

Methane Emissions Due to Paddy Rice Farming in Sri Lanka: Environmental, Social and Economically Sustainable Alternatives

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Thesis

Alternatives to paddy rice production that take into consideration environmental, social and economic dynamics must be implemented to effectively reduce agricultural methane emissions in Sri Lanka.

Background & Introduction

- Methane (CH₄) is 28 times more powerful than carbon dioxide (CO₂).
- As rice straw, the organic material left behind after paddy rice is harvested, decomposes in the submerged fields, microbes release methane into the atmosphere as a byproduct.
- Rice paddy cultivation is extremely labor intensive.
- Rice makes up 34 percent of the total cultivated area of Sri Lanka.

Methods

- Case studies of other paddy rice producing countries were analyzed including their methods of growing rice and the role of their smallholder farmers.
- Alternative technologies were explored as potential solutions for reducing paddy rice methane emissions.
- Expert panels and interviews were conducted at the United Nations Framework Convention on Climate Change, Conference of the Parties 23 to gain a more holistic and local understanding of the issue.

Solutions

Environmental

The solution must reduce atmospheric methane emissions without jeopardizing soil or environmental health.

Economic

Farmers must be able to afford and access information and technologies.

Social

Solutions cannot dismiss the knowledge and history of traditional farming practices.

Potential Solutions

- Subsistence and/or polyculture farming result in healthier soils, more diverse cropping systems and a need-based economy, further resulting in reduced methane emissions.
- Addition of rice straw-derived biochar has been discovered to lower methane emissions in increased temperature and carbon dioxide conditions, congruent with future climates.
- Responsible water management such as slower infiltration techniques, breaking up of soil aggregates or alternate wetting and drying (AWD) would result in fewer methane emissions.
- Policy must encourage sustainable farming practices and address current subsidies.

Conclusion

Based on case studies, new technologies and information gathered from COP23, the most effective solutions will be a combination of

- Cooperatives between smallholder farmers,
- Alternate wetting and drying, and
- Policy incentivizing long-term sustainable farming.

Further Reading

Raising and Sustaining Productivity of Smallholder Farming Systems in the Tropics: A Handbook of Sustainable Agricultural Development by Willem C. Beets

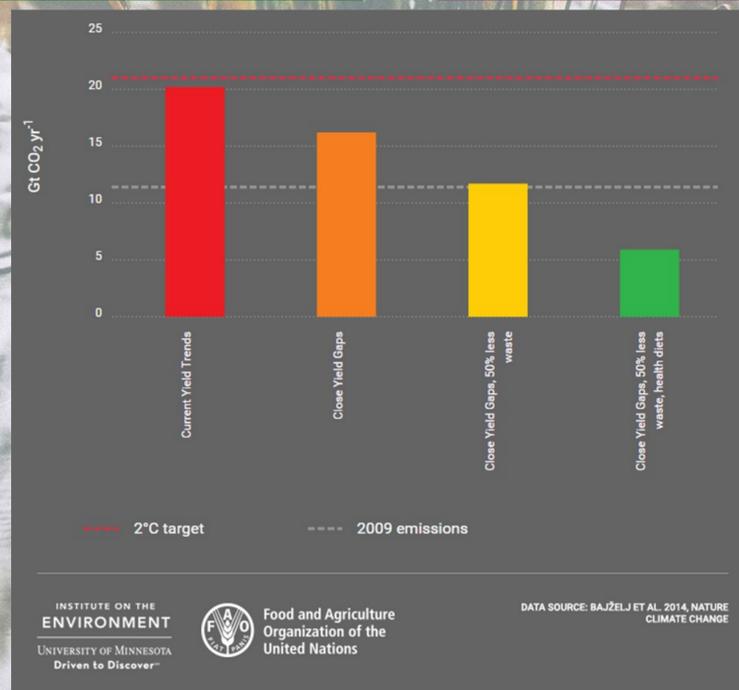


Figure 1. The most effective way to reduce greenhouse gas emissions from the paddy rice sector will be a combination of consistent seasonal yields, waste reduction and a transition to a diverse diet.