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PhD title and study topic:
"Climate Neutral Farms (ClieNFarm)
Massey University, PhD in Environmental Science

Host Institute and Supervisor:
1. Dr Thiagarajah Ramilan- Main supervisor- Massey University
2. Prof Peter Tozer- Co-Supervisor- Massey University
3. Dr. Cecile de Klein- Co-Supervisor- AgResearch

NZ-GRADS Project:
As I stand at the threshold of pursuing my doctoral studies in Environmental Science at the School of Agriculture and Environment Science, Massey University, New Zealand, I reflect on the unanticipated but transformative path that led me to the present moment. This journey, characterised by determination and passion for sustainable agriculture, proves my power and resilience and reflects the immense potential that women in science can unleash. In my journey toward pursuing a PhD, a significant aspect that stands out is my passion for sustainable farming and my eagerness to make a meaningful contribution to the world. The Climate Neutral Farms (ClieNFarms) project description, which encapsulates two pivotal elements, sustainable farming and Bioeconomic modelling, ignited my attention, as these topics align perfectly with my interests and aspirations.

The first research objective addresses challenges in accounting for greenhouse gas (GHG) emissions, specifically in pastoral grazing systems, with a primary emphasis on dairy cattle. The purpose is to enhance the accuracy and reduce uncertainties of GHG emission reports by refining the calculation of enteric fermentation emissions. Through synthesis and analysis of the most recent and relevant data, the research identifies key factors influencing enteric fermentation emissions from dairy cattle. The consideration factors are dietary components, animal age, and physiology, which must be considered in New Zealand's accounting methodology.

In parallel, the second focus is on validating the Cool Farm Tool. This internationally recognised GHG emission on-farm accounting tool is crucial in assessing the environmental impact of agricultural practices and GHG emissions. However, its validation is necessary to ensure its accuracy and applicability in specific regional contexts. Hence, local data specific to New Zealand will be used to validate the Cool Farm Tool, providing it accurately represents the region's distinct agricultural practices and environmental conditions.

The expected results from this research are substantial and impactful for upholding New Zealand's clean, green dairy industry reputation. Firstly, refining greenhouse gas (GHG) emission reporting will contribute to a more accurate understanding of emissions, especially in pastoral systems. A deep understanding of animal methane dynamics will facilitate measuring the additive effect of diet manipulation in the global fight toward reducing GHG emissions and climate change, similarly, integrating this abatement strategy in the agricultural national inventory. Secondly, validating the Cool Farm Tool ensures its reliability in the New Zealand context, providing a robust instrument for evaluating and enhancing the sustainability of agricultural practices. This not only offers an opportunity for farmers and policymakers globally to make standardised comparisons but also fosters global understanding and collaboration. It supports policy alignment, ensuring consistency and reliability in data, and promotes an effective tool for achieving alignment with international sustainability goals."

Moreover, the knowledge generated from this research holds global implications, offering valuable and transferable skills applicable to various agricultural sectors and countries. The research outcomes will comprise publications, datasets, and policy recommendations. Furthermore, the research's broader relevance extends to New Zealand's support for other partner countries' efforts to slow climate change by training young scientists and encouraging nations to find more effective approaches to reduce uncertainties in the reported data by accounting for country-specificities and achieving higher Tier of complexity reports.

About you…
I am Nelma Ngonga from Mozambique. I studied BSc in Agriculture and Rural Development at Universidade São Tomás De Moçambique – Mozambique and completed my Master of Science in Dryland Agriculture Systems at Curtin University, Australia.
The successful completion of this research will enable me to join a community of individuals who make significant contributions to knowledge. Furthermore, the research's relevance to the global battle against climate change can significantly enhance my academic and professional standing. It will profoundly impact my career, establishing me as a valuable asset in environmental science and data analysis nationally and internationally. After I finish the current research program, I intend to return to Mozambique and work as a researcher. I also aspire to be involved in teaching activities on subjects such as environmental science, computer simulator modelling, and sustainable development. Moreover, it will benefit my country by reinforcing its reputation and ensuring alignment with the United Nations Framework Convention on Climate Change (UNFCCC) and sustainable development goals.

Favourite quote…

"We are not to blame for the world we find at birth. But we need, to the best of our ability, to do something for the world that is being built (or destroyed) as we live. A world that will be bequeathed to those to come." (Gilberto Cotrim)