GHG Emissions Analysis Report-Wheat Farmers

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1. Introduction

This report evaluates greenhouse gas (GHG) emissions from 4,000 wheat farmers . Using IPCC Tier-1 methodology, nitrous oxide (N_2O) emissions were calculated for baseline (current practice) and two improved scenarios including Nano-Urea and Organic fertilizer applications.

farmer	dist ate	crop	N_applied_kg_per_ha	N2O_N_direct	N2O_N_indirect	Total_N2O_N	N2O_gas_kg_per_ha	CO2e_kg_per_ha	CO2e_kg_per_ha
0	Gadag	Karnataka	Wheat	100	1.0	0.40	1.40	2.1980	655.0040
1	Gadag	Karnataka	Wheat	60	0.6	0.24	0.84	1.3188	393.0024
2	Gadag	Karnataka	Wheat	110	1.1	0.44	1.54	2.4178	720.5044
3	Gadag	Karnataka	Wheat	80	0.8	0.32	1.12	1.7584	524.0032
4	Gadag	Karnataka	Wheat	100	1.0	0.40	1.40	2.1980	655.0040

And goes on upto 40000(its hypothetical data since , only for project purpose)

2. Data & Methodology

Dataset: 4,000 wheat farmers applying nitrogen between 60–160 kg/ha.
Methodology follows the IPCC 2006 Tier-1 Guidelines.

Emission Factors:

- Direct N_2O-N = N_applied × 0.01
- Indirect N_2O-N = N_applied × 0.004
- Total N_2O-N = Direct + Indirect
- N_2O gas = N_2O-N × 1.57
- CO_2e = N_2O × 298

3. Baseline Emissions

Baseline emissions reflect farmer-level nitrogen application under current practices. The calculated emissions include direct N_2O, indirect N_2O, total N_2O, and CO_2-equivalent.

4. Improved Practice Emissions

Two reduced-emission practices were analyzed:

- Nano-Urea: Approximately 67% nitrogen reduction.
- Organic: Approximately 83% nitrogen reduction.

Per-farmer emissions were recomputed using adjusted nitrogen levels.

5. Statistical Summaries

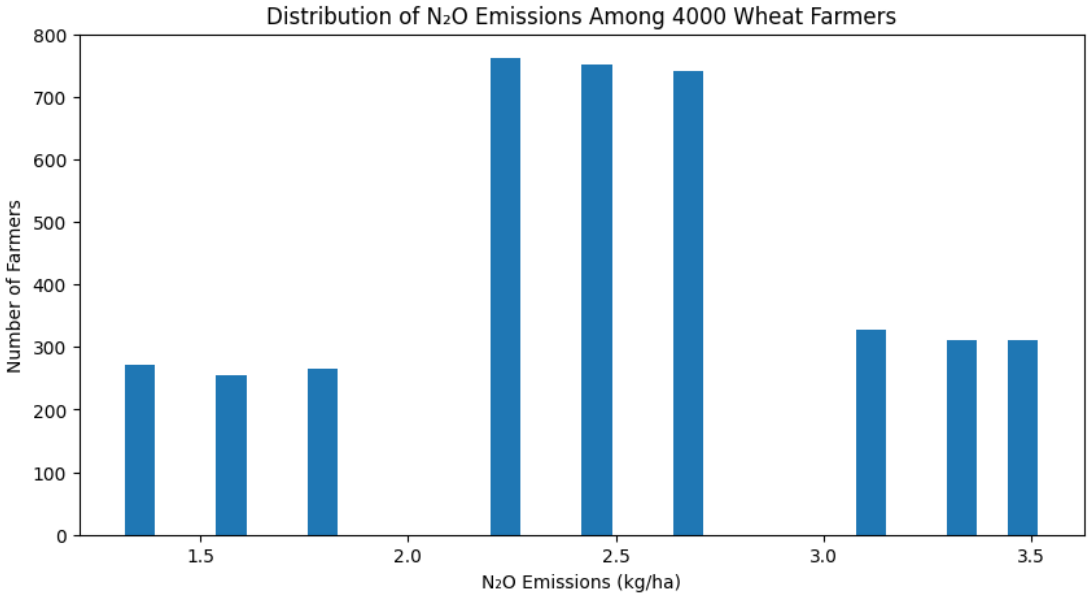
Statistical summaries cover mean, median, standard deviation, min–max values, and quartile variations for all three scenarios (Baseline, Nano, Organic).

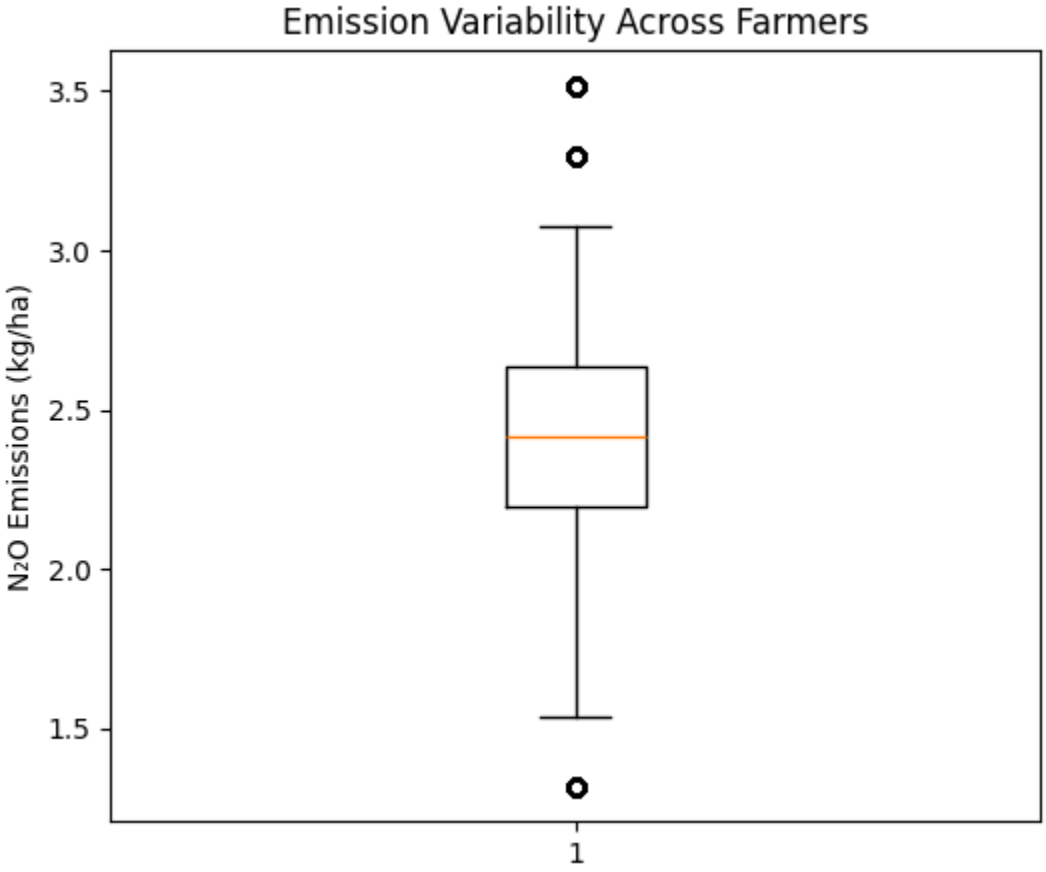
6. Emission Reduction Potential

Nano-Urea shows around 60–70% emission reduction.
Organic shows 70–85% reduction depending on original nitrogen levels.
Both demonstrate strong potential for carbon mitigation projects.

7. Visual Insights

Visual elements such as histograms, boxplots, and comparative bar charts may be inserted here in the final version of the report.





8. Conclusion

Nitrogen fertilizer management significantly influences N_2O emissions. Improved practices show strong mitigation potential and support MRV frameworks for agricultural carbon projects.