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Perception of smallholder farmers on the efficacy of ecological farming in Chiradzulu district, Southern Malawi

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Abstract

The majority of sub-Saharan countries, including Malawi, heavily rely on cereals such as maize as their staple food. However, climate change and poor farming practices have led to soil degradation, hindering smallholder farmers' ability to increase maize production. This problem is compounded by the escalating costs of inorganic fertilisers, which smallholders are forced to use. This practice also leads to high transaction costs within the value chain system and increases food prices. Malawi, like many other sub-Saharan countries, is dependent on inorganic fertiliser imports from the global North. Any supply chain disruption, such as the Russian-Ukrainian war, creates a bottleneck that makes fertiliser scarce and expensive, exacerbating food insecurity in the region. To address this issue, there is an urgent need for a radical sustainable option for the farmers. Ecological farming has been proposed as a cost-effective and sustainable alternative to conventional farming that can improve soil health and reduce the dependence on increasingly expensive inorganic fertilisers. However, despite the potential benefits, smallholder farmers in many sub-Saharan African countries, including Malawi, have been slow to adopt ecological farming practices. To understand why this is the case, we examined the perception of smallholder farmers on the efficacy of ecological farming in Traditional Authority Mpama, Chiradzulu district in Malawi. Our study involved five focus group discussions and structured interviews with 120 smallholder households, and we analysed the data using qualitative approaches and the Principle of Weighted Average Index. Our findings indicate that at least 60% of smallholders perceive ecological farming technologies as retrogressive and non-productive. Furthermore, we identified a significant association between socio-economic characteristics of respondents and community perceptions on the efficacy of ecological farming. To overcome these barriers, we suggest implementing interventions that improve knowledge levels, attitudes, and behaviours of farmers through capacity building, sensitisation, and mobilisation. We believe that these interventions can effectively promote the adoption of ecological farming among smallholders, leading to increased food security and reduced dependence on expensive and lethal technologies.

Keywords: *Capacity building, ecological farming, food security, land optimisation, perceptions, smallholder farmers.*

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Introduction

Over the next decade, socio-ecological crises such as climate change, biodiversity loss, the high cost of food, war, and migration are expected to worsen globally (Eyhorn, et

al., 2019). The effects of such calamities will likely hit the poor hard, especially smallholder farmers in the Global South, such as women and children. Thus, there is an urgent need for money and time to

effectively manage them. Unfortunately, according to Erenstein et al.,(2022) both resources are scarce among smallholder farmers in Malawi. Contemporary sustainability literature suggests a radical shift from conventional to ecological farming systems that employ natural techniques and resource-nexus approaches which are consistent with the current nature-positive development (SLU,2016). Ecological farming combines modern science and innovation with respect for nature and biodiversity. The concept is also called sustainable agriculture, ecosystem-based farming, limited external input sustainable agriculture (LEISA), limited external input agriculture (LEIA), and organic farming (SLU,2016). This system does not use inorganic inputs such as chemicals, genetically modified seeds, and inorganic fertilizers. Instead, local and cost-effective nature-based solutions are used without compromising the quantity and quality of yield from a parcel of land (SLU,2016). However, the adoption levels of these technologies are still low in Malawi. Therefore, this study was conducted to assess smallholder farmers' perceptions of ecological farming's efficacy, in order to establish an entry level for advocacy, communication, and extension services.

Methods and Materials



Figure.1a Seven weeks ecologically produced maize (*Zea mays*) crops without fertiliser

A Convergent Mixed method approach was employed (Creswell & Creswell, 2018) to study the perceptions of smallholder farmers on the efficacy of ecological farming in Traditional Authority Mpama in Chiradzulu District located at coordinates 15°42'S35°10'E. Household survey interviews were conducted on 120 households. The sample size was determined by Sloven's formula as follows;

$$n = \frac{N}{1 + Ne^2}$$

Where, n is the sample size, N is the population size and e is the margin of error (0.05). Focus group discussions (FGD) and Key Informant Interviews (KII) were qualitatively analysed and triangulated with the results from the survey interviews to validated the results. Ranking of the perceived efficacy of ecological farming was done by the Principle of Weighted Average Ranking Index computed (Munthali et al.,2018)as follows;

$$index = \frac{R_n C_1 + R_{n-1} C_2 \dots + R_1 C_n}{\sum R_n C_1 + R_{n-1} C_2 \dots + R_1 C_n}$$

Where R_n = Value given for the least-ranked level (For example, the least ranked level of this study was 5th, thus=5 counts of the least ranked level (In the case of this study, the 5th rank).

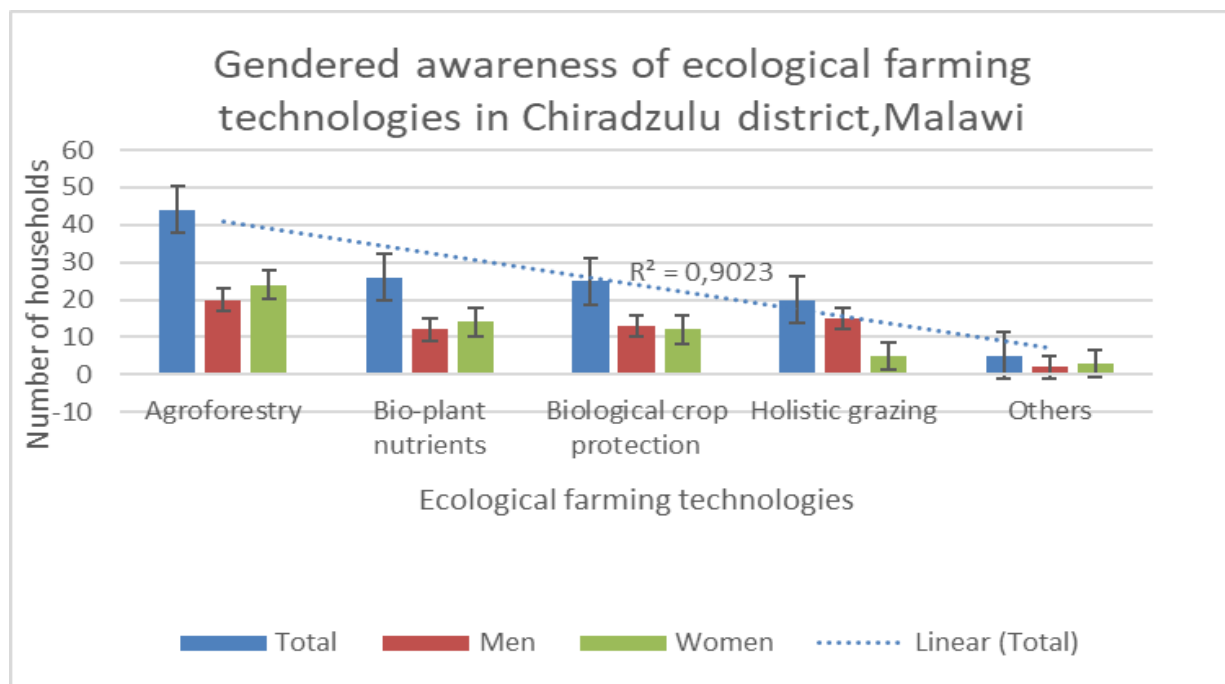
Results and Discussion



Figure.1b Seven weeks maize (*Zea mays*) crops without fertiliser

Maize is the main food crop grown by most smallholder farmers in Malawi, as it is the country's staple food. Unfortunately, maize production heavily depends on imported fertilizers, mainly from Russia and Ukraine. Due to the conflict between these two countries, along with the impact of COVID-19, supply chains have been altered,

resulting in high fertilizer prices that most smallholder farmers cannot afford. For instance, fertilizer prices in Malawi have increased by 400% from 2020 to 2023, rendering them unaffordable. If farmers fail to apply fertilizers, the yield drops by at least 90% (Fig. 1b), leading to food insecurity for an indefinite period.



In Chiradzulu district, the majority of smallholder farmers are women. The study found that most men are not interested in farming instead they go to the nearby Blantyre city, the commercial city of Malawi to get formal employment or piece work. The participants of the study identified four major ecological farming technologies of which Agroforestry ranked the highest. This is not surprising as the area has a low land holding size of approximately 0.3ha per household and low energy security (World Bank,2017). Households depend on fuelwood for heating and cooking although it is in low supply. As a result, smallholders

are forced to include multipurpose tree species in the farms to support their daily wellbeing making it easy for them to identify these technologies. The study also finds that there is no significant difference in the awareness levels of Agroforestry, Bio-nutrient and biological crop protection technologies except in the holistic grazing (SLU,2016). This is enough evidence to validate how smallholder farming remains a gender issue in Malawi. Men are mostly concerned with cash farming technologies and all the household food production is done by women.

Table 1. Perceptions of smallholders on Ecological farming (n=120)

Parameter	Weight	Index	Rank
Availability	624	0.0971	1
Accessibility	608	0.0946	2
Sustainability	484	0.0753	3
Contemporality	460	0.0716	4
Productivity	437	0.0680	5

Most smallholders affirmed that ecological farming technologies are available, accessible and sustainable in the study area. However, the majority think these technologies are non-productive and retrogressive. They argue that both the Government and Non-governmental organizations' extension workers provide much-needed awareness, sensitisation and capacity-building services in relation to ecological farming. They also think most of the technologies are simple and depend on nature-based solutions. Thus they are readily available to farmers without cost barriers.

Conclusion and Outlook

Lastly, one can note that this study has effectively demonstrated that by utilizing nature-based solutions powered by innovation, ecological farming is geared to propel the health of the people and the environment. This can only be achieved if smallholder farmers adopt a resource nexus approach in their livelihood activities. This approach seeks to consider one or more natural resources and associated materials both in management and governance to spur structural transformations and sustainability.

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