

Review of: "Growth, Instability and Trend Analysis of Rice Production Indicators in Nigeria"

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Potential competing interests: No potential competing interests to declare.

Review for the paper entitled :

Growth, Instability and Trend Analysis of Rice Production Indicators in Nigeria

General opinion:

The paper focuses on a very interesting, and important topic, rice production trends in Nigeria. Rice being a major staple food, the topic is really worth serious analysis. This paper is a nice attempt considering the choice of its topic, but its presentation certainly needs considerable improvements. Also, some minor English language check may be welcome, several sentences seem to be confusing for me, and occasionally there are minor errors of spelling, language usage. See the following details.

Details:

The title of the paper should specify the research time range, i.e. 1961-2020, as: "*Growth, Instability and Trend Analysis of Rice Production Indicators in Nigeria from 1961 to 2020.*"

Abstract

In the Abstract, the Purpose does not really explain the purpose, but only the topic of the paper. What is the purpose of analysing the trends and decomposition of rice production indicators? Please explain.

Findings: When you mention CAGR in this section, please give the full meaning of the acronym here. There is a typo in the third line: 19660 instead of 1960, please correct it.

1. Introduction:

The last sentence of the first paragraph is unclear: „This feature of Nigerian poverty and food insecurity is concerning, with major policy consequences”. What do you want to say here? Maybe: This feature of Nigerian poverty and food insecurity has major policy consequences”.

At the end of the second paragraph of Introduction please give some relevant rice production data for the mentioned years, 1970 and 2017, too.

Third paragraph, 4th line: „The number of urbanized regions is anticipated to treble between 2000 and 2030“. Does this refer to Nigeria, or Africa, or what region? Please specify.

First line in Page 3: „Nigeria is the continent's biggest rice consumer, one of Africa's major rice producers, and one of the world's largest rice imports,“. Do you mean the world's largest importers or largest exporters? Imports is not good here!.

Page 3, second paragraph, first sentence: The per capita intake of 32 kg should refer to annual per capita intake, please correct it. The second sentence says: „Consumption has climbed at a rate roughly four times the world average over the previous decade..“ Please give the actual annual growth rates for the world average and for Nigeria.

Page 3, 4th paragraph, first sentence: „Despite the immense hurdles of researching rice...“. What do you mean here? What are the immense hurdles of researching rice? Please explain!.

Page 3, 4th paragraph, third line: „...but studies on rice production indices..“. Please specify what kind of indices you are referring here. Are these growth rates measured by actual value per previous value, or some more complex indices, or what? Generally, it is not enough to mention „indices“, or „index“, but a precise definition is needed of how the referred indices are computed, what they are to measure or indicate.

Page 3, 4th paragraph, last sentence : „..... that the challenges associated with expanding development infrastructure and increasing industrial drive pose a serious threat to achieving agricultural growth solely through the expansion of cultivated/harvested rice seeds rather than high yield rice seeds.“ This statement is unclear. What do you want to say here? Please explain it more clearly+

2. Literature review:

Sub-section 2.1:

In this section, and in the rest of the paper you often use the following way of referencing: „Ref[15] claims....“. In such cases you should mention the names of the authors of Ref[15], like: „Jones [15] claims...“. Please use this form in other occasions of the same style of referencing.

The first paragraph in page 4 talks about rice growing regions in Nigeria. I suggest that the author presents a map of Nigeria indicating the mentioned regions.

The first paragraph explains in detail the rice production of the African rice variety, but the end of the previous page talks about 2 other varieties. Please add some information of the production areas etc. about the other 2 varieties at the end of the first paragraph in page 4.

Sub-section 2.2

The first sentence starts with : „Rice is a staple cuisine“. This should rather be: „Rice is a staple food...“.

I suggest a new sub-section 2.3 added to the literature review:

2.3 Measurements of yield and production trends and instability

Here you could review literature dealing with crop yield trends and instability, mentioning possible ways of assessing these. Besides the Cuddy- Della Valle index that you use, there are many other methods, that have been extensively used for yield and production analysis throughout the world. Please see the following open access paper for references:

- Bacsi, Z., & Hollósy, Z. 2019. The yield stability index reloaded - The assessment of the stability of crop production technology. *Agriculturae Conspectus Scientificus*, 84(4), 319–331.
<https://acs.agr.hr/acs/index.php/acs/article/view/1629>
- Bacsi, Z., Fekete-Farkas, M., & Ma'ruf, M. I. 2022. Coffee Yield Stability as a Factor of Food Security. *Foods*, 11(19).
<https://doi.org/10.3390/foods11193036>

Then the present sub-section 2.3 could be 2.4. In this section,

- the 4th and 5th line mentions „Aus”, „Aman” and „Boro” seasons. What are these? Please explain.
- Later in the 8th and 9th lines you write: „... with little indication of commonalities across rice-producing regions’. What do you mean by „commonalities” here?
- In line 9 you write: „strategic strategy” – this is a strange wording, use a different expression.
- In line 10 you mention Ref [1] – please add to the sentence that this reference is about Kenya.
- In this sub-section, before starting to review literature about Nigeria (i.e before the second line of page 5) please review relevant literature about other rice producing countries, too, besides Bangladesh and Kenya. There should be plenty of other references regarding rice yields elsewhere in Africa and Asia, too.
- At the end of the sub-section, there is one paragraph with the title 2.3.1 Distinct Agricultural and Rural Phases in Nigeria. This paragraph should not be numbered. If you do not have a 2.3.2 sub-section, then there is no need to use the numbering 2.3.1, and anyway this is just one paragraph. On the other hand, you should explain briefly why you consider this paragraph important for the analysis you are going to present. Also, the second and third lines of this paragraph should be clarified: „... more in Nigeria's different administrations' constant sourcing and execution of policies and programs across many decades”. What do you want to say here? Please explain your meaning more clearly here.

3. Research Methodology

3.1 Data

The last two lines of page 5 say: „... For the analysis, the time was separated into four sub-periods. The study, however, was divided into four historical periods.” The first sentence is unnecessary, because the second sentence just repeats it.

The first line of page 6 defines the 4 time periods: the first one is 18 years, the second and third one are 15 years each, and the fourth one is 12 years long. Please explain briefly why you segmented the full time range of 1961-2020 to exactly these periods.

3.2 Analysis of data

- When you present the equations with their time-dependence, you should indicate the time dependence of the Y value, i.e. instead of „Y =..” you should use „Y(t) =..”, because the value of Y certainly varies by time.
- When you mention that „ $b=1+r$ ”, and then „r= growth rate”, please explain how you get this interpretation, i.e. how you arrive to the idea that $b-1$ = growth rate of Y(t).
- Later you mention „CAGR =[antilog b - 1] * 100. What is „antilog” here? If you are using the natural logarithm „ln” then the „antilog” should be the inverse function of this, i.e. supposing $b = \ln w$, then „antilog b” should be w, which is nothing else than: $w = e^b$. If you mean something else, please define it more precisely.
- Second line from the bottom of page 6, you write: „This calculation is based on the premise that variations in rice output in a given year are reliant on output in the preceding year.” I don’t see why should this be reasonable. Why should the output of the given year depend on the output of the preceding year? It should much more depend on the inputs used, on weather patterns of the current year, or on the management and technology choices, than on the previous output. However, if we assume this dependence, then the problem of autocorrelation should be faced, and there is absolutely no consideration of possible autocorrelation analysis in the present paper!.

3.2.2 Instability in rice production

The first paragraph of this section should be placed into Literature review, to the suggested new 2.3 sub-section. The mentioned references here should be expanded, as it was suggested formerly in the present review. Please add more references of empirical studies that use the Cuddy-Della Valle index, too.

Page 7, equation (4): Please explain how to interpret the Cuddy-Della Valle index: do high values mean more instability, and small values more stability, or vice versa?

Page 7, equation (7): Please explain why you are using this form of equation for decomposition? At the bottom of the page you explain the meanings of A_B , P_B and Y_B , but you say nothing about A_b , P_b and Y_b . Are they the same, or are they different?

4. Results and Discussion

4.1 Trend in Area, Yield and Production...

First line of the sub-section: You mention here „Sub-Group Performance”, do you mean the four sub-periods of time, or something else? Please clarify.

Third line of the sub-section: you have „(2.3893 Hg/ha)” – Please give the value in kg/ha or t/ha here.

Figure 1: The scales of the data are very different. It would be better to give these data in a Table instead of this figure. Also, in the legends: „rice paddy’ – what it is? Is it production of rice paddy in tonnes, or what? Please be more precise!

Figure 2 (page 8) – again in the legends: „rice paddy’ – what it is? Is it production of rice paddy in tonnes, or what? Please be more precise!

4.2 Compound Annual Growth rate...

The first line refers to Table 1, and the table refers to the semi-log function. Please explain here briefly why the semi-log function was used in the table.

Second paragraph of the sub-section: Why do you choose India to compare with Nigeria? Where do you get the mentioned data for India (4.97%; 5.48%; 0.48%)? Why is India relevant in this comparison? It is not the same continent, not the same climate, probably not the same rice varieties.... Could you present comparisons with other countries, too?

The last sentence in page 8: „The low yield R-squared suggests that the semi-log functional form (model) failed to capture the type of movements and growth pattern in rice yield.”. So the presented results are not good enough. How to interpret and handle this problem?

Page 9, Table 2. There are altogether 5 time periods: the 4 sub-periods and the pooled time period. The equations, and the growth rates are different for each. Then the R-square values should also be different for each sub-period, and you should present all these R-square values separately.

4.3 Decomposition of Production of Rice...

At the end of the first paragraph you should mention if rice varieties, differences of rice types may also be a relevant explanation of production levels.

Table 2. – Please use only 2 or 3 digits after the decimal point in the table, there is no need to have 8 digits at all!

4.4 Instability in Area, Yield...

The last three lines of the page are the repetition of the first three lines of the sub-section. Please delete the repetition.

After presenting Table 3, please add the discussion of the values presented in the table.

5. Conclusion and Recommendation

5.1. Conclusion

The third and 4th lines of this sub-section say: „Furthermore, when area, production, and yield growth rates are compared across all time periods, rice performs substantially better in Nigeria.” What do you want to say here, please explain it more clearly.

5.2 Recommendation

The first recommendation is too general, therefore it does not say anything relevant. Please give more precise, practical recommendations instead.

Regarding the second recommendation: if better rice varieties are developed, will farmers be able to get access to them and plant them, or will there be financial difficulties involved, or should the government support the access of the farmers

to new varieties? Please reflect on these issues here.

Overall, I suggest the authors to carefully consider my remarks and suggestions listed above and improve their paper accordingly, to make the manuscript more suitable for publication.