

Editor/Chief-Editor Landbauforschung

Landbauforschung: Accepted with minor suggestions

We are pleased to inform you that **we've accepted your revised manuscript “Position Paper: The BIOEAST countries’ Vision of Agroecology”**, which you submitted to Landbauforschung – *Journal of Sustainable and Organic Agricultural Systems*. Both reviewers agreed with us that the manuscript has significantly improved and that the revisions had been fulfilled. **In the attached manuscript you’ll find some further corrections and suggestions from our chief editor which you still should consider.**

((Editor: Further corrections are not published here.))