

Peer Review

Review of: "A Study for Estimation of Greenhouse Gas Emissions of Cotton in Central Greece"

Adeyemi Adegoke Adeleke¹

1. Biological and Agricultural Engineering, Texas A&M University - College Station, United States

Summary

This manuscript provides a quantitative evaluation of greenhouse gas (GHG) emissions associated with cotton cultivation in Central Greece using the Cool Farm Tool (CFT). It analyzes input-specific emissions, spatial variation across farm plots, and year-over-year dynamics, with a particular focus on nitrogen-based fertilizer emissions. The study is timely and relevant, addressing critical climate impacts in agriculture with empirical support and statistical robustness.

Strengths

Methodological Rigor: The use of the CFT and multiple regression analysis allows for precise quantification and attribution of GHG sources.

Granular Field Data: Data from 12 farm plots over two years provide a solid empirical foundation and enhance regional relevance.

Clear Attribution of Emissions: Fertilizers are convincingly identified as the primary or dominant emission source (66%), supported by high adj. R^2 values (up to 0.99).

Statistical Validation: Use of paired t-tests and one-way ANOVA confirms the significance of temporal and spatial variations.

Policy and Practice Relevance: The study's insights on precision agriculture, biochar application, and improved N management provide actionable strategies for emission reduction.

Weaknesses & Recommendations

Model Assumptions & Sensitivity Analysis Missing

The paper does not sufficiently explain the **underlying assumptions of the CFT model** or validate its sensitivity to input variability (e.g., irrigation frequency, fertilizer rates).

► *Recommendation:* Include a sensitivity or uncertainty analysis for key parameters.

Comparative Benchmarking Needs Expansion

While the paper compares results with other countries (e.g., China, Iran, Australia), it lacks a consistent normalization method (e.g., CO₂e/kg lint vs. per hectare) and does not adjust for climate, yield, or irrigation strategy.

► *Recommendation:* Normalize emissions using functional units (e.g., fiber output or energy equivalent) for fairer benchmarking.

Neglect of Emissions from Seed & Machinery Manufacturing

The system boundary excludes upstream inputs such as seed production, machinery life-cycle emissions, and chemical manufacturing beyond fertilizer and pesticide use.

► *Recommendation:* Clarify the scope or justify exclusions more explicitly in the methods.

Discussion Lacks Depth on Mitigation Scenarios

While several mitigation techniques (e.g., biochar, precision ag) are mentioned, there is no **quantitative modeling** of how they might reduce emissions in this context.

► *Recommendation:* Include a scenario-based analysis to quantify potential GHG reductions from best practices.

On the Conclusion

The conclusion section could be strengthened in the following ways. Firstly, citations are generally not recommended for inclusion in the conclusion of a scientific article as you are summarizing the previously analyzed and referenced data. Additionally, the manuscript does not explicitly offer recommendations for follow-up studies, which could benefit researchers or practitioners seeking to build on this work and strengthen the article's impact.

References

Additional references are recommended to support several claims made in the first paragraph of the introduction, particularly within the opening sentences. Furthermore, some of the cited references (e.g., from 2007 and 2011) are over a decade old and may not accurately reflect the current state of knowledge

in the field. Replacing or supplementing these with more recent and relevant literature would enhance the article's credibility and ensure alignment with current research trends.

Language & Structure

Some sections (particularly the introduction and results) would benefit from **tighter language, clearer subheadings**, and reduced redundancy. Occasional minor grammatical errors are present.

For example, the 2 in the carbon dioxide formula should be a subscript--CO₂e/kg, not CO2e/kg. (See lines seven and eight of the abstract, for instance.) Also, once the full form of an abbreviated term is defined once, the abbreviation suffices for referencing the full form subsequently--see "greenhouse gas (GHG)" in lines four and six.

► *Recommendation:* Professional copyediting is advised prior to publication.

Conclusion

This is a technically sound and policy-relevant manuscript that makes a valuable contribution to agricultural sustainability literature. With modest refinements—particularly in clarifying scope, deepening comparative analysis, and tightening the discussion—this work would be suitable for peer-reviewed publication.

Final Recommendation: Accept with Minor Revisions.

Declarations

Potential competing interests: No potential competing interests to declare.