REVIEWER 1:

From what year is yield data available? This study used weather data from 1976, so yields can be compared for periods prior to 1990.

A: There are serious concerns that agricultural statistical data before the Romanian Revolution from December 1989 may be seriously biased by political influences, and anyway there were massive changes in the agro-technology after the restitution of the agricultural land of Agricultural Production Cooperatives ("CAP") and State Agricultural Enterprises ("IAS") towards the owners from 1945 and their heirs, practically begun before the application of Law 18 19/02/1991. The excessive fragmentation of agricultural land was partially and gradually mitigated through leasing and purchase, and the acquisition of modern agricultural machinery was subsequently supported by bank loans and EU funds.

Why do the 1995 estimation values differ from the observed values? This is useful information for readers in terms of understanding the limitations of model predictions.

A. That year may be regarded as a transition year. According to personal communication from older researchers there were several influences not considered by the DSSAT models (failure in weed and pest control). The estimations of FAOSTAT doesn't show major variations of the average nitrogen dose per hectare for all crops in Romania in 1995 (Figure 1) compared with 1994 and 1996, but, there is a statistical reference indicating that in Calarasi county the number of chemical fertilizer spreaders (252) was seriously reduced (with around 46%) in 1995 (Figure 2), and this should decrease the capacity of applying fertilization in the optimal period or even the application of treatments in several farms . Due to impossibility of benefiting from the optimal fertilization period, treatments with larger quantities of fertilizers (Figure 3). were probably applied to more crops that otherwise usually are not fertilized in the South -Eastern Romania resulting in a larger fertilized area in 1995. New machinery was acquired after 1995 replacing the obsolete, worn-out devices.

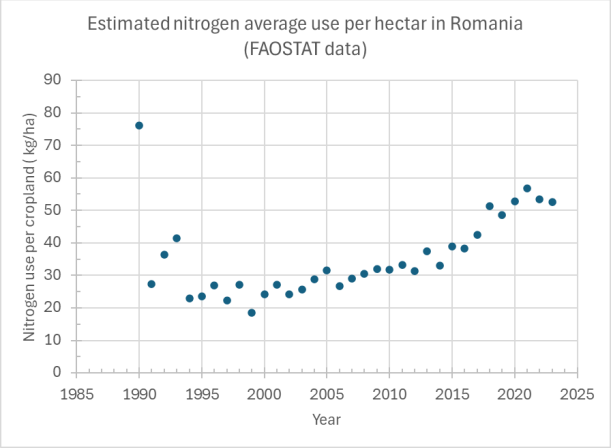


Figure 1 FAOSTAT estimated values of nitrogen/ha doses used in Romania between 1990 and 2003 (https://www.fao.org/faostat/en/#data/RFN)

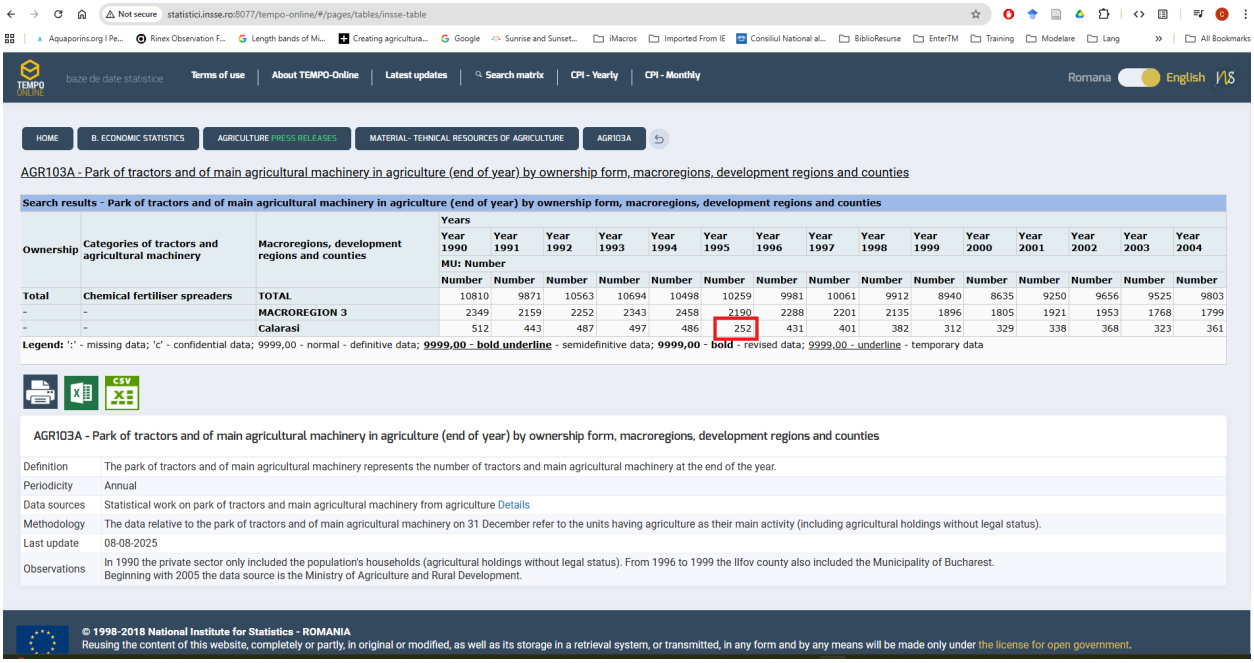
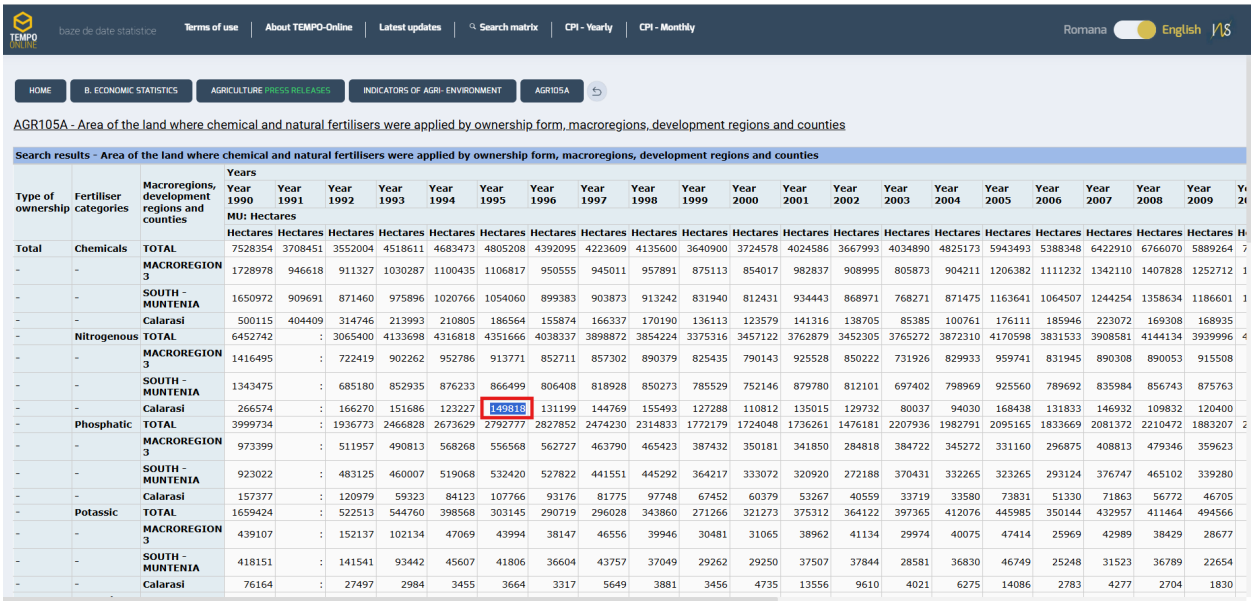


Figure 2 Dynamics of chemical fertilizer spreaders at national level and Calarasi county of Romania (source National Statistics Institute, http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table)



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HOME | B. ECONOMIC STATISTICS | AGRICULTURE PRESS RELEASES | INDICATORS OF AGRI- ENVIRONMENT | AGR105A

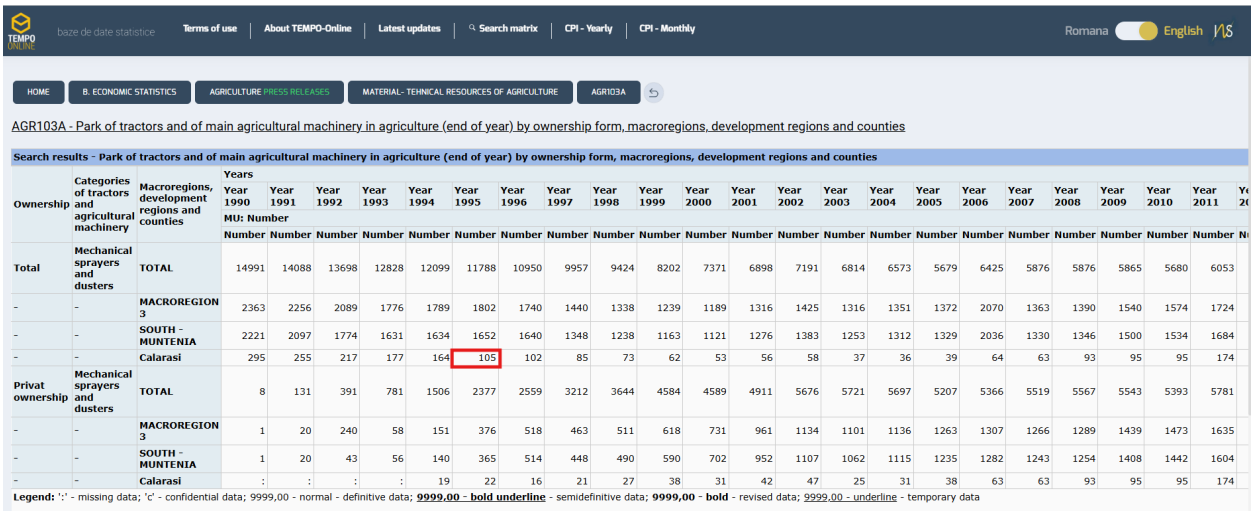
AGR105A - Area of the land where chemical and natural fertilisers were applied by ownership form, macroregions, development regions and counties

Search results - Area of the land where chemical and natural fertilisers were applied by ownership form, macroregions, development regions and counties

Type of ownership	Fertiliser categories	Macroregions, development regions and counties	Years																						
			Year 1990	Year 1991	Year 1992	Year 1993	Year 1994	Year 1995	Year 1996	Year 1997	Year 1998	Year 1999	Year 2000	Year 2001	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008	Year 2009	Y
			MU: Hectares																				
			Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	Hectares	H
Total	Chemicals	TOTAL	7528354	3708451	3552004	4518611	4683473	4805208	4392095	4223609	4135600	3640900	3724578	4024586	3667993	4034890	4825173	5943493	5388348	6422910	6766070	5889264	7
-	-	MACROREGION 3	1728978	946618	911327	1030287	1100435	1106817	950555	945011	957891	875113	854017	982837	908995	805873	904211	1206382	1111232	1342110	1407828	1252712	1
-	-	SOUTH - MUNTENIA	1650972	909691	871460	975896	1020766	1054060	899383	903873	913242	831940	812431	934443	868971	768271	871475	1163641	1064507	1244254	1358634	1186601	1
-	-	Calarasi	500115	404409	314746	213993	210805	186564	155874	166337	170190	136113	123579	141316	138705	85385	100761	176111	185946	223072	169308	168935	
-	Nitrogenous	TOTAL	6452742	:	3065400	4133698	4316818	4351666	4038337	3898872	3854224	3375316	3457122	3762879	3452305	3765272	3872310	4170598	3831533	3908581	4144134	3939996	4
-	-	MACROREGION 3	1416495	:	722419	902262	952786	913771	852711	857302	890379	825435	790143	925528	850222	731926	829933	959741	831945	890308	890053	915508	
-	-	SOUTH - MUNTENIA	1343475	:	685180	852935	876233	866499	806408	818928	850273	785529	752146	879780	812101	697402	798969	925560	789692	835984	856743	875763	
-	-	Calarasi	266574	:	166270	151686	123227	149818	131199	144769	155493	127288	110812	135015	129732	80037	94030	168438	131833	146932	109832	120400	
-	Phosphatic	TOTAL	3999734	:	1936773	2466828	2673629	2792777	2827852	2474230	2314833	1772179	1724048	1736261	1476181	2207936	1982791	2095165	1833669	2081372	2210472	1883207	2
-	-	MACROREGION 3	973399	:	511957	490813	568268	556568	562727	463790	465423	387432	350181	341850	284818	384722	345272	331160	296875	408813	479346	359623	
-	-	SOUTH - MUNTENIA	923022	:	483125	460007	519068	532420	527822	441551	445292	364217	333072	320920	272188	370431	332265	323265	293124	376747	465102	339280	
-	-	Calarasi	157377	:	120979	59323	84123	107766	93176	81775	97748	67452	60379	53267	40559	33719	33580	73831	51330	71863	56772	46705	
-	Potassic	TOTAL	1659424	:	522513	544760	398568	303145	290719	296028	343860	271266	321273	375312	364122	397365	412076	445985	350144	432957	411464	494566	
-	-	MACROREGION 3	439107	:	152137	102134	47069	43994	38147	46556	39946	30481	31065	38962	41134	29974	40075	47414	25969	42989	38429	28677	
-	-	SOUTH - MUNTENIA	418151	:	141541	93442	45607	41806	36604	43757	37049	29262	29250	37507	37844	28581	36830	46749	25248	31523	36789	22654	
-	-	Calarasi	76164	:	27497	2984	3455	3664	3317	5649	3881	3456	4735	13556	9610	4021	6275	14086	2783	4277	2704	1830	

Figure 3 Dynamics of the area of land where chemical and natural fertilizers were applied in Calarasi county of Romania (source National Statistics Institute, http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table)

A 35% decrease in mechanical sprayers and dusters active in Calarasi county in 1995 as compared with 1994,(Print screen 3) and this may be related to an unfavorable pest and disease evolution. This decreasing trend of plant protection machinery continued till 2004, but the new equipment from the private sector was more performant.



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HOME | B. ECONOMIC STATISTICS | AGRICULTURE PRESS RELEASES | MATERIAL- TEHNICAL RESOURCES OF AGRICULTURE | AGR103A

AGR103A - Park of tractors and of main agricultural machinery in agriculture (end of year) by ownership form, macroregions, development regions and counties

Search results - Park of tractors and of main agricultural machinery in agriculture (end of year) by ownership form, macroregions, development regions and counties

Ownership	Categories of tractors and agricultural machinery	Macroregions, development regions and counties	Years																						
			Year 1990	Year 1991	Year 1992	Year 1993	Year 1994	Year 1995	Year 1996	Year 1997	Year 1998	Year 1999	Year 2000	Year 2001	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Y
			MU: Number																						
			Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	N
Total	Mechanical sprayers and dusters	TOTAL	14991	14088	13698	12828	12099	11788	10950	9957	9424	8202	7371	6898	7191	6814	6573	5679	6425	5876	5876	5865	5680	6053	
-	-	MACROREGION 3	2363	2256	2089	1776	1789	1802	1740	1440	1338	1239	1189	1316	1425	1316	1351	1372	2070	1363	1390	1540	1574	1724	
-	-	SOUTH - MUNTENIA	2221	2097	1774	1631	1634	1652	1640	1348	1238	1163	1121	1276	1383	1253	1312	1329	2036	1330	1346	1500	1534	1684	
-	-	Calarasi	295	255	217	177	164	105	102	85	73	62	53	56	58	37	36	39	64	63	93	95	95	174	
Privat ownership	Mechanical sprayers and dusters	TOTAL	8	131	391	781	1506	2377	2559	3212	3644	4584	4589	4911	5676	5721	5697	5207	5366	5519	5567	5543	5393	5781	
-	-	MACROREGION 3	1	20	240	58	151	376	518	463	511	618	731	961	1134	1101	1136	1263	1307	1266	1289	1439	1473	1635	
-	-	SOUTH - MUNTENIA	1	20	43	56	140	365	514	448	490	590	702	952	1107	1062	1115	1235	1282	1243	1254	1408	1442	1604	
-	-	Calarasi	:	:	:	:	19	22	16	21	27	38	31	42	47	25	31	38	63	63	93	95	95	174	

Legend: ':' - missing data; 'c' - confidential data; 9999,00 - normal - definitive data; **9999,00 - bold underline** - semidefinitive data; **9999,00** - **bold** - revised data; 9999,00 - underline - temporary data

Figure 4 Dynamics of mechanical sprayers and dusters in Calarasi county of Romania between 1990 and 2005 (source National Statistics Institute, http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table)

Also, which of the 12 management scenarios is closest to reality?

The 0-60-120 is relevant for many years of the historical period. The low input agrotechnology for rainfed maize was a direction preferred for the sensitivity part of the study due to economic concerns; projection simulations are using the current 0-60-120 N fertilization.

REVIEWER 2

Re-review: “A modeling System for Identification of Maize Ideotypes,

optimal sowing dates and nitrogen fertilization under climate change -

PREPCLIM-v1” (gmd-2024-105)

Unfortunately, the authors’ revisions did not do much to improve the paper’s organization,

language, or figures, which were the three major themes of my first review. I recommend

another set of major revisions.

The issues of most critical importance to the paper are marked in **bold**.

General

1. Are these tools publicly accessible? If so, please provide URLs. If not, please explain

why.

A01. Info-Platform is publicly available < https://climatologis.shinyapps.io/PrepClim/ > [L217]. The access to User-Platform hosted on an internal server is granted at request addressed to the correspondent author [L220].

2. Figures throughout (including the Supplement) are very low-quality with

obvious JPEG artifacts. PDF should be used when possible for vector-based

figures and PNG elsewhere, with a resolution of at least 300 dpi. (JPEGs should

only ever be used for photographs.) See “Figure composition” bullet at

https://www.geoscientific-modeldevelopment.

net/submission.html#figurestables

A02 Graphs are now in PNG format, enhanced resolution x1000, y 800. The simultaneous use of red and green colors was avoided.

3. Code is still not associated with a DOI, despite the GMD requirement:

https://www.geoscientific-modeldevelopment.

net/policies/code_and_data_policy.html#item3

A03 The DSSAT code used in PREPCLIM project, the PREPCLIM software and a PREPCLIM sample data set are available On ZENODO (DOI 10.5281/zenodo.13145521, DOI 10.5281/zenodo.13132587 and respective DOI 10.5281/zenodo.13133107) [L226]

Abstract:

4. L18: Specify *Southern* Romania.

A04 Done [L18]

Sect. 1: Introduction

5. L90: What is a “cross-range”?

A05 changed with “multiple parameter range” [L90]

6. L110: Portability is more than just showing that changing inputs doesn’t change

the results much, which seems to be what Sect. S2 is saying, although it’s very

unclear. I suggest deleting this sentence, as well as deleting Sect. S2, which is

an unnecessary hodgepodge of manipulations that don’t seem comprehensive

enough to draw meaningful conclusions from. It’s just distracting and

confusing.

A06 Suggestion applied (Deleted phrase)

Sect. 2: Data and Methods

7. Split Sect. 2 (Data and Methods) into subsections for science (L119-173) vs.

software (L174-204).

A07 Suggestion applied

8. From reading Sect. 2 (Data & Methods), I don't have a sense of whether the

optimal management and cultivars are allowed to evolve over time. Is the

optimization taking place for each year?

A08 Yes, it takes place each simulated year. [L177]

9. L137-140: This description of P2 is hard to understand. What does it mean to "delay"

development? Can P2 be summed up as, "Longer days increase plant growth only

up to a point P2, above which plant growth decreases"? If so, please explain why.

A09 Genetically some cultivars present, in different degrees, a slower phenogical advancement to flowering when the period with light during day exceed a certain value (long day plants).The process is controlled by phytochrome, that presents two reversible conformations (Pr and Pfr) which absorb red light (R) and respectively far-red light (FR). This part of the text was anyway rephrased. [L143]

10. I ask again: If P4 was kept constant, why is it even mentioned? You only analyze

responses across five parameters, so why talk about this sixth one? Is it because it's

something that the application COULD analyze, you just didn't do it here? That's

relevant for the software side of things but not the science.

A10 Suggestion applied, text referred to this parameter were removed.

11. L149: Thermal time parameter is missing (a) base temperature and (b) and time

component. Is it 3-70 °C-*days*? Above what base temperature?

A11 Base temperature is 8°C, it is mentioned at L140

12. L154: “representatives” should be “representativeness”.

A12 Text rephased [L161].

13. L154-155: What did you actually do to “rigorously test” the parameter range?

What “analysis of extreme values”? If you mention these tests/analyses, you

need to give details of their methods and results.

A13 Text rephased [L161].

14. L155-6 and throughout the rest of the manuscript: For clarity, do not say “Pi”

when you can just say “parameter” or “parameters” instead.

A14 Suggestion applied

15. L164: It’s not a “proposed” approach; it’s the approach you actually used. Delete

“proposed”.

A15 Suggestion applied

16. L174: “optimal paths” of what? Cultivars and management?

A16 Suggestion applied, added “in various climate and management scenarios”

17. L175:

a. “one-way interactive (static)” confuses more than it helps. Please consider

deleting, because “providing agro-climate information” already implies “the

user is just browsing existing content, not generating anything themselves.”

A17a Suggestion applied

b. Mention that NUTS3 in Romania corresponds mostly to the county level.

A17a Suggestion applied, “NUTS3 level, aligned with the European Union's Nomenclature of Territorial Units for Statistics, primarily corresponding to county level in Romania” [L212]

18. L177:

c. “climate -agro-climate” typo?

A18 c Error removed

d. What indicators and indices?

Done L212-216

19. L204-208 (Table 1 caption) and elsewhere throughout paper: Replace “exper” with

“experiment.”

Done

20. Table 1 is not mentioned anywhere in its section.

Done, L164

21. Table 1 is still extremely confusing.

e. The authors now explain that “1N” and “3N” are experiments, but they

don’t explain *why* they’re experiments. The text in Sect. 2 says at L159-

160, “By default, the twelve agro-management scenarios encompass

four sowing dates (spaced five days apart) and three fertilization levels

(zero, then a regional average and its double).” That explains *either* 0-60-

120 (“3N”) or 0-23-46 (“1N”), but I don’t understand why the authors have

***both*. What exactly is the regional average? Is it 23 or 60?**

A21 The 0-60-120 is relevant for many years of the historical period. The low input agrotechnology for rainfed maize was a direction preferred for the sensitivity part of the study due to economic concerns; projection simulations are using the current 0-60-120 N fertilization.

f. It's very confusing to have one "treatment," e.g. TR7, corresponding to

both "May 5 planting with 60 kgN/ha" and "May 5 planting with 23

kgN/ha." Why are those not designated as separate treatments within a

single experiment?

A21 f Treatment were renamed (Table 1)

Sect. 3: Results

22. It's still very jarring to see the agro-climatic indicators introduced in a Results

section. The authors' explanation that this section is simply to "justify" the

work makes it even odder—generally those kinds of things are in a Methods

section titled something like "Study Region." This paper is about the

experiments and the software; the region the authors chose to test is of

secondary importance. The authors' citation of the Copernicus 2023 report

confirming that the region is a European hotspot further confuses me—why

include this three-page analysis, with climatic indicators that the reader is

almost certainly not familiar with and which haven't been previously explained?

I *strongly* suggest the authors (a) add a subsection at the beginning of Sect. 2

titled something like “Study Region” consisting of a paragraph or two describing

how the region is a hotspot of climate change but not introducing any original

analysis. The authors’ analyses can be included in a Supplement instead, so as

not to distract from the focus of the paper. This will also allow me to be less

critical of the organization of the authors’ analyses, since the separation into

“indicators” vs. “extremes” is still giving me trouble (although the authors did

explain well why my “temperature” vs. “precipitation” idea wouldn’t work). It

would also make it perfectly fine to have the indicators explained in the midst

of their results—indeed, this would work better! Any tidbits from the authors’

analyses that are especially interesting and/or useful for interpreting results

can be mentioned in the new Methods subsection, with reference made to the

new Supplement section.

A22 We took your suggestion and agro-climatic part was significantly reduced and moved to Methods and to Supplementary

23. L213: Again, specify that NUTS3 in Romania mostly corresponds to the county level.

A23 Already specified at first occurrence [L212]

24. Fig. 5:

a. In addition to “NUTS region 103032,” say the name of the place.

24 a Added Ilfov county [L800]

b. Needs in-figure legend explaining the lines, their colors, and what the

shading represents.

Done

c. Y-axis labels needed with text explanations and units

Done

25. L269: No significant or near-significant decreasing trend is observed in the first

dekad for either RR10 (p=0.7, Fig. 5b left side) or RR (p=0.3, Fig. 5c left side).

A25 We kept only statistically significant results , Supplement 1.

26. L279: Section 3.c?

Done

27. L280-284: Model validation needs its own subsections in the methods and at

the beginning of the results. While three pages are dedicated to what is

essentially a supplementary analysis (agro-climatic indicators/extremes), in

this revision the validation of the model that is the *actual focus of the paper*

only gets two sentences (L280-284), including one for the methodology (in the

Results section for some reason), and its results figure is shunted oj to the

Supplement. This is a critically important part of the paper and *must* be treated

as such.

A27 Validation part was moved in “3.1 Model validation”

28. L286-291: Speculation about how models could be improved is material for a

Discussion section, not Results. Also, where do the authors get the data about

1995's real values being close to 80-120 kgN/ha and April 15th?

A28 The maize yield of year 1995 in Calarasi county from the statistical was rather close to a lower fertilization level (Supplement 2). Model improvement discussion was removed.

29. Figs. 6 and 7:

d. What is "ENS"? Ensemble? Ensemble of what? Does each data point

represent an ensemble mean? If so, uncertainty intervals should be added.

Ensemble Max and min values of the members are now plotted on the maps together with mean ensemble values.

e. Need in-figure legend explaining the colors. From the GMD guidelines at

https://www.geoscientific-modeldevelopment.

net/submission.html#figurestables: "A legend should clarify all

symbols used and should appear in the figure itself, rather than verbal

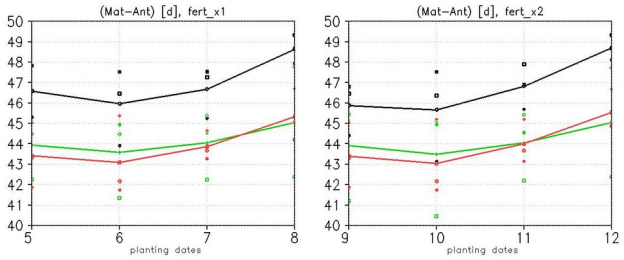
explanations in the captions." Suggestion applied

30. L301-306, 316-317, 325-326: These results should be illustrated with figures

"..changes in maturity days" due to model failure as a function of fertilization Fig. below shows for 2 fertilizations (left Fx1; right Fx2 the grain filling season length, maturity minus anthesis, for Hist (black), Rcp45 (green), Rcp85 (red).

(apologies for colors, we will redo it)

We note that under Fx2 the season's' length slightly increases; this could be related to model reaching in simulations more frequent physical conditions of "too slow grain filling".



(supplement OK). Also, what was the method for the correlation analysis?

For correlations we used least square fitting method.

Correlations of Harvest with precipitation, (for models, for the two scenarios and Hist and treatment) are now shown in a new supplementary: S2.

31. L319: “H difference Hist minus scenario”? Was reformulated

32. Fig. 8: Needs in-figure legend explaining the colors. From the GMD guidelines at

https://www.geoscientific-model-development.net/submission.html#figurestables:

“A legend should clarify all symbols used and should appear in the figure itself,

rather than verbal explanations in the captions.” corrected in Figures in this version

33. L337-479 (Sect. 3.3):

f. Instead of GX and GI, refer to these percentile ranges as “upper”/“top”

and “middle”/“intermediate”.

The suggestion was implemented; we used top/intermediate

Also, why is the intermediate range 25th-

70th (asymmetric around median) rather than 25th-75th?

We use now the interval 25% - 75

g. Again, avoid the use of things like Pi and P0i, which make this section

hard to parse. Use words instead. We used “parameters”

34. L372: Why are some numbers in parentheses? corrected

35. L380-385: I don’t understand this almost at all. Was rephrased

36. Fig. 9:

h. Legends should have sowing date + fertilization level instead of TR#.

For all legends we implemented your suggestion

i. What is ORD? Removed now

j. All the text about Fig. 9 refers to percentile ranges, so those should be the X; axis are computed now as percentile ranges

axis, not rank. Specifically be sure to mark the 2.5th, 25th, and 70th percentiles,

labeling ranges GI and GX.; the 2.5th, 25th, and 75th are located

k. Each one of these lines is an ensemble across three climate models, right?

What is the inter-model variation like? (we added this information in Supplement 3)

l. Fig. 9a: What is the arrow? (removed, we use now build-in rectangle to point the aread discussed in the text)

m. Why are lines in Figs. 9b and 9c not monotonically increasing?

The slopes of response are different in function of treatment, the curves intersect hence, in the differences fields, this results in non-monotonic response

37. L415-417: Please include P# labels here for ease of comparing the text to the figure. Done

38. L418: What are the “main stages of the development”? We now Specified

39. Fig. 10:

n. Too small. Fig. 10 was redone

o. I don’t understand what the X axes are supposed to be here.

Axes were changes to percentiles of change normalised, to allow comparison of percentile of the parameter change, among parameters.

p. Where is Harvest? (Figure was redone)

q. Needs in-figure legend explaining the colors. From the GMD guidelines at https://www.geoscientific-modeldevelopment. (requirement applied)

net/submission.html#figurestables: “A legend should clarify all symbols used and should appear in the figure itself, rather than verbal explanations in the captions.”

r. What are the things in the background? Full ensemble ranges for red and black lines? Why not also blue? (dots are now explained in the caption, as well blue omitting for clarity in the figure: RCP4.% is intermediat to Hist and RCP8.5 in all cases, so was shown only its running mean)

40. Fig. 11: Fig.11 was redone

s. Too small.

t. I don’t understand what the X axes are supposed to be here.

Axis were transformed to show percentiles of the change in the parameter

u. Where is Harvest? (percentiles shown in the new figures)

v. Needs in-figure legend explaining the colors. From the GMD guidelines at https://www.geoscientific-modeldevelopment.

net/submission.html#figurestables: “A legend should clarify all symbols used and should appear in the figure itself, rather than verbal explanations in the captions.” we aligned with the requirement

41. L 462-469: I don’t understand this at all.

“Annex” (should be “Appendix” in *GMD*’s style):

42. Please number the steps. done

43. L805: Repeat starting from which step? Was now specified

44. Consider putting this in Sect. 2 (Data and Methods), because that section is rather

short anyway, and *GMD* encourages technical details. The suggestion was followed

Supplement:

45. All figures: Do not use red and green in the same figure, as this is dijicult for

people with the most common form of color-blindness. See yellow box at the

top of https://www.geoscientific-modeldevelopment.

net/submission.html#figurestables (removed red-green)

46. Fig. S1:

a. Move back to main text (see above). Requirement followed

b. Use date + fertilization instead of TRT #. Requirement followed

c. What are the four-digit numbers? The observed values? Why include these?

d. Many colors are hard to see against the white background. The Figure was redone

e. Missing values should be represented as breaks in the lines rather than zero.

47. Sect. S2: Just delete this; see comment about L110 above. Supl Section S2 was deleted

48. Fig. S3:

f. Too small.

g. Why here do you split into 1-200 and 201-1890 as opposed to the percentile (plot is a running mean, now pointed in caption)

ranges from the main text?

49. Fig. S4 is so small, and the image quality is so low, that the figure is

unintelligible. (kept only the main results, parameters P1 and P3 for clarity)