

OU STEM EEES Project Proposal Form – 2024 entry

Project Title	Enhancing cooperative extension service provision for sustainable development goals (SDG's): case study of macadamia in Malawi
Key words	Macadamia, extension services, cooperatives, food security, SDG
Supervisory team (including email address)	PI: Yoseph Araya (Yoseph.Araya@open.ac.uk) Co-I: Emmanuel Junior Zuza (Emmanuel.Zuza@open1.ac.uk), Rick L. Brandenburg (rbranden@ncsu.edu), Andrew Emmott (chair@nenomacadamiastrust.org)
Is the PhD suitable for part time study?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Project Highlights:

- Agricultural development requires alignment between producers and supply chain support provided by the state. This study takes account of the developing smallholder climate-smart macadamia agroforestry in Malawi, which has been of recent study within the school.
- The primary objective is to understand the current state of extension services and training within macadamia cooperatives and local ministry of agriculture extension and identify best practices for improving their effectiveness. Assessment of changes to the extension services and training for cooperative members and extension staff as they develop during the study period will be made.
- How this works and how it compares with case studies of state intervention in extension services in other crops and countries in global South will be compared against and learned lessons drawn out. Based on this the outcomes of this research have the potential to inform policy changes, capacity-building initiatives, and cooperative practices in other agricultural subsectors, benefiting both farmers and the broader socio-economic and environmental sustainability of Malawi.

Overview:

Agricultural development in Malawi has long been a focal point for researchers and policymakers seeking to enhance the livelihoods of smallholder farmers and address critical challenges associated with food security and rural poverty (Chisale et al., 2022). Among the agricultural commodities that have gained prominence in recent years, macadamia nuts stand out as a valuable export crop and cereal based-diet supplement, offering potential economic benefits (Table 1) to both farmers and the nation as a whole (Zuza et al., 2023). However, realising this potential depends significantly on the provision of effective agricultural extension services to smallholder macadamia farmers (Zuza, 2023).

Highlands Macadamia Cooperative Union Limited (HIMACUL) a smallholder cooperative union aims to be an anchor with the 2063 vision Mega farm initiative with cooperative anchor farms based in the Extension Planning Areas (EPA) that the cooperatives are based. These cooperative anchor farms will provide demonstration sites in different agro-ecologies to underpin a paradigm shift to improve the linkage between applied research, extension and training and farmer uptake of new technologies. As macadamia is still a relatively new crop to the smallholder sector in Malawi there is a need to develop curriculum and training material which will assist with this paradigm shift.

A key policy recommendation emphasised the need to strengthen the provision of agricultural services for smallholder macadamia farmers. Building on this foundation, the present study seeks to delve deeper into this issue by investigating how macadamia cooperatives and ministry of agriculture provide macadamia extension services to farmers. Furthermore, it aims to draw insightful comparisons between these cooperatives and analogous entities where such extension services have proven successful.

The primary objective of this research is to gain a comprehensive understanding of the current state of extension services within macadamia cooperatives and ministry of agriculture in Malawi and identify best practices that can be adopted to enhance their efficacy. The secondary objective is to assess changes to the extension services and training for cooperative members and extension staff as they

develop during the study period. By achieving these objectives, it is expected that the study will make a valuable contribution to the sustainable development of the macadamia industry and, more broadly, contribute to the attainment of several United Nations Sustainable Development Goals (SDGs). These goals include, but are not limited to, No Poverty, Zero Hunger, Sustainable Production and Consumption, and Climate Action.

The relevance of this research extends beyond the macadamia sector, as it holds the potential to inform and inspire policy changes, capacity-building initiatives, and cooperative practices in other agricultural subsectors.

Methodology:

The research will employ a mixed-methods approach, combining quantitative and qualitative data collection methods. This will involve:

- Surveys and questionnaires to gather information from smallholder macadamia farmers.
- Interviews and focus group discussions with farmers, extension officers, and other stakeholders.
- Data analysis and statistical techniques to assess current practices and evaluate the effectiveness of extension services.
- Monitoring new practices as they develop over the period of the project.
- Case studies of successful macadamia cooperatives and extension models from other regions.
- Policy analysis to understand the regulatory framework affecting the macadamia industry.

Training and skills:

1. Research skills

- The student will gain expertise in designing a comprehensive research project, including developing research questions, hypotheses, and methodologies.
- They will learn various data collection methods, such as surveys, interviews, and data analysis techniques to gather and interpret data effectively.
- Proficiency in using statistical software for quantitative data analysis to draw meaningful conclusions from survey data.
- Skills in analysing qualitative data from interviews and focus group discussions to identify patterns and themes.

2. Interdisciplinary knowledge

- Understanding of both agricultural practices and socio-economic contexts, as this research involves interdisciplinary considerations.

3. Policy analysis

- The capacity to analyse agricultural policies and regulations, making recommendations for policy improvements.

4. Community engagement and communication

- Developing skills in engaging with local communities, cooperatives, and stakeholders to foster collaboration and gather insights.

5. Policy advocacy

- The research may lead to policy recommendations, and the student will gain skills in advocating for policy changes based on their findings.

6. Global Perspective

- Understanding of how local agricultural practices fit into the broader context of global agricultural challenges and sustainable development.

Partners and collaboration:

- Highlands Macadamia Cooperative Union Limited.
- Royal Agricultural University.
- Neno Macadamia Trust.
- Cooperative College.
- North Carolina State University.
- Imperial College London.

Possible timeline:

Year 1: Revise the existing state led support on macadamia production in Malawi. Extend equivalent experiences observed in other countries in the Global South. Draw out similarities and experiences. Conduct pilot interviews and analyse findings amongst smallholder macadamia producers and government partners to identify salient initiatives and their outcomes. Develop a framework on how to study salient approaches of extension interventions to support smallholder farmers. Present preliminary project outline/results to the school. Pass probation upgrade.

Year 2: Based on the developed framework, undertake more extensive field work and conduct critical analysis, identifying farmers and extension support, to collate/curate existing resources to tackle challenges and propose or repurpose and co-produce new interventions. Present preliminary results at a national conference, prepare article for publication.

Year 3: Finalise analytical work on data collected in Year 2, return to existing initiatives of extension to validate proposed interventions. Present results at an international conference.

Write thesis, prepare articles for publication.

Further reading:

- Zuza, E. J., Maseyk, K., Bhagwat, S. A., Chemura, A., Brandenburg, R. L., Emmott, A., Rawes, W., Hancock, W., Mnthambala, F., & Araya, Y. N. (2023). Factors affecting soil quality among smallholder macadamia farms in Malawi. *Agriculture and Food Security*, 12(1), 17.
- Araya, Y. N., Emmott, A., Rawes, W., & Zuza, E. J. (2023). Promoting climate-smart sustainable agroforestry to tackle social and environmental challenges: The case of Macadamia agroforestry in Malawi.
- Zuza, E. J., Maseyk, K., Bhagwat, S. A., de Sousa, K., Emmott, A., Rawes, W., & Araya, Y. N. (2021). Climate suitability predictions for the cultivation of macadamia (*Macadamia integrifolia*) in Malawi using climate change scenarios. *PLoS ONE*, 16(9), e0257007.
- Zuza, E. J., Maseyk, K., Bhagwat, S., Emmott, A., Rawes, W., & Araya, Y. N. (2021). Review of Macadamia Production in Malawi: Focusing on What, Where, How Much Is Produced and Major Constraints. *Agriculture*, 11(2), 152.

Further details:

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