

# Can Less Be More?

## The Power of Conservation Agriculture Through the Lens of the Makwelero Steps in Malawi

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# INTRODUCTION

Malawi is a country heavily reliant on agriculture, with a large portion of its population engaged in small-scale agriculture. The sector serves as the backbone of the economy and the primary source of income for millions of Malawians. However, recurring challenges, including erratic weather patterns, limited access to resources, agricultural knowledge gaps and market volatility, threaten the sustainability of agricultural production and exacerbate food insecurity in the country. With more than 50% of its population living in poverty, Malawi grapples with persistent food and nutrition insecurity issues among its rural population, particularly smallholder farmers.

The significance of addressing food insecurity in Malawi cannot be overstated. In the pursuit of addressing these pressing challenges, initiatives such as the Harvesting Prosperity and Resilience project have emerged as crucial endeavors. Launched in 2019, the Harvesting Prosperity and Resilience project, implemented by Rise Against Hunger and in-country partner Foundation for Community Support Services (FOCUS), aims to bolster food security and resilience for smallholder farmers and their families. Amidst challenges, the project stands as a beacon of hope, utilizing an integrated approach to improve food production, nutrition practices and income.

This paper will assess the effectiveness of the Harvesting Prosperity and Resilience project in addressing food security challenges and enhancing the resilience of smallholder farmers, using climate-smart agricultural techniques, in the Karonga and Mzimba districts. Through a comprehensive analysis, Rise Against Hunger will evaluate the impact of the project interventions, identify successes and shortcomings, and offer insights into strategies for improving future initiatives in Malawi. By examining the Harvesting Prosperity and Resilience project's outcomes, we endeavor to contribute valuable insights that can support policy decisions, guide resource allocation, add to the ongoing discourse on agricultural development and poverty alleviation, and shape the trajectory of agricultural interventions in Malawi and beyond.



## BACKGROUND ON AGRICULTURAL CHALLENGES IN MALAWI'S KARONGA AND MZIMBA DISTRICTS

Agriculture plays a central role in the livelihoods of most Malawians, with approximately 5.3 million of the country's estimated 11.8 million hectares of land being cultivable. Malawi's agricultural industry and economy are heavily dependent on maize, which serves as a staple crop and constitutes 66% of the country's agricultural exports. However, the agricultural sector faces a myriad of challenges that hinder food security and economic development. Smallholder farmers, who constitute a significant portion of Malawi's agricultural workforce, encounter various obstacles that impede their productivity and resilience, including limited access to quality seeds, inadequate credit facilities and insufficient extension services. Land degradation and the adverse effects of climate change, such as erratic rainfall patterns and prolonged droughts, further exacerbate these challenges, leading to decreased agricultural productivity and increased food insecurity for smallholder farmers.

The Karonga and Mzimba districts in Malawi, where the Harvesting Prosperity and Resilience project is implemented, have unique agricultural, climate and soil characteristics that influence farming and livelihoods in the area. The districts also face specific challenges. These are outlined below.

### Additional key statistics to note:

- Agriculture contributes approximately 30% to Malawi's Gross Domestic Product (GDP) and employs over 80% of the economically active population, with 59% being women and 41% men.
- Smallholder farmers disproportionately produce crops for markets, accounting for approximately 80% of all food consumed in Malawi.
- Disparities in land ownership are prevalent; the average landholding size for poor households is about 0.23 hectares, compared to 0.42 hectares for wealthier households.
- Only 32% of agricultural landholders in Malawi are women, highlighting gender inequities in land ownership and access to resources.



## Karonga:

- **Agriculture:** Located in northern Malawi near the border with Tanzania, the Karonga district is predominantly agricultural, with farming being the main economic activity for the local population. The primary crops include maize (corn), tobacco, rice, groundnuts and various vegetables. Livestock farming, particularly cattle rearing, is also practiced, contributing to food security and income generation for households.
- **Climate:** Karonga experiences a subtropical climate, characterized by distinct wet and dry seasons. The rainy season typically occurs from November to April, with the heaviest rainfall usually between December and February. The dry season, from May to October, is marked by cooler temperatures and lower humidity. During this time, irrigation is essential for sustaining agriculture.
- **Soil Context:** The soil in Karonga varies across the district, but it is generally fertile and suitable for agriculture. The predominant soil types include sandy loams and clay. Soil fertility management is crucial in Karonga, with farmers practicing techniques such as mulching, crop rotation and the use of organic fertilizers to enhance soil health and productivity.
- **Challenges:** Like many regions in Malawi, Karonga faces challenges related to climate change, including erratic rainfall patterns, droughts and occasional flooding during the rainy season. Soil erosion is also a concern in some areas, particularly on sloping terrain, which can lead to soil degradation and reduced agricultural productivity.

## Mzimba:

- **Agriculture:** Agriculture is the primary economic activity in Mzimba, another district in northern Malawi located northeast of Karonga. Agriculture supports the majority of livelihoods. The main crops grown are maize (corn), tobacco, groundnuts, rice, cassava and various vegetables. Livestock farming is also prevalent, with cattle, goats and chickens being raised for meat, milk and other products.



- **Climate:** The Mzimba district experiences a subtropical climate, characterized by distinct wet and dry seasons. The rainy season typically occurs from November to April, with peak rainfall between December and February. The dry season, spanning from May to October, features cooler temperatures and lower humidity. Irrigation is essential for sustaining agriculture during this period.
- **Soil Context:** The soils in Mzimba vary but are overall fertile and suitable for agriculture. Sandy loams, clay and loamy soils are common soil types. Soil fertility management practices, such as mulching, composting and crop rotation, are used by farmers to enhance soil health and productivity.
- **Challenges:** Like Karonga and other regions in Malawi, the Mzimba district is impacted by climate variability, including unpredictable rainfall patterns, droughts and occasional flooding. Soil erosion and land degradation are concerns in certain locations, especially on slopes and areas with intensive agricultural practices.

In response to these varied challenges and circumstances across Malawi and particularly in the Karonga and Mzimba districts, the Harvesting Prosperity and Resilience project adopts an integrated approach aimed at enhancing food security among vulnerable farming communities. By addressing the multifaceted needs of smallholder farmers in the two districts, the project endeavors to improve their livelihoods and strengthen their capacity to withstand shocks and stresses.



## PROJECT APPROACH

The Harvesting Prosperity and Resilience project recognizes there are a variety of factors influencing agricultural productivity and resilience. By addressing the root causes of agricultural vulnerability and promoting sustainable development, the project aims to be a catalyst for positive change and contribute to the long-term prosperity of smallholder farmers in rural communities in Malawi.

Throughout the project's implementation, there has not only been intentional emphasis on the importance of access to improved seeds, credit through village savings and loans associations, and extension services, but also promotion of sustainable farming practices and climate-smart agriculture. The project has utilized targeted interventions and capacity-building activities to empower smallholder farmers in diversifying their income sources, adopting resilient farming techniques and mitigating the impact of climate change on their livelihoods. Project activities have included:

- Distribution of high-quality seeds to project participants.
- Training on nutrition, climate-resilient and labor-saving agriculture practices, and post-harvest processing.
- Establishment of village saving and lending associations as a way for project participants to pool their savings, make loans within their group and benefit from the interest paid back on the loans.

In 2022, the project also developed and began implementing the Makwelero steps. This adapted approach is utilized for implementation of extension programs and the promotion of climate-resilient farming practices to ensure participants gain actionable knowledge on project topics.



## The Makwelerero Steps

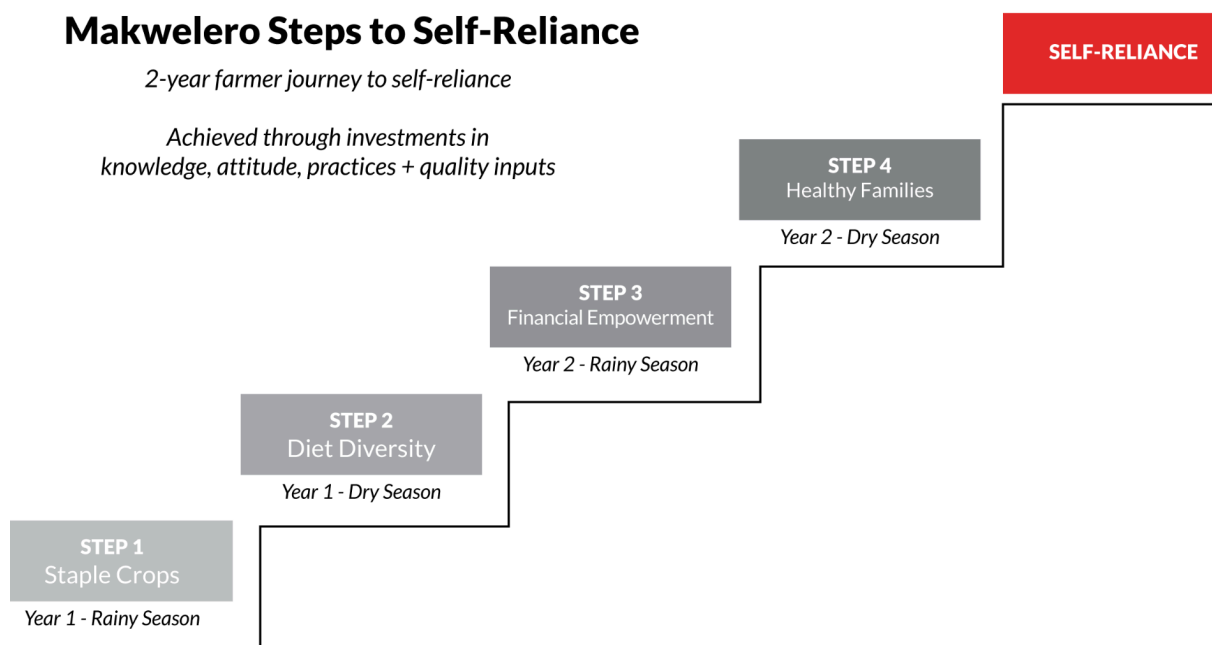
When the Harvesting Prosperity and Resilience project transitioned to the Makwelerero approach, it was a significant, intentional pivot. Recognizing the interconnectedness of factors influencing food security and resilience, the approach aimed to better address the multifaceted challenges faced by smallholder farmers in Karonga and Mzimba by integrating nutrition, health and financial empowerment components into project activities, rather than focusing solely on agricultural productivity.

The Makwelerero approach, which translates to "ladder" in the local Chichewa language, is a holistic and community-driven strategy. It utilizes a phased approach, building knowledge and skills over time, starting with increased crop production and dietary diversity, before moving into financial empowerment and advanced food processing topics. This promotes sustainable agricultural livelihoods, enhances food security and improves overall wellbeing. To foster self-reliance, participating farmers had to go through four steps of capacity building and graduated based on performance. The capacity-building initiatives were conducted in a cascading way, with farmers clustered into two groups and each group made up of a lead farmer and follower farmers. Lead farmers were trained firsthand by the project's field officers and government extension workers; the follower farmers were then trained by their group's lead farmers.

### Makwelerero Steps to Self-Reliance

*2-year farmer journey to self-reliance*

*Achieved through investments in knowledge, attitude, practices + quality inputs*





Utilizing the Makwelero approach, the Harvesting Prosperity and Resilience project expanded to include a broader range of interventions. Key elements of the Makwelero approach include:

- **Integrated Agriculture and Nutrition Training:** Recognizing the importance of nutrition-sensitive agriculture, the project increased its focus on promoting diet diversity, backyard gardening and conservation agriculture techniques that boost crop yields and improve dietary diversity and nutrition outcomes.
- **Financial Empowerment and Savings Groups:** In line with the Makwelero philosophy of promoting financial resilience, the project facilitated the establishment of Village Savings and Loan Groups to empower participants to save or earn enough cash to invest in quality seeds and other agricultural inputs.

<p style="text-align: center;"><b>Staple Crops</b></p> <p><b>Maximum yields for staple crops on available land.</b>  <b>Increase diversity of staple crops per household.</b></p> <p style="text-align: center;"><b>Activities:</b></p> <ul style="list-style-type: none"> <li>● Conservation Agriculture: Manure making, mulching, tree conservation, pit planting</li> <li>● Nutrition for the body</li> <li>● Portion sizes</li> <li>● MUAC &amp; malnutrition</li> <li>● Six food groups</li> <li>● Hygiene &amp; sanitation: Hand washing, compound planning</li> </ul>	<p style="text-align: center;"><b>Diet Diversity</b></p> <p><b>Households consume four or more food groups daily over the entire year.</b></p> <p style="text-align: center;"><b>Activities:</b></p> <ul style="list-style-type: none"> <li>● Backyard gardens</li> <li>● Conservation Agriculture: Crop rotation, intercropping</li> <li>● Post-harvest management</li> <li>● Grain banking</li> <li>● Seed saving</li> <li>● Goat rearing: Nutrition, housing</li> <li>● Six food groups</li> <li>● Nutrition for the body</li> <li>● Cooking demos</li> <li>● Aflatoxin prevention</li> <li>● Exclusive breastfeeding</li> <li>● Complementary feeding</li> </ul>
<p style="text-align: center;"><b>Financial Empowerment</b></p> <p><b>Participants save or earn enough cash to purchase quality seeds each season.</b></p> <p style="text-align: center;"><b>Activities:</b></p> <ul style="list-style-type: none"> <li>● Village savings and loans</li> <li>● Tree planting</li> <li>● Food preservation</li> <li>● Solar dryers</li> <li>● Six food groups</li> <li>● WASH: rubbish pits, Soak away pits</li> <li>● Aflatoxin prevention</li> <li>● Cooking demonstrations</li> </ul>	<p style="text-align: center;"><b>Healthy Families</b></p> <p><b>Reduction in household malnutrition</b></p> <p style="text-align: center;"><b>Activities:</b></p> <ul style="list-style-type: none"> <li>● Irrigation</li> <li>● Advanced food processing</li> <li>● Cash crops</li> <li>● Nutrition across the lifecycle: Adolescence, Elderly</li> <li>● Food safety practical</li> </ul>

- **Health and Hygiene Promotion:** Emphasizing the link between health and agricultural productivity, the project integrated hygiene and sanitation promotion activities into its interventions, including hand washing demonstrations, waste management and sanitation infrastructure improvements.
- **Community Engagement and Ownership:** The Makwelero approach prioritized community participation and ownership, empowering local communities to identify their needs, set priorities and drive the implementation of project activities. This participatory approach ensured that interventions were contextually relevant and sustainable.





- **Flexibility and Adaptability:** Unlike traditional project models, the Makweleri approach embraced flexibility and innovation, allowing the project team to adapt interventions based on participants' feedback and changing community dynamics. This iterative process of learning and adaptation facilitated the identification of effective strategies and the refinement of project activities over time.



# COMPARATIVE ANALYSIS

## Conservation Agriculture and Conventional Agriculture Results in Karonga and Mzimba

**Size of Land Cultivated Under Conservation Agriculture (Acres) and Size of Land Cultivated Under Conventional Agriculture (Acres)**

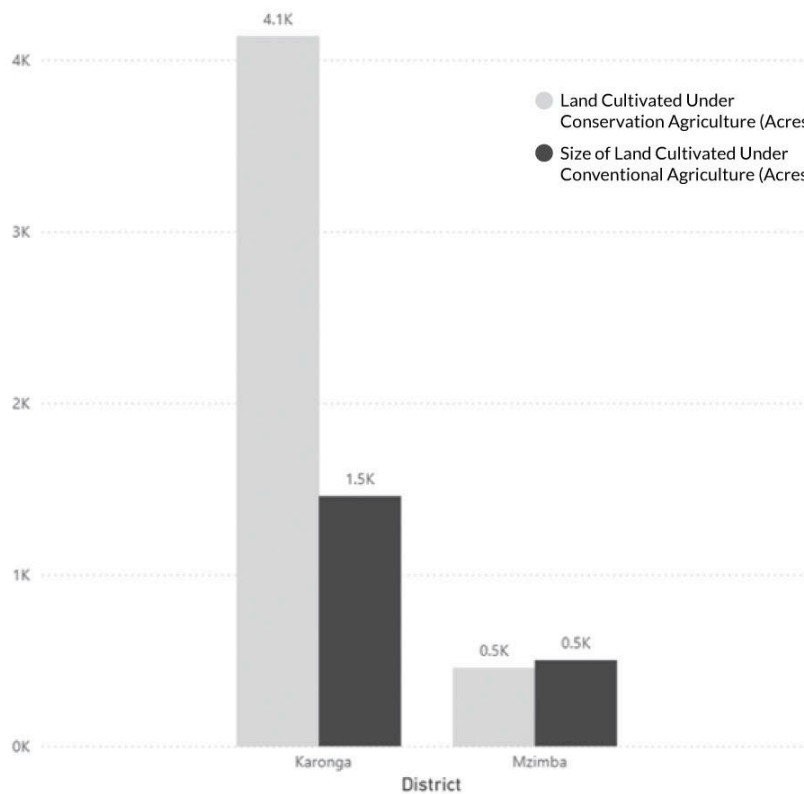


Figure 1: Adoption rate of conservation agriculture in both Karonga and Mzimba.



In Karonga, 4,100 acres of land were used for conservation agriculture in 2023, compared to 1,500 acres used for conventional agriculture. This shows a 73% adoption rate of conservation agriculture in the district.

In Mzimba, the use of conservation agriculture and conventional agriculture was more even, with conventional agriculture still slightly more preferred. Of the 1,000 acres cultivated in 2023, there was a 45% adoption rate of conservation agriculture.

This data shows that barriers to knowledge, attitude and practice of conservation agriculture are gradually being broken in both districts, with more dominance in Karonga.

### Seeds Planted Under Conservation Agriculture (KG) VS Seeds Planted Under Conventional Agriculture (KG)

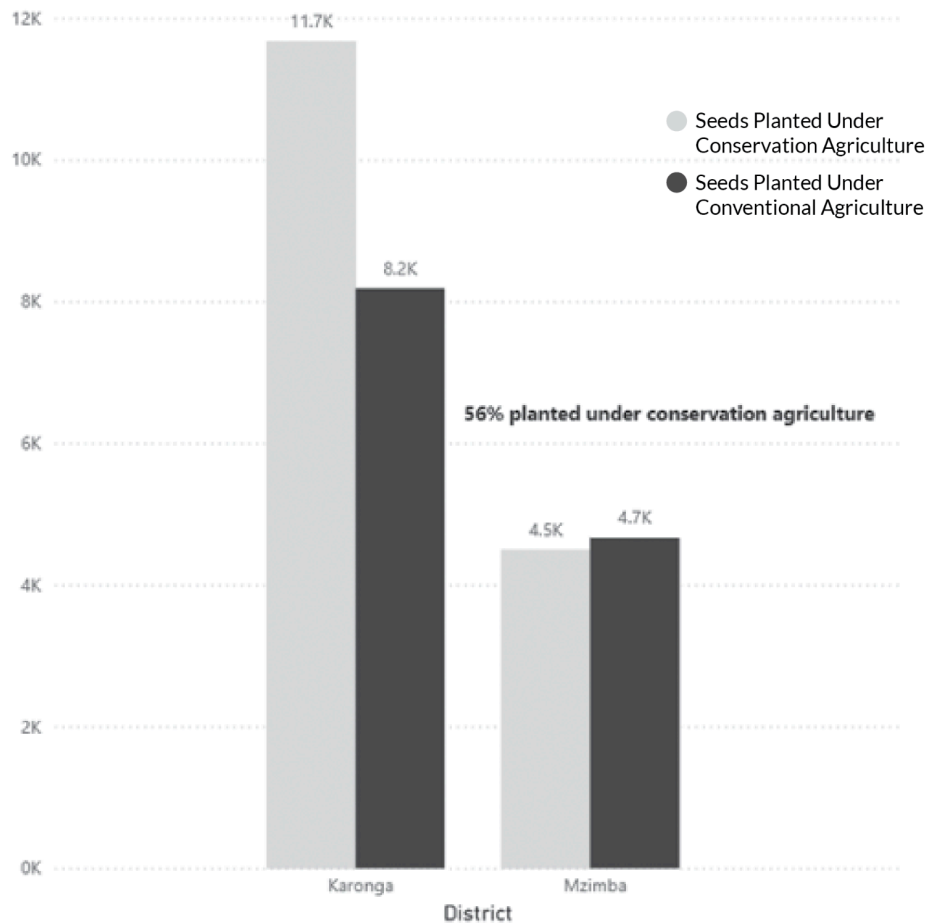


Figure 2: Seed allocation between conservation agriculture and conventional agriculture.



In Karonga, 19,900 kilograms of seeds were planted. Of those, 11,700 kilograms (59%) were planted on lands cultivated using conservation agriculture and 8,200 kilograms (41%) were planted in areas cultivated using conventional methods. Conversely, in Mzimba, 9,200 kilograms of seeds were planted, with 4,500 kilograms (49%) planted on land cultivated using conservation agriculture and 4,700 kilograms (51%) planted on land cultivated using conventional agriculture.

### Yield per KG Planted on Conventional Agriculture vs Yield per KG Planted on Conservation Agriculture

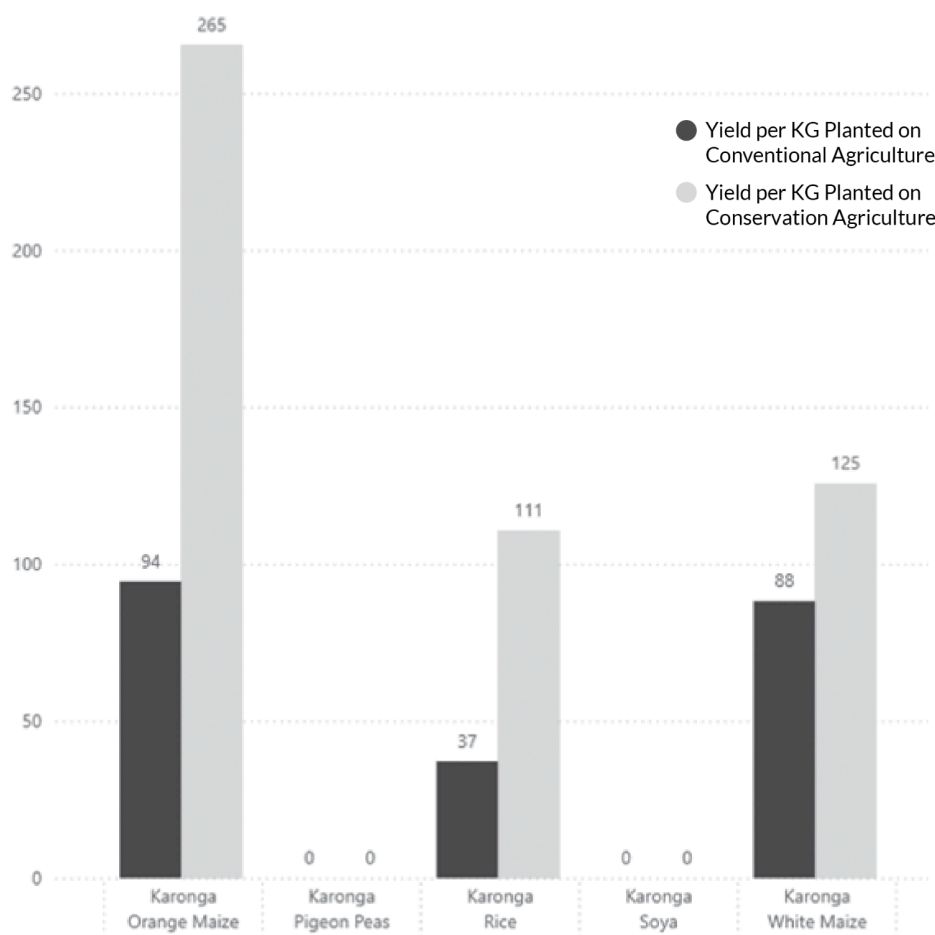


Figure 3: Yields in Karonga.



### Yield per KG Planted on Conventional Agriculture vs Yield per KG Planted on Conservation Agriculture

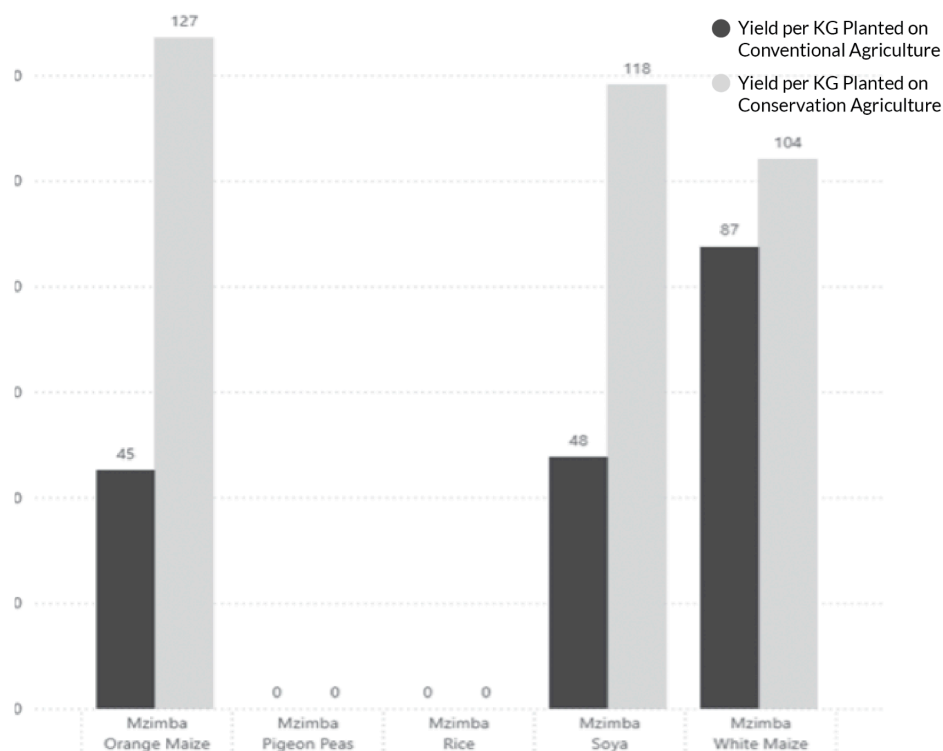


Figure 4: Yields in Mzimba.

The charts in Figures 3 and 4 are comparative analyses of yields per kilogram of seeds for a variety of crops planted in Karonga and Mzimba using conservation agricultural versus conventional agricultural techniques in 2023. While the results vary by crop – as detailed below – in each district, the overall results (shown in Figures 3 and 4) provide evidence of higher yields when conservation agriculture techniques are used.



## Karonga

For three crops measured in Karonga, the yields were between 50-200% higher when conservation agricultural techniques were used versus conventional agricultural techniques.

- **Orange maize:** With conventional techniques, there was an average yield of 94 kilograms for each kilogram planted. When conservation techniques were used, there was an average yield of 265 kilograms, an average increase of 171 kilograms, which is almost two times more, per kilogram planted.
- **White maize:** Conventional agriculture methods yielded an average of 88 kilograms for each kilogram of seeds planted. For seeds planted using conservation agriculture methods, the average yield jumped to 125 kilograms, showing an average variance of 37 kilograms and an increase of more than 50%.
- **Rice:** Conventional agriculture yielded an average of 37 kilograms per kilogram of seeds planted. In comparison, conservation agriculture yielded an average of 111 kilograms. An average variance of 74 kilograms, the yields from conservation agriculture were exactly 200% greater than with conventional methods.

## Mzimba

For three crops measured in Mzimba, the yields ranged from about 20-200% higher when conservation agricultural techniques were used versus conventional agricultural techniques.

- **Orange maize:** Orange maize was introduced as a nutrition intervention to address vitamin A deficiencies, one of the most common micronutrient deficiencies, observed in Mzimba. For each kilogram planted using conventional techniques, there was an average yield of 45 kilograms. For seeds planted using conservation agriculture, the average yield increased almost two times more to an average of 127 kilograms, a difference of 82 kilograms.
- **White maize:** While conventional agriculture methods had an average yield of 87 kilograms for each kilogram of seeds planted, seeds planted using conservation agriculture showed an average yield of 104 kilograms. This average variance of 17 kilograms is an increase of almost 20%.
- **Soya:** Conventional agriculture methods produced an average yield of 48 kilograms per kilogram planted. For each kilogram planted using conservation agriculture, the average yield increased to 118 kilograms, almost two times greater.



## Yield Under Conservation Agriculture (KG) vs Yield Under Conventional Agriculture (KG)

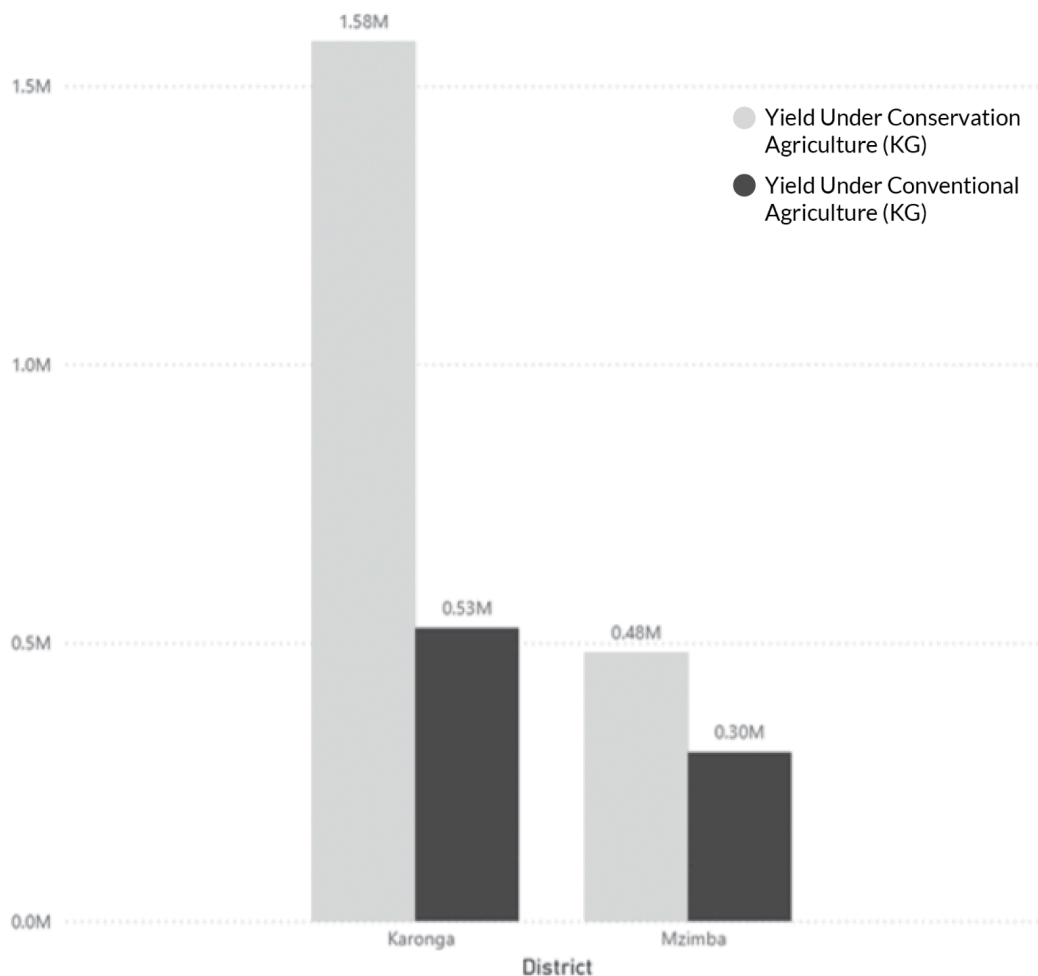


Figure 5: Aggregation of reported yields in conservation agriculture and conventional agriculture.

As shown above in the chart of the aggregation of yields for both conservation and conventional agriculture, almost 1.6 million kilograms (76%) of the overall yield of 2.1 million kilograms in Karonga resulted from conservation agriculture. Only 530,000 kilograms (24%) of the total yield came from conventional agriculture. In Mzimba, they also saw a higher percentage of the total yield come from conservation agriculture. With a total yield of 780,000 kilograms, 480,000 kilograms (62%) were from conservation agriculture and 300,000 kilograms (38%) were from conventional agriculture.



Additionally, it is important to note how much land was allocated for each method. In Mzimba, 45% of the total land allocated for agriculture utilized conservation agriculture methods, but that land accounted for 62% of the total yields. Similarly, in Karonga, 73% of cultivated land was allocated for conservation agriculture and accounted for 76% of the total yield. This evidence, along with the data shown in Figures 3, 4 and 5, proves that crops planted using conservation techniques tend to have higher yields. Even with less land and the same seed quantities, more food can be produced using conservation agriculture.

The high cost and limited accessibility of quality seeds are major hurdles for farmers. Many smallholder farmers are unable to afford the quantities of high-quality seeds needed to maximize their crop yields, so they find themselves trapped in a vicious cycle of low yields and insufficient produce, making it difficult to meet household needs, break even on farming costs and generate surplus crops to sell. Quality seeds are relatively expensive, and the high initial investment can be a significant financial burden. In addition, farmers frequently face challenges accessing seeds due to long distances to supply centers. This not only adds to their expenses, but it also limits how many seeds they can procure, further constraining their planting capacity and making them unable to plant enough crops to achieve high yields. The evidence from Mzimba and Karonga demonstrates that conservation agriculture offers a viable pathway for smallholder farmers in Malawi to enhance their productivity, economic stability and sustainability. By leveraging conservation agriculture techniques, farmers can overcome the challenges of high seed costs and limited accessibility, producing more food on less land and paving the way for a more secure and prosperous future.





## CHALLENGES IN ADOPTION OF CONSERVATION AGRICULTURE IN MZIMBA AND KARONGA

While the data shows that conservation agriculture supported increased crop yields with less land needed, it is important to note that there have also been challenges with using the Makwelero steps in the adoption of conservation agricultural techniques. The major challenges witnessed in the Mzimba and Karonga districts include:

- **Monitoring knowledge transfer:** Due to the cascade approach of the Makwelero steps that the project adopted, it became imperative for knowledge transfer from the lead farmers to the follower farmers to be accurate. However, due to each group's large number of participants (approximately 70 follower farmers per one lead farmer), it became quite challenging to monitor. To solve this challenge, the metrics evaluated were the knowledge change level of lead farmers and adoption level of follower farmers.
- **Mindset shift:** Adopting improved practices goes beyond sharing knowledge. We have noticed a barrier in attitude and practice. Some farmers are fearful of staking their only source of livelihood on practices that are alien to them, and others are reluctant to adopt due to cultural undertones that make them unsure where to draw the line between actual taboos and supposed taboos.
- **Weather-dependent practices:** In Karonga, the reliance on natural bodies of water for cultivation poses a significant challenge during adverse weather conditions, such as dry spells. Conservation agriculture is supposed to solve for these challenges, but protracted occurrences of drought have meant that is not always the case.



## CONCLUSION AND RECOMMENDATIONS

From the data and project's implementation of the Makwelero steps analyzed in this paper, we conclude with recognizing that real change happens over time. In Malawi, a lot of agricultural resource waste occurs due to lack of conservation agriculture knowledge and attitudes toward improved techniques and their implementation. While resources, especially land, are limited, achieving maximum benefits with the land that is available will, therefore, not be possible without the right mix of knowledge, attitude and practice.

This change in knowledge, attitude and practice takes time, and lasting agricultural change happens through localization. Hesitance and reluctance creep in when the materials are perceived to be out of reach through cost, distance of source, frequency of availability or due to being unknown/new to the local contexts. With this understanding, we have composed the following recommendations that can be applied to the Harvesting Prosperity and Resilience project as well as future agricultural initiatives in Malawi and other countries.

### Recommendations

- With the right approach for the relevant conservation agriculture techniques, knowledge transfer conducted in phases like through the Makwelero steps, and attitude and behavior changes regarding the adoption of these techniques, it could take less land to produce more food. For food security to be achieved, efficiency and effectiveness of agricultural resources must be prioritized.
- It is not a waste of time or resources to repeat activities, as some farmers participating in the Harvesting Prosperity and Resilience project only adopted techniques after repeated mentorship and monitoring.
- Identifying focal points among the farmers will be helpful for accountability. For example, the lead farmers in the Harvesting Prosperity and Resilience project train and monitor their follower farmers as part of the Makwelero approach. This enables the lead farmers to serve as agents of change and ownership locally.



- Piloting new agricultural practices with a fragmented reserved plot can be beneficial to drive adoption. It allows comparison on the same plot to be done in real time between areas that adopted conservation techniques and those that continued conventional techniques. With their firsthand experience, the farmers working on the fragmented plot can become key drivers of change in their communities.
- Materials used for innovations should be created and driven from local sources and readily available. For example, mulching can be done using dead leaves or groundnut shells that are easily accessible to the farmers.



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