

**STRENGTHENING SMALLHOLDER FARMER RESILIENCE, RESPONDING TO COVID-19  
AND  
ELIMINATING FOOD POVERTY**

---

**Emsizini Extension Planning Area, Northern Malawi**

**AN IMPACT EVALUATION REPORT**



*Client:*



**Tiyeni**

**P.O. Box 429, Mzuzu, MALAWI**

*Consultant:*

**Kabash Consultants**

**P.O. Box 20292, Mzuzu 2, Mzuzu  
MALAWI**

**Contact: Mr. Patrick Jambo  
M: (+265) 999 223 119  
E: [jambopats@gmail.com](mailto:jambopats@gmail.com)**

**June2023**

---

## TABLE OF CONTENTS

<b>LIST OF ACRONYMS .....</b>	<b>iii</b>
<b>LIST OF TABLES .....</b>	<b>iv</b>
<b>LIST OF FIGURES .....</b>	<b>iv</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>vi</b>
<b>CHAPTER ONE: INTRODUCTION.....</b>	<b>1</b>
<b>1.1. Location of Emsizini EPA .....</b>	<b>1</b>
<b>Figure 1: Location of Emsizini EPA.....</b>	<b>1</b>
<b>1.2. Tiyeni.....</b>	<b>2</b>
<b>1.3. Background of the Project .....</b>	<b>2</b>
<b>1.3.1. Objectives of the Survey .....</b>	<b>3</b>
<b>1.3.2. Scope of work of the Survey.....</b>	<b>4</b>
<b>Table 1: Evaluation criteria and the structure.....</b>	<b>5</b>
<b>CHAPTER TWO: METHODOLOGY.....</b>	<b>8</b>
<b>2.1. Evaluation design .....</b>	<b>8</b>
<b>2.2. Sampling technique.....</b>	<b>8</b>
<b>2.3. Data collection methods.....</b>	<b>9</b>
<b>2.3.1. Household Survey .....</b>	<b>9</b>
<b>2.3.2. Focus Group Discussions (FGD).....</b>	<b>10</b>
<b>2.3.3. Key Informant Interviews (KII) .....</b>	<b>10</b>
<b>2.3.4. Field Observations .....</b>	<b>10</b>
<b>2.4. Data Analysis.....</b>	<b>10</b>
<b>Figure 2: Summary of survey approaches.....</b>	<b>11</b>
<b>2.5. Limitations of the Survey .....</b>	<b>11</b>
<b>CHAPTER THREE: EVALUATION FINDINGS.....</b>	<b>12</b>
<b>3.1. Introduction.....</b>	<b>12</b>
<b>3.2. Demographic and Socio-economic characteristics.....</b>	<b>12</b>
<b>Figure 3: Age group structure of the evaluation survey respondents.....</b>	<b>12</b>

<b>Table 2: Sociodemographic characteristics of smallholder farmers in the project area .....</b>	<b>13</b>
<b>3.3. Relevance .....</b>	<b>14</b>
<b>3.3.1. Project appropriateness to beneficiary needs .....</b>	<b>15</b>
Box 1: Appropriateness of Strengthening Smallholder Farmer Resilience, Responding to COVID-19 and Eliminating Food Poverty Project in Emsizini EPA .....	15
<b>3.4. Effectiveness .....</b>	<b>15</b>
<b>3.4.1. Performance on project goal .....</b>	<b>16</b>
<b>3.4.2. Performance on project outcome .....</b>	<b>17</b>
<b>Figure 6: Climate-smart Deep Bed Farming Practices .....</b>	<b>19</b>
<b>3.4.3. Performance on project output .....</b>	<b>19</b>
<b>3.5. Sustainability .....</b>	<b>19</b>
<b>3.6. Impact .....</b>	<b>20</b>
<b>3.6.1. Crop yields increased in the project area - 50% minimum .....</b>	<b>21</b>
<b>Table 3: Soya yield before and after DBF .....</b>	<b>22</b>
<b>Figure 9: Increased income arising from improved production .....</b>	<b>24</b>
<b>3.6.3. Food security will be improved by 40% .....</b>	<b>24</b>
<b>Table 4: Household Coping Strategy Index (CSI) .....</b>	<b>25</b>
<b>CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>26</b>
<b>4.2. Conclusions .....</b>	<b>26</b>
<b>4.3. Recommendations .....</b>	<b>26</b>
<b>APPENDICES .....</b>	<b>27</b>
<b>Appendix 1: Household Questionnaire .....</b>	<b>27</b>
<b>Appendix 2: Focus Group Discussion Checklist .....</b>	<b>35</b>
<b>Appendix 3: Key Informant Interview Checklist .....</b>	<b>35</b>

## **LIST OF ACRONYMS**

ADD	Agricultural Development Division
AEDO	Agriculture Extension Development Officer
DBF	Deep Bed Farming
EPA	Extension Program Area
PPE	Personal Protective Equipment
FGD	Focus Group Discussion
KII	Key Informant Interview
MWK	Malawi Kwacha
HH	Household

## **LIST OF TABLES**

Table 1: Evaluation criteria and the structure .....	5
Table 2: Sociodemographic characteristics of smallholder farmers in the project area .....	13
Table 3: Soya yield before and after DBF .....	22
Table 4: Household Coping Strategy Index (CSI) .....	25

## **LIST OF FIGURES**

Figure 1: Location of Emsizini EPA.....	1
Figure 2: Summary of survey approaches .....	11
Figure 3: Age group structure of the evaluation survey respondents .....	12
Figure 4: Smallholder farmers received capacity building in DBF .....	16
Figure 5: FGD with smallholder farmers in Baula section .....	18
Figure 6: Climate-smart Deep Bed Farming Practices .....	19
Figure 7: Maize yield before and after DBF .....	21
Figure 8: Smallholder farmer income after adopting DBF.....	23
Figure 9: Increased income arising from improved production.....	24

## ACKNOWLEDGEMENTS

Kabash Consultants would like to express its gratitude to all stakeholders that participated in an Impact Evaluation Survey of the Strengthening smallholder farmer resilience, responding to COVID-19 and eliminating food poverty project in Emsizini Extension Planning Area (EPA), Mzimba District, Northern Malawi implemented by the Tiyeni. The consultations were held with Project Beneficiaries, Agriculture Extension Development Officer (AEDO) and Community Groups in Emsizini EPA.

Kabash Consultants would also like to appreciate the efforts of Tiyeni Project management team, in particular the Country Director, the Monitoring and Evaluation (M&E) officer, the Project Manager and the Field Officer for their guidance and coordination as well as their support provided during the assignment.

In a special way, Kabash Consultants would like to commend all those who participated in the household survey, key informant interviews and focus group discussions for their commitment and dedication throughout the entire period of data collection.

The views and opinions expressed in this report remain those of the author and do not represent the views of the Tiyeni.

**Kabash Consultants**

**E-mail: [jambopats@gmail.com](mailto:jambopats@gmail.com)**

**Cell: +265999223119**

---

## EXECUTIVE SUMMARY

Tiyeni engaged Kabash Consultants to undertake the Project Impact Evaluation for the strengthening smallholder farmer resilience, responding to COVID-19 and eliminating food poverty project in Emsizini EPA, Mzimba District, Northern Malawi. This Report presents the main findings of the Impact Survey in terms of the performance of the Project.

The purpose of an impact evaluation survey was to assess the impact made by the Project towards achieving the project goal ‘*to provide farmer training how to improve crop yields substantially, leading to the elimination of food insecurity*’. An impact evaluation survey has outlined the change made by the project to improved farmers' household food security, incomes and livelihoods, including better health outcomes of the project beneficiaries from the time of its inception to the present; provided a comprehensive assessment on effectiveness, relevance, sustainability and impact of the project and, provided recommendations on areas where the project did well or did not do well.

To adequately address the scope of the assignment, the approaches of an impact evaluation survey collected both qualitative and quantitative data. Principally, the approach involved extensive review of the existing literature; key informant interviews with stakeholder at EPA level; focus group discussions with communities and a household survey. The household survey randomly sampled a total of 178 households in the project impact areas. These approaches were also complemented by direct field observations.

The key findings of the survey have been aligned to the scope of work specifically on the effectiveness, relevance, sustainability and impact of the project:

### *a. Effectiveness*

The project evaluation survey found that the project activities were relevant as they addressed 5 needs, aligned to the project goals. This was proved by an increase on the percentage and counts of the project targets and compared to what was achieved before practicing Deep Bed Farming

method. The evaluation study revealed that income of most (78%) smallholder farmers made from surplus yield has increased that has contributed to poverty reduction in the project area. Since the inception of the project, 69% of smallholder farmers were not practicing any food coping strategy indicating increased food security. The evaluation indicated an improved health and nutrition of 44 households through consumption of variety of food nutrients from crops achieved from practicing intercropping. Notably, female empowerment in the project area has been addressed by the project. For example, out of 72 lead farmers, 46 were female. This project has reduced land damage, control surface run-off and protect biodiversity in and around the project area as 90% of smallholder farmers in the project area were practicing sustainable climate-smart Deep Bed Farming methods which support climate smart agriculture.

***b. Relevance***

The project was relevant in addressing project needs including poverty reduction, increased food security, improved health and nutrition, female empowerment and climate change resilience which are directly supporting SDGs 1, 2, 3, 5 and 13 respectively.

***c. Sustainability***

The project has trained smallholder farmers from 72 villages in the project area. This knowledge transfer ensures continued implementation of the DBF method in Emsizini EPA. Further, the project has built the capacity of smallholder farmers in Deep Bed Farming (DBF) method in the project area and selected 72 lead farmers representing each trained village. Lead farmers will support sustainability of the project interventions in the project area by providing technical support in the implementation of DBF.

***d. Impact***

The project has a remarkable positive impact in the project area. Malawi was one of the countries affected by COVID-19. According to WHO (2023), from January 2020 to May 2023 88,653 COVID-19 cases were confirmed with 2,686 deaths and a total of 8,168,028 vaccine doses have been administered. The project also responded to COVID-19 pandemic in Emsizini EPA by providing Personal Protective Equipment (PPE), and training smallholder farmers in hygiene and social distancing through meetings organized to distribute PPEs. Further, the project lobby and



advocate for limiting group meeting and distant traveling when the disease was at its peak. Project interventions on COVID-19 in Emsizini had a positive impact in smallholder farmers that no COVID-19 case was recorded among smallholder farmers since the inception of the project except relatives to farmers and those in town.

Since the inception of the project in Emsizini, maize crop yield at 1.4 acres has increased by 89% exceeds the minimum 50% project target on crop yield increase. On average, the evaluation study revealed that before DBF smallholder farmers were realizing MWK 67,500.00 (~£54) from surplus yield realized on 1.4 acres. Since the inception of DBF method, 78% of smallholder farmers started earning an average amount of MWK 192,000.00 (£154) from surplus yield realized on the same piece of land of 1.4 acres. The study analysis showed that majority (69%) of households were not practicing any food coping strategy since the inception of DBF due to improved crop production hence able to have food for the whole year. Further, Coping Strategy Index (CSI), a measure of food insecurity had a lower smallholder farmers household CSI (15) indicating a mild food insecurity in the project area realised after adopting DBF which has increased crop yield.

#### *e. Recommendations*

The study revealed that through DBF method smallholder famers yield, income has increased with reduced food insecurity. However, there is a need for more measures to ensure sustainability of the project interventions. Therefore, it recommended that the project should build capacity of considerable number of Agricultural Extension Development Officers (AEDOs) in DBF to ensure its sustainability.

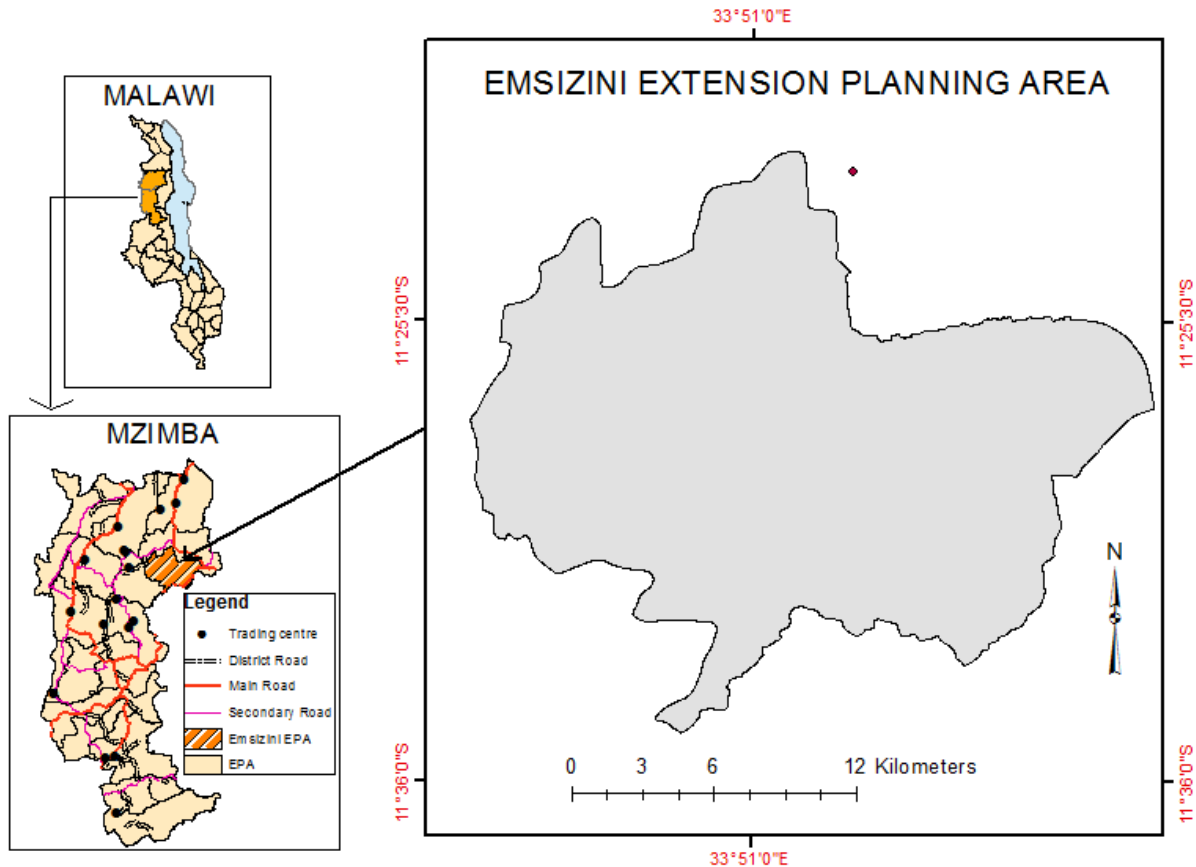
The study revealed that through DBF method smallholder farmer yields, and income have been increased resulting in reduced food insecurity. Therefore, there is a need for more areas to be considered. Therefore, it is recommended that the project should provide a comprehensive capacity building of AEDOs in DBF in the other Emsizini sections to ensure sustainability.

## CHAPTER ONE: INTRODUCTION

Tiyeni Limited engaged Kabash Consultants to conduct an end of project evaluation for the Strengthening Smallholder Farmer Resilience, Responding to COVID-19 and Eliminating Food Poverty in Malawi. The results of the survey have been presented in this report that are aligned with the effectiveness, relevance, sustainability, and the impact that the project has made:

### 1.1. Location of Emsizini EPA

The EPA forms part of the nine of Ministry of Agriculture extension planning areas in Mzimba north which is under Mzuzu Agricultural Development Division (MZADD). Emsizini EPA lies between  $11^{\circ} 25' 48''\text{S}$ ,  $33^{\circ} 48' 56''\text{E}$  North and  $11^{\circ} 26' 49''\text{S}$ ,  $33^{\circ} 50' 30''\text{E}$  South. The EPA is about 25km from Mzuzu City. Figure 1 shows the map of the project area.



**Figure 1: Location of Emsizini EPA**

The survey was administered to 178 smallholder famers from the following 5 sections: Emsizini, Baula, Kafulufulu, Chiwiri and Enyizini.

## **1.2. Tiyeni**

Tiyeni is a non-profit limited company registered as a local non-governmental charitable organization with the governing body in Malawi; CONGOMA. The principal object of Tiyeni is the alleviation and eventual eradication of poverty and hunger in Malawi and neighboring countries through the training and education of farming communities with particular concern for the conservation of natural resources.

Tiyeni developed and now promotes Deep Bed Farming (DBF) - a low-cost, low-tech set of farming practices - with minimal inputs or handouts, using a demand-led model of only responding to requests for assistance from farming communities. The main objectives are for farmers' household incomes and livelihoods to be improved, including better health outcomes through improved nutrition as a result of improved crop yields in quality and quantity.

Since 2017 Tiyeni has scaled up and now operates in all three regions of Malawi – North, Central and South. The DBF method is a tried and tested innovation which by June 2020 had been adopted by over 17,500 farmers and since then has increased to over 30,000 farmers.

## **1.3. Background of the Project**

Tiyeni Limited in partnership with Tiyeni Fund UK implemented a project called Strengthening smallholder farmer resilience, responding to COVID-19 and Eliminating Food Poverty in Emsizini Extension Planning Area, Mzimba District, Northern Malawi. The project grant has enabled a new 'Hotspot' project established in Emsizini EPA. Further, project activities have effectively responded to COVID-19.

Smallholder farmers in the project area were unable to access vital agricultural information, technical support, or inputs to achieve self-sufficiency. Through a structured but responsive approach of community engagement, empowerment and capacity building, based on prior experience and consultation with local leaders and stakeholders, the project utilized a holistic package. This resulted in the achievement of the project outcome of increased utilization of the Deep Bed Farming method in Emsizini area. Through the outcomes and outputs, farmers'

household food security, income and livelihoods, health and nutrition have improved and transformed.

### **1.3.1. Objectives of the Survey**

The aim of the evaluation survey was to assess the change made by the project towards achieving the project goal of improving crop yields substantially and leading to the elimination of food insecurity in Emsizini EPA through provision of capacity building in sustainable climate smart Deep Bed method of farming. Specifically, the project activities were aligned to the following goals:

- i. **Poverty reduction (Goal 1. No Poverty)** - Deep Bed Farming reduces farming expenses, frees up farmers' time to be spent on other activities and ultimately increases income.

Poverty is the main reason for children in Malawi failing to complete primary education so as incomes in the project area increase, we expect completion rates for primary schooling to increase.

- ii. **Increased food security (Goal 2. Zero Hunger)** – Project activities lead to food security for beneficiary households, with sustainable agriculture that rebuilds soils. Families using Deep Bed Farming (DBF) typically consume an extra meal per day compared to farmers growing crops conventionally. The benefits will spread to indirect beneficiaries through peer to peer learning and local project events.

- iii. **Improved health and nutrition (Goal 3. Good Health and Well-being)** – Better health outcomes are achieved through improved nutrition as a result of improved crop yields in quality and quantity. Access to basic education, health and nutrition are cross cutting issues. 23% of all child death cases in Malawi are related to under-nutrition; 37% of children in Malawi are affected by stunting. Completion rates for primary schooling for girls can be important in reducing early marriage and child pregnancies, which has an intergeneration impact on the number of stunted children.

Health of children in the project area will be enhanced, and we anticipate infant and child mortality will be lower where we work than in the non-project areas monitored.

Advice and guidance on protection against the Covid-19 virus will be given alongside the training and a capacity building programme.

- iv. **Female empowerment (Goal 5. Gender Equality)** - We will encourage participating females into leadership roles and provide essential farming inputs. Our staff will create awareness in Emsizini communities of the importance of female farmer participation in decision making in agriculture activities.
- v. **Climate change resilience (Goal 13. Climate Action)** - Tiyeni's methods help farmers deal with the effects of climate change by making crops and soils more resilient and storing water more effectively. Properly treated soils, and growing of a wider variety of crops, can directly help to mitigate climate change too. This project will reduce land damage, control surface run-off and protect biodiversity in and around the project area.

### **1.3.2. Scope of work of the Survey**

As indicated by Tiyeni, the evaluation addressed 4 key evaluation criteria mainly on effectiveness, relevance, sustainability and impact of the project.

#### **a) Effectiveness**

Is the project delivered its intended objectives? This includes, but not limited to, the following:

- The extent to which the programme activities/outputs reached intended beneficiaries.
- The major factors influencing the achievement/non-achievement of the project objectives.

#### **b) Relevance**

- How relevant is the project to the priorities of the target beneficiaries?
- The extent to which the project is addressing and meeting the needs of the beneficiaries.

#### **c) Sustainability**

- What are the major factors influencing the sustainability of the project and how can they be strengthened?
- To what extent can the project results be maintained after the end of the project?

**d) Impact**

- What impact has the project contribute to the project beneficiaries and, where necessary, provide recommendations to ensure consolidation of such impact.

The project evaluation also reviewed the progress and results achieved by the project during the implementation period. The evaluation assessed the contribution that the project has made towards its stated goal and objectives. Table 1 shows the evaluation criteria and the structure.

**Table 1: Evaluation criteria and the structure**

**Evaluation Framework – Program aspects and evaluation questions**

<b>Program aspect</b>	<b>Evaluation questions</b>	<b>Evaluation dimension</b>	<b>Data collection methods</b>
<b>a. Effectiveness: Is the DBF program delivered its intended objectives?</b>  <b>Extent to which planned outcomes were delivered at the end of the project.</b>	What achievement/s does the project made to the project’s objectives (outcomes)?	<b><i>Increased crop yields (50% minimum):</i></b> <ul style="list-style-type: none"> <li>• What is the current crop production of your household?</li> <li>• Do the households feel that they have access to food?</li> <li>• Would your house remain safe of food year round?</li> <li>• Do the household yield change brought about DBF?</li> </ul>	<ul style="list-style-type: none"> <li>• Key informant interviews</li> <li>• Focus Group Discussion</li> <li>• Field visits</li> <li>• Desk review (project reports)</li> </ul>
	What extent to which the project	<b><i>Improved food security (40%):</i></b> <ul style="list-style-type: none"> <li>• Does the household use improved agriculture technologies?</li> <li>• Does the household use DBF method?</li> </ul>	

	activities/outputs reached intended beneficiaries?	number of delivered activities/outputs.	<ul style="list-style-type: none"> <li>• Key Informant Interviews</li> </ul>
	What major factors influencing the achievement/non-achievement of the project objectives.	<ul style="list-style-type: none"> <li>• Improved agriculture extension services.</li> <li>• Improved knowledge management.</li> <li>• Farmer-led experiential learning.</li> <li>• Improved farming method (DBF).</li> </ul>	<ul style="list-style-type: none"> <li>• Household Interviews</li> <li>• Focus Group Discussion</li> <li>• Key Informant Interviews</li> </ul>
<b>b. Relevance</b>	How relevant is the program to the priorities of the target beneficiaries?	<ul style="list-style-type: none"> <li>• Increased financial capital.</li> <li>• Increased physical capital.</li> <li>• Increased social capital</li> <li>• Increased human capital</li> </ul>	<ul style="list-style-type: none"> <li>• Focus Group Discussion</li> <li>• Key Informant Interviews</li> </ul>
	<b>WHAT EXTENT TO WHICH THE PROGRAM IS ADDRESSING AND MEETING THE NEEDS OF THE BENEFICIARIES?</b>	<ul style="list-style-type: none"> <li>• Improved agriculture productivity (%).</li> <li>• Increased food security (%).</li> <li>• Increased income (%).</li> <li>• Increased DBF method (%).</li> </ul>	<ul style="list-style-type: none"> <li>• Household Interviews</li> <li>• Focus Group Discussion</li> <li>• Key Informant Interviews</li> </ul>
<b>c. Sustainability</b>	What are the major factors influencing the sustainability of the project and how can they be strengthened?	<p><i>Adaptive capacity in:</i></p> <ul style="list-style-type: none"> <li>• Improved agriculture productivity.</li> <li>• Improved knowledge management.</li> <li>• Increased DBF method.</li> <li>• Increased land sizes that the farmers are putting to the DBF</li> </ul>	<ul style="list-style-type: none"> <li>• Focus Group Discussion</li> <li>• Key Informant Interviews</li> </ul>
	To what extent can the project results be maintained after the end of the project?	<ul style="list-style-type: none"> <li>• Degree of capacity.</li> <li>• Accountability and knowhow in place at the time of evaluation.</li> </ul>	<ul style="list-style-type: none"> <li>• Household Interviews</li> <li>• Focus Group Discussion</li> <li>• Key Informant Interviews</li> </ul>
<b>d. Impact: Any impact achievements</b>	What impact have you realised	Improved agriculture productivity (increased yield)	<ul style="list-style-type: none"> <li>• Focus Group Discussion</li> <li>• Key Informant Interviews</li> </ul>

<p><b>reported by beneficiaries and, where necessary, provide recommendations to ensure consolidation of such impact.</b></p>	<p>following DBF interventions?</p>	<p>Improved knowledge management, agriculture extension services and farmer-led experiential learning.</p>	
		<p>Increased mitigation to climate change.</p>	
		<p>Improved adoption of DBF method.</p>	
		<p>Increased financial capital, physical capital, social capital and human capital</p>	



## **CHAPTER TWO: METHODOLOGY**

### **2.1. Evaluation design**

This was a cross sectional study. To exhaustively collect accurate, credible and valid evaluation data for the project, Kabash Consultants used a participatory mixed-method approach i.e. combination of qualitative and quantitative methodologies. The evaluation included but not limited to consultative and transparent approach with DBF internal and external stakeholders throughout the evaluation process. To assess the contribution of the project towards its stated objectives, two communities (DBF vs Non-DBF communities) were compared and looked at before and after DBF in the project area.

The triangulation-based evidence approach was utilised in this study which underpinned the validation and analysis, and eventually supported the conclusions and recommendations of the evaluation. Literature review of related documents was conducted in this study which constitutes an important aspect of the evaluation approach, primarily in relation to questions of programme management, coherence and synergies. Interviews were also conducted with Tiyeni staff directly connected to the project.

To answer the above evaluation questions, the evaluation approach used mixed methods and triangulation of information. Kabash Consultants selected this approach to ensure that the evaluation findings fully respond to the purpose of the evaluation. The methods included but not limited to the following:

- i. Review of existing documentation on the Strengthening smallholder farmer resilience, responding to COVID-19 and eliminating food poverty through DBF.
- ii. Analysis of DBF self-reported information, in particular the annual reports.
- iii. Semi-structured interviews with DBF and Non-DBF history farmers.
- iv. Focus Group Discussion, Key Informants Interview and direct observation during field visits in the project implementation area.

### **2.2. Sampling technique**

Kabash used a random sample size formula to come up with the sample size for the evaluation study. Slovin's formula (2006) was applied to calculate the sample size:

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

Where;

$n$  is the sample size

$N$  is population or the number of direct beneficiaries

$e$  is error tolerance of 0.05

Using 230 as direct beneficiaries of the Strengthening smallholder farmer resilience, responding to COVID-19 and eliminating food poverty project in Emsizini, the sample size of evaluation study was 178 smallholder farmers who practiced DBF in 2021/2022 and 2022/2023 growing.

### **2.3. Data collection methods**

Quantitative method which involved administering structured questionnaire (click [Household Questionnaire](#) to open) for household surveys was used to provide comprehensive and statistically valid data on stakeholders, program objectives and impacts. Open Data Kit (ODK) app. was used for data collection. Qualitative method of the evaluation involved beneficiary assessment through focus group discussions and project assessment through key informant interviews with stakeholders provided data for analysing beneficiaries' and stakeholders' views, opinions, and experiences, as well as institutional rules and behaviours including relevant documents.

#### **2.3.1. Household Survey**

The project evaluation survey included a survey of households to collect data on demographic and socio-economic characteristics; DBF knowledge, attitudes and practices; among others. A household questionnaire was administered to the smallholder farmers from Emsizini, Baula, Chiwiri, Kafulufulu and Enyizini sections. The household questionnaire was administered to knowledgeable smallholder farmers of 18 years old and above.

### **2.3.2. Focus Group Discussions (FGD)**

FGD of 8-12 smallholder farmers with similar backgrounds were facilitated in the project area to gain in-depth information on beneficiary views, perspectives, objectives, and impact. Participants were selected carefully to ensure that they were representative of the beneficiaries. During the FGD, issues related to effectiveness, sustainability and impact of the project were covered as well as women empowerment in lead farmer group participation.

### **2.3.3. Key Informant Interviews (KII)**

KII of 2 key stakeholders and 1 project implementer were conducted on deep dive of DBF in the project area. The KII involved a lead farmer, AEDO and Tiyei field officer. Key informants were purposively selected by targeting people with in-depth knowledge about DBF in the project area.

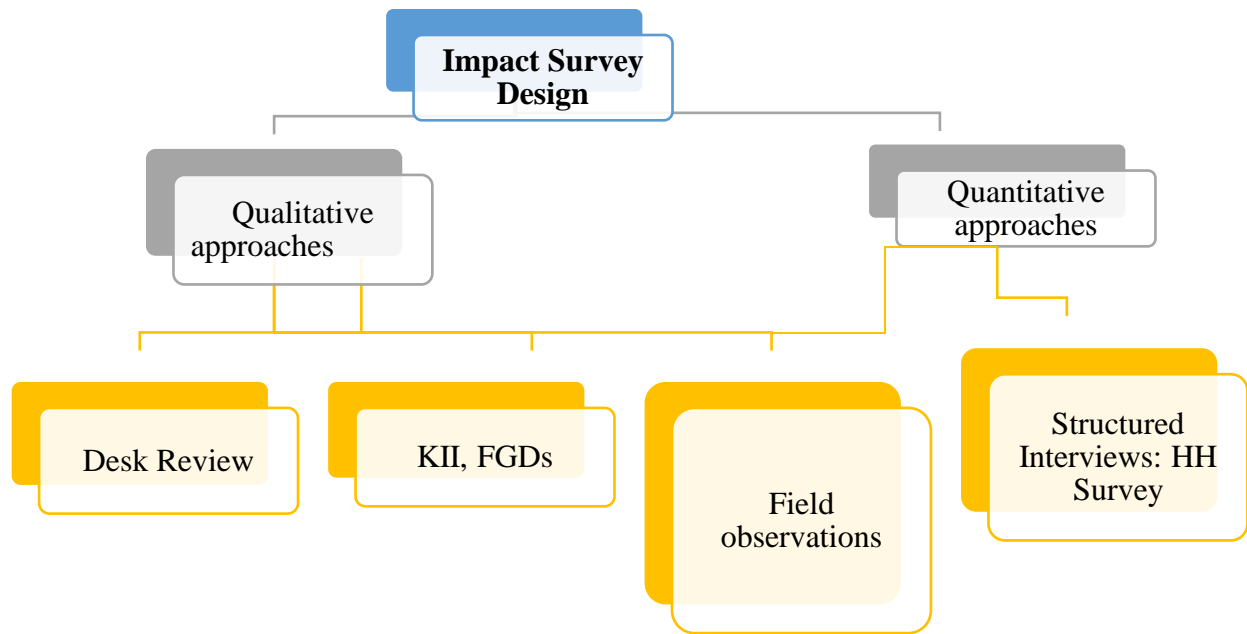
### **2.3.4. Field Observations**

Field observations were conducted within the project area which mainly focused on DBF fields. Pictures of DBF fields were taken during data collection to provide evidence on the practice of the method by smallholder farmers.

## **2.4. Data Analysis**

The study will have two distinct sets of data, quantitative and qualitative. Data cleaning, editing and coding will be done before analysis. The qualitative data from the Focus group discussions (FDGs) as well as key informant interviews will be transcribed and categorized into thematic areas and then summarized and documented in the report. Descriptive statistics for quantitative data will be analysed in Microsoft Excel. The outputs the analysis will then be carefully reported together.

Operationally, the impact Survey was conducted in a participatory manner by involving a wide range of project management team, stakeholders, and communities. The survey employed both quantitative and qualitative methods of data collection (Figure 2).



**Figure 2: Summary of survey approaches**

### **2.5. Limitations of the Survey**

There were no significant challenges faced during the survey apart from some rains that disrupted data collection for a day. Data collection continued for one more day to cover up for the rainy day.

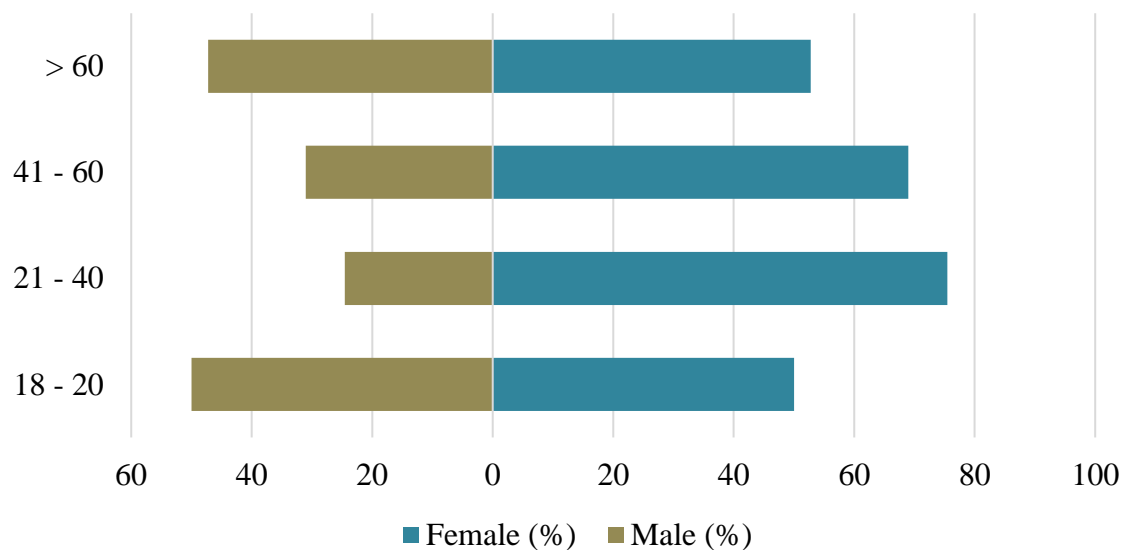
## CHAPTER THREE: EVALUATION FINDINGS

### 3.1. Introduction

The evaluation findings indicate the level of transformation that the project has made in the project area is lined to project' outcome indicators. The project results are organized based on a set of questions on socio-demographic characteristics, effectiveness, relevance, impact and sustainability.

### 3.2. Demographic and Socio-economic characteristics

The demographic and social-economic aspects of the households serve the purpose of describing the key characteristics of smallholder farmers that may have direct or indirect implications on the impact of the project interventions. The analysis indicated that 120 and 58 female and male smallholder farmers respectively participated in the evaluation study (Table 2). The majority (75) of female smallholder famers were within the age group of 21–40 years old. The study indicated the majority (50) of male smallholder farmers were within the age group of 18 – 20 years old. Figure3 shows age group structure of the survey respondents.



**Figure 3: Age group structure of the evaluation survey respondents**

The study results show that the occupation of most of household in the project area is farming with 93%, 79%, 74%, 100% and 75% in Emsizini, Baula, Chiwiri, Kafulufulu being smallholder

farmers. Only 1% of the respondents in Baula section and 2% of the respondents in Emsizini section had formal work and were students respectively.

The study results indicated that 80%, 85%, 87%, 92% and 94% of the household in Emsizini, Baula, Chiwiri, Kafulufulu and Enyizini sections respectively earned less than MWK 50,000.00 (~£40) per month. Further, 15%, 10%, 9%, 8% and 6% in Emsizini, Baula, Chiwiri, Kafulufulu and Enyizini sections respectively earned money between MWK 50,000.00 (~£40) to MWK 100,000.00 (~£80) per month. The analysis revealed that some of the households in the project area mainly from Emsizini (2%), Baula (4%), Chiwiri (4%) were able to make more than MWK 150,000.00 (~£120) per month.

The analysis revealed that 70%, 81%, 74%, 83% and 88% of smallholder farmers in Emsizini, Baula, Chiwiri, Kafulufulu and Enyizini sections respectively were married. The study analysis indicated a considerable percentage of smallholder farmers, 31% in Emsizini, 45% in Baula, 50% in Chiwiri, 25% in Kafulufulu and 64% in Enyizini had good health history since the inception of the project in Emsizini EPA. However, Chiwiri section indicated a high (29%) prevalence of Malaria, Emsizini section a high (54%) prevalence of dry cough and Kafulufulu section indicated a high prevalence of chronic diseases.

**Table 2: Sociodemographic characteristics of smallholder farmers in the project area**

Variable		Section				
		Emsizini (%)	Baula (%)	Chiwiri (%)	Kafulufulu (%)	Enyizini (%)
Gender	Male	28	38	13	33	44
	Female	72	62	87	67	56
Occupation	Farming	93	79	74	100	75
	Business	4	11	9	0	4
	Casual labour	0	6	9	0	0
	Working	0	1	0	0	0
	Student	2	0	0	0	0
	Other	0	2	9	0	0

Monthly income	<MWK 50,000 (~£40)	80	85	87	92	94
	MWK 50,000-100,000 (~£40 - £80)	15	10	9	8	6
	MWK101,000-150,000 (~£80 - £120)	2	1	0	0	0
	>MWK150,000 (~£120)	2	4	4	0	0
Level of education	None	9	2	4	0	0
	Primary	70	74	74	100	88
	Secondary	20	22	22	0	12
	Higher	2	1	0	0	0
Marital status	Single	2	1	0	0	0
	Married	70	81	74	83	88
	Divorced	0	4	0	0	0
	Separated	2	1	4	0	0
	Widowed	26	12	22	17	12
Common diseases	Chronic	15	3	7	25	0
	Diarrhoea	0	3	0	0	0
	Disability	0	0	7	0	7
	Dry cough	54	34	7	50	7
	Dysentery	0	0	0	0	14
	Malaria	0	14	29	0	7
	None	31	45	50	25	64

### 3.3. Relevance

Relevance is defined as the extent to which the objectives of the project remained consistent with the Country's needs, global priorities and partners' policies (OECD, 2008). Specifically, the Endline Survey assessed the extent to which the Project interventions conformed to the existing priorities, strategies and programmes in Malawi; alignment of the Project to the national policies and the extent to which the Project interventions met the needs and interests of the targeted

beneficiaries. In this regard, relevance was evaluated by examining the conformity of the Project strategies to the Country's strategies, Global goals and Organization needs.

### **3.3.1. Project appropriateness to beneficiary needs**

The results from Extension Development Officer (AEDO) revealed that the project design was appropriate in terms of strategic focus and alignment to government priorities and Mzuzu Agricultural Development Division (ADD) priorities. The AEDO cited the linkage between the goal and strategy of project to the national development priorities expounded in the MGDS I, Malawi 2063 Agenda as well as Tiyeni's principal objective (Box 1).

#### **Box 1: Appropriateness of Strengthening Smallholder Farmer Resilience, Responding to COVID-19 and Eliminating Food Poverty Project in Emsizini EPA**

- **MGDS I: Eradicate Extreme Poverty and Hunger**

The MDG target of reducing by half the proportion of people living in extreme poverty. The target aligns with Tiyeni's Poverty reduction (Goal 1. No Poverty) through Deep Bed Farming that reduces farming expenses, frees up farmers time to be spent on other activities and ultimately increases income. The AEDO mentioned that through the project, majority of smallholder farmers have realized increased income from DBF method which has extreme low cost of production.

- **MALAWI 2063, Pillar 1: Agricultural Productivity and Commercialization**

The pillar targets Agricultural Productivity which directly supports project object "*Crop yields will be increased in the project area*". The AEDO for Emsizini EPA mentioned that the project has led to high yield achieved by most of smallholder farmers which was not the same before the project.

- **Tiyeni's principal objective**

The principal objective is alleviation and eventual eradication of poverty and hunger in Malawi. Tiyeni's Field Officer indicated that through the project mainly the adoption of DBF, the poverty level and hunger in most of households have been dramatically reduced compared to the time when the project was not introduced.

### **3.4. Effectiveness**

Project effectiveness was looked at three levels: results on goal, outcomes and outputs generated by the Project at the time of the Survey. This was done by reviewing monitoring and evaluation reports, conducting interviews with stakeholders and undertaking a household survey.

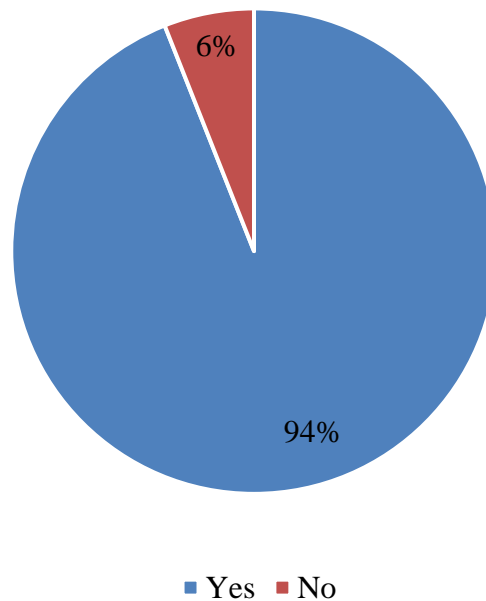


### 3.4.1. Performance on project goal

The goal of the project was to “provide farmer training on how to improve crop yields substantially, leading to the elimination of food insecurity”.

#### 3.4.1.1. Capacity building on how to improve crop yields substantially

Figure 4 shows percentage of smallholder farmers who received farmer training. The descriptive statistics indicated that the majority (94%) of smallholder farmers in the project area received capacity building on how to improve crop yields substantially, leading to the elimination of food insecurity.



**Figure 4: Smallholder farmers received capacity building in DBF**

Smallholder farmers in the project area mentioned that they have been trained in sustainable climate-smart Deep Bed Farming methods that help to maximize production. The areas of sustainable climate-smart Deep Bed Farming methods training were indicated by smallholder farmers:

- Breaking the hard pan
- Composting
- Deep and wide beds
- Zero tillage

- Contour terracing
- Intercropping
- Mulching and
- Other

The majority (71%) of smallholder farmers indicated that the trainings were offered by Tiyeni Field Officers while 29% of the farmers mentioned that the trainings were delivered by Agriculture Extension Officer for Emsizini EPA.

### **3.4.2. Performance on project outcome**

The project outcome was designed to deliver on utilization of the Deep Bed Farming method in Emsizini EPA measured using:

**3.4.2.1. Outcome indicator:** Number of farmers reached by hunger and nutrition sensitive agriculture interventions.

The evaluation study indicated that since the inception of the project, 44 households were practicing intercropping in the project area which was not the same before the project as only few smallholder farmers (<10) were growing more than one crop within the same growing season. Smallholder farmers who are practicing intercropping promoted by the project indicated that they were intercropping Maize, Soya beans, Common beans, Groundnuts, Cassava, Sweet potato and Cow Peas (Nkhunde).

*“During the focus group discussion, participants indicated that before the project most smallholder farmers were just grow only one crop mainly maize which had negative impact on hunger and nutrition. But the DBF method has promoted intercropping farming system which involve growing more than one crop in the same growing season. This has a reduced hunger and improved nutrition in households practicing intercropping as they can consume a healthy diet, which consists of a variety of nutrients(Baula section FGD)”.*

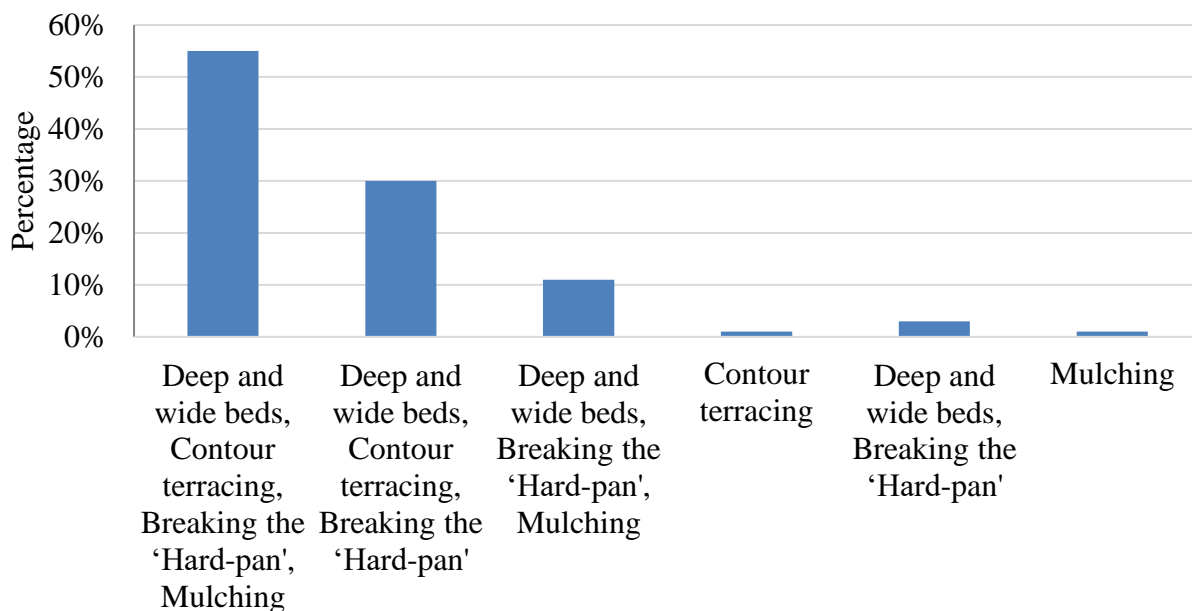
Figure 5 shows FGD conducted in Baula section.



**Figure 5: FGD with smallholder farmers in Baula section**

**3.4.2.2. Outcome indicator:** Number of people benefitting from interventions that are having a transformational impact on climate issues.

The study results indicated that 90% of smallholder farmers in the project area are practicing sustainable climate-smart Deep Bed Farming methods which are supporting climate smart agriculture. Figure 6 shows climate-smart Deep Bed Farming practices in Emsizini EPA. The majority (55%) of smallholder farmers in the project area was practicing climate-smart Deep Bed Farming included deep and wide beds, contour terracing, breaking the hard-pan and mulching. A considerable percentage (30) of smallholder farmers were practicing deep and wide beds, contour terracing, breaking the hard-pan while 11% were practicing deep and wide beds, breaking the hard-pan and mulching.



**Figure 6: Climate-smart Deep Bed Farming Practices**

### 3.4.3. Performance on project output

The Strengthening Smallholder Farmer Resilience, Responding to COVID-19 and Eliminating Food Poverty Project intends to train 60 lead farmers, 39 being female. However, the project has overachieved that 72 lead farmers have been trained; 46 are female and each lead farmer represents 1 village in the project area.

*“So far, the project has performed very well that 72 lead farmers have been trained in DBF method. Further, 72 villages in the project area have been trained in DBF method reaching out about 1500 smallholder farmers of which 900 smallholder farmers have benefited from the project interventions (Field Officer)”.*

### 3.5. Sustainability

The project evaluation survey noted that there were several measures put in place to ensure sustainability of the interventions supported by Strengthening Smallholder Farmer Resilience, Responding to COVID-19 and Eliminating Food Poverty Project. The evaluated study noted the following measures:

- The study revealed that the project adopted Integrated Village Training Approach (IVTA) that all villages were trained in DBF. However, the project selected 72 lead farmers (of which 46 were females) as representatives for the respective villages. Further the trainings offered in the project area were actively participated by 9 AEDOs from 9 sections which forms Emsizini EPA. This ensures sustainability of the project interventions as the number of trained lead farmers exceeded the project target number of 60 lead farmers, 39 being female lead farmers and the trained AEDOs will play a critical role in providing refresher sessions for continued utilization of DBF in Emsizini EPA.

*“Smallholder farmers trained through IVTA ensure that the DBF method will be used by the farmers in each growing season since the knowledge that has been conveyed to farmers will be still used in each growing season. Further, the selected lead farmers will provide technical support in the implementation of DBF method (Field Officer, KII)”.*

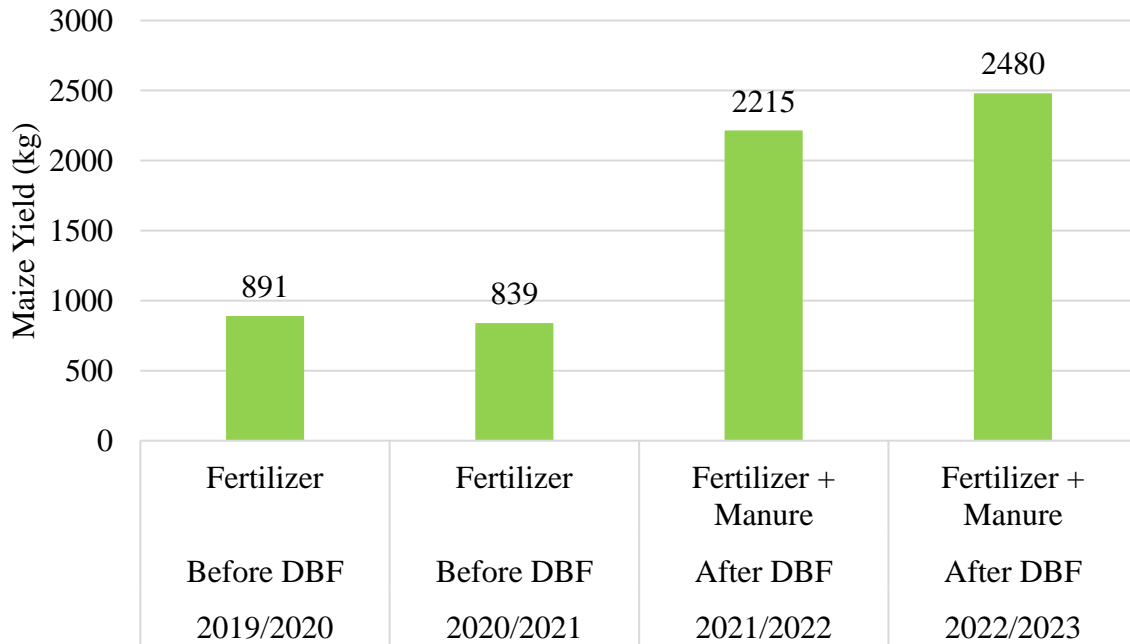
### **3.6. Impact**

Through DBF method, the Strengthening Smallholder Farmer Resilience, Responding to COVID-19 and Eliminating Food Poverty Project in Emsizini EPA has impacted the livelihoods of the project beneficiaries by achieving increased crop yields, increased income and improved food security. The project directly supported smallholder farmers during COVID-19 pandemic in several ways but not limited to:

- Access to Personal Protective Equipment (PPE) for the COVID-19 response such as masks, basins, cups, jug, plates, and liquid soap used by smallholder farmers reduced prevalence of the disease in the project area.
- Realizing high yield through application of manure as it was difficult to have access to fertilizer due to high cost and scarcity during COVID 19 pandemic.

### 3.6.1. Crop yields increased in the project area - 50% minimum

The results indicated that the majority (72%) of smallholder farmers commonly grow Maize with only 13%, 8% and 7% of smallholder farmers grow common beans, soya beans and other crops including ground nut, sweet potato, and cassava respectively. The evaluation study revealed that since the inception of the project in Emsizini, maize crop yield at 1.4 acres has increased by 89% exceeds the minimum increase by 39%.



**Figure 7: Maize yield before and after DBF**

Before DBF (2028/2019, 2019/2020 growing seasons) smallholder farmers were getting less maize yield of up to the average of 865 at 1.4 acres. The study shows that smallholder farmers realized increased maize yield after practicing DBF (2021/2022 and 2022/2023 growing seasons) and use of little fertilizer plus more manure of up to average of 2348 kilograms at the same piece of land of 1.4 acres.

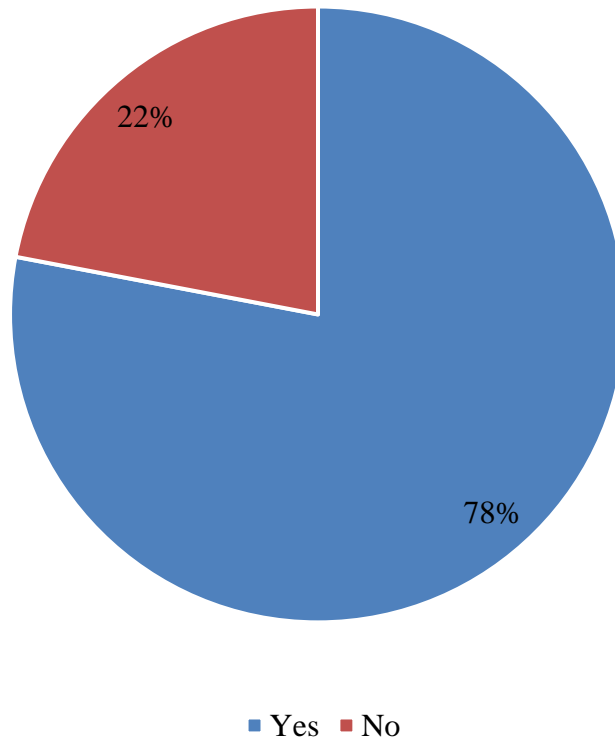
Table 3 shows Soya harvests before and after DBF by smallholder farmers in the project area. The evaluation study indicated that before the inception of the project in the project area smallholder farmer were realizing small quantity of soya yield of up to 100kg on a 0.4 acre per growing season. On the same piece of land smallholder farmers have realized an increase in soya yield of up to 570kg after practiced DBF method including the use of manure.

**Table 3: Soya yield before and after DBF**

Row Labels	Soya Yield (kg)
<b>Fertilizer only</b>	
<b>Before DBF</b>	
2019/2020	80
2020/2021	100
<b>Fertilizer + Manure</b>	
<b>After DBF</b>	
2021/2022	400
2022/2023	570

### **3.6.2. Increased income arising from improved production - 30%**

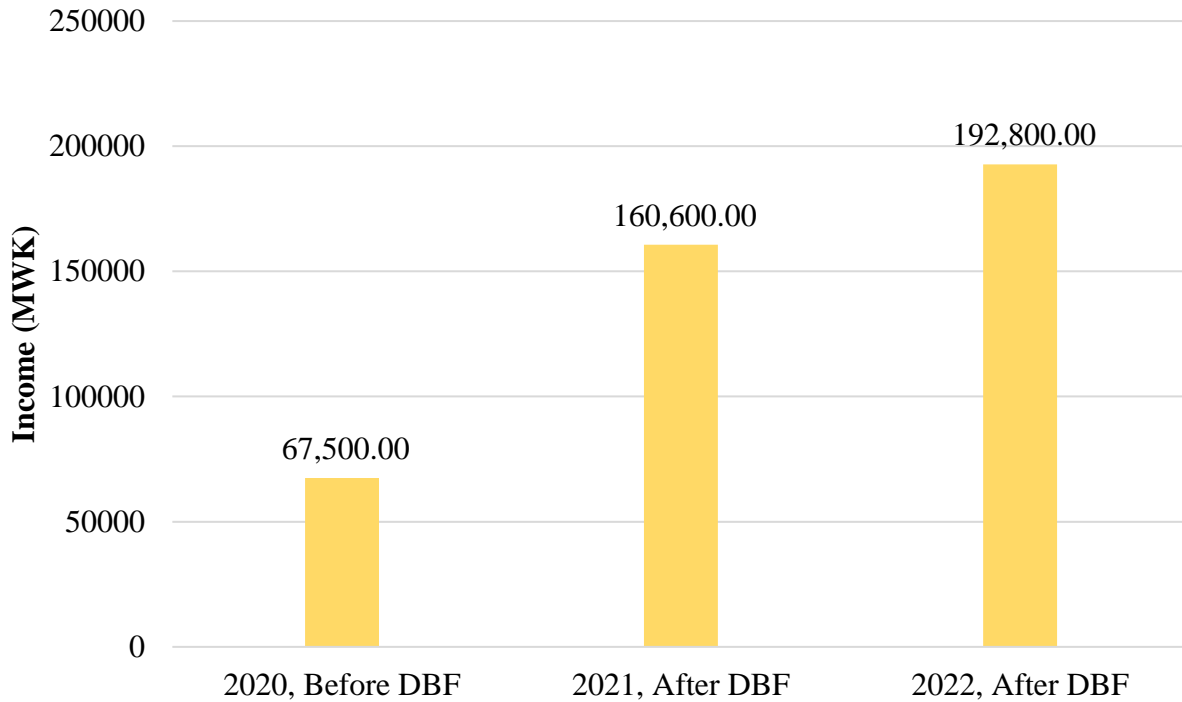
The majority (78%) of smallholder farmers in the project area indicated an increase in income mainly after adopting DBF that has improved crop production leading to surplus yield. This doubles the project target of 30% of smallholder farmers earning an increased income arising from improved production. Only 22% of smallholder farmers mentioned that though they have realized improved crop production they have not yet started enjoying surplus yield which they could sell to earn money.



**Figure 8: Smallholder farmer income after adopting DBF**

Figure 8, show income realized by smallholder farmers before and after DBF in Emsizini EPA. On average, the evaluation study revealed that before DBF smallholder farmers were realizing MWK 67,500.00 (~£54) from surplus yield realized on 1.4 acres. The analysis indicated that after adopting DBF, smallholder farmers started earning an average amount of MWK 192,000.00 (~£154) from surplus yield realized on the same piece of land of 1.4 acres.





**Figure 9: Increased income arising from improved production**

*“Smallholder famers in the project area acknowledged benefits realized from adopting DBF. Among other benefits include an increase in income arising from improved production. In 2021 and 2022, smallholder farmers made a huge profit from sales of surplus yield realized in the respective growing seasons. Further, smallholder farmers mentioned that income for most of smallholder farmers has doubled which was not the same before the inception of DBF in Emsizini EPA and smallholder farmers were not earning money due to decreased crop production. (Chiwiri section FGD with Smallholder Farmers)”.*

### **3.6.3. Food security will be improved by 40%.**

The study analysis showed that majority (69%) of households were not practicing any food coping strategy since the inception of DBF due to improved crop production as they were able to have food for the whole year. Only 31% of the households are still practicing food coping strategies which included: Eating foods that are less preferred, Limiting portion size, Temporary work for money and Harvest immature crops (Table 4). Copping Strategy Index (CSI), a measure of food insecurity had a lower smallholder farmers household CSI (15) indicating a mild food insecurity in the project area. Smallholder farmers who were practicing coping strategies when they ran out

of food were frequently eating foods which were less preferred but with least severity. Sometime, some of the smallholder farmers' households limit portion size with moderate severity.

**Table 4: Household Coping Strategy Index (CSI)**

<b>Coping Strategies</b>	<b>Raw Score</b>	<b>Severity Weight</b>	<b>Weighted Score =Frequency X weight</b>
Eating foods that are less preferred	7	0	0
Limiting portion size	5	2	10
Borrowing food or money to buy food	0	1	0
Maternal buffering	0	1	0
Skipping meals	0	0	0
Skipping eating for whole days	0	0	0
Given by friends/family	0	4	0
Work in exchange for food	0	2	0
Hunt/eat wild plants	0	0	0
Harvest immature crops	5	0	0
Send HH member to eat elsewhere	0	1	0
Temporary work for money	5	1	5
<b>AVERAGE HOUSEHOLD SCORE</b>			<b>15</b>

*“Before the inception of Tiyeni DBF in Emsizini EPA, the majority of the smallholder farmers were not producing enough yield due to poor husbandly practices resulted in food insecurity. Since the inception of DBF in Emsizini EPA, issues of food insecurity in most of the households have reduced as they are now able to maximize crop yield (Emsizini section FGD)”.*

## **CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS**

### **4.2. Conclusions**

To a large extent, the project has achieved its overall objective which was “combating hunger and poverty of smallholder farmers by realizing surplus crop yield which are sold for income in Emsizini EPA through provision of capacity building in sustainable climate smart Deep Bed method of farming”. The project reached out 1500 smallholder farmers in the project area and 900 farmers have benefited from the project. Further, the project has managed to meet the needs of smallholder farmers by decreasing household’s food insecurity by 10% (43.5% - 58.5%), improved farming practice by adopting Deep Bed Farming system (2.2%) and increased income (before DBF: MWK 38,824 / ~£31; after DBF: MWK 75,192 / ~£60) of small holder famers by realizing surprisingly high yields.

The project has managed to build the capacity of smallholder farmers from 72 villages in sustainable climate smart Deep Bed Farming method promoting good crop husbandry practice in the project area. These sustainable land management practices included contour terracing with closed ridge and furrows; mulching; manure making; breaking the hard-pan; zero tillage; intercropping; deep and wide beds and off-farm piggeries were adopted by smallholder farmers in the Emsizini EPA. This has resulted in reduced food insecurity, poverty, and increased income of smallholder farmers through the realization of surplus yields.

### **4.3. Recommendations**

The study revealed that through DBF method smallholder farmer yields, and income have been increased resulting in reduced food insecurity. Therefore, there is a need for more areas to be considered. Therefore, it is recommended that the project should provide a comprehensive capacity building of AEDOs in DBF the other sections to ensure sustainability.

The evaluation study has revealed that the project did not use conventional demonstration gardens in their relative sections but had very good impact using the Decentralized Demonstration Garden extension method (DDGem). It is therefore recommended that Tiyeni should intensify the use of the DDGem.

## APPENDICES

### Appendix 1: Household Questionnaire

*Data should be collected by interviewing knowledgeable members of households. Respondents should be informed that they were chosen through random selection and that their participation is voluntary. They are free to withdraw at any time without giving reasons and that the information obtained will be confidential.*

**Name of Enumerator** \_\_\_\_\_ **Date:** \_\_\_\_\_

Address of respondent: \_\_\_\_\_ District: \_\_\_\_\_

EPA : \_\_\_\_\_

TA : \_\_\_\_\_

GVH : \_\_\_\_\_

Village : \_\_\_\_\_

GPS Coordinate **X:** \_\_\_\_\_ **Y:** \_\_\_\_\_

#### A. HOUSEHOLD DEMOGRAPHIC DATA

Variable		Response (Use codes)				
Name of respondent/famer						
Sex		1=Male		2=Female		
Age of respondent		Years:				
Please give the number of people in each age category in your household.						
Age Group	Under 6 years old	7 - 18 Years old	19 - 40 Years old	41 - 60 years old	> 60 Years old	Total
<b>Male</b>						
<b>Female</b>						
<b>Total</b>						
Name of HH head						
Lead farmer		Yes <input type="radio"/>		No <input type="radio"/>		

Relationship with head	1=Mother 2=Farther 3=Grandmother 4=Grandfather 5=Daughter 6=Son 7=Uncle 8=Aunt 9=Respondent
Marital status	1=Single 2=married 3=separated 4=divorced 5=widowed
Education of respondent	1=None 2=Primary 3=Secondary 4=Higher
Occupation of respondent	1=Business 2=Working 3=Farming, 4=Casual 5=Fishing, 6=Student 7=Other
Monthly income	Continuous in MK:
Tribe of respondent	1=Khonde 2=Tumbuka 3=Chewa 4=Tonga 5=Labia 6=Swahili
Health status- common disease	1=Diarrhea 2=Scabies 3=Dry cough 3=Malaria 4=Dysentery 5=Cholera 6=Conjunctivitis 7=Chronic 8=Disability 9=None

## B. REDUCTION IN HOUSEHOLD'S FOOD INSECURITY (10% MINIMUM)

B1. How much food does your household have right now? First find out the quantity of each food in storage/reserve in local units e.g. bags, buckets, and bunches (**Food security**)

Type of food in store	Local units of measurement	No. of units	Estimated weight (kg) per local unit	Total kilograms
1. Maize (Whole grain)				
2. Cassava				
3. Millet				
4. Sweet potatoes				
5. Vegetables				
6. Beans				
7. Groundnuts				
8. Other foods (specify)				

B2. Does your household run out of food for the past 7 days?

Yes  No

B3. If yes to B2, what coping mechanisms do you use when your household runs out of food (food shortages)? 4 = Never (zero times per week); 3 = rarely (once or fewer times per week); 2 = sometimes (2-5 times per week); 1 = frequently (almost every day).

Question	Coping strategies	Frequency scoring
During the period of food shortage, how did your family obtain food?	Eating foods that are less preferred	
	Limiting portion size	
	Borrowing food or money to buy food	
	Maternal buffering	
	Skipping meals	
	Skipping eating for whole days	
	Given by friends/family	
	Work in exchange for food	
	Hunt/eat wild plants	
	Harvest immature crops	
	Send HH member to eat elsewhere	
	Temporary work for money	
Other (specify):		

B4. Does your household have any experience of increase in food security?

Yes  No

B6. If yes or no, what is your assessment on food status at your house during the years of Not Practicing and Practicing DBF? Use the following levels to define food insecure and food secure.

1. Food Secure 2. Mildly Food Insecure 3. Moderately Food Insecure 4. Severely Food Insecure

Not Practicing DBF			Practicing DBF		
2015	2016	2017	2018	2019	2020

B5. Does the adoption of the deep-bed farming system led to more household income being available?

Yes  No

B6. If yes, indicate household annual income (MK) before and after adopting DBF.

Not Practicing DBF			Practicing DBF		
2015	2016	2017	2018	2019	2020

B7. What is the current household income?

1. Very low income
2. Low income
3. Lower-middle income
4. Upper-middle/high income
5. All groups

### C. HIGH LEVELS OF CHANGE IN FARMING PRACTICE

#### C1. Empowering smallholder farmers to rebuild soil fertility using good husbandry practices.

C1.1. Indicate whether your household used fertilizer or manure in the following growing seasons for the crops indicated in the table? **F** means Fertilizer, **M** means Manure

Crop	2017/18		2018/19		2019/20		2020/21	
	F/M	Yield	F/M	Yield	F/M	Yield	F/M	Yield
Maize								
Common Beans								
Ground nuts								
Other								

C1.2. Have you noticed any change in soil erosion for the following growing season? Rate change using the scale of **1. High Reduction, 2. Medium Reduction, 3. Low Reduction, 4. No Reduction**

	2017/18	2018/19	2019/20	2020/21
Soil erosion				

**C2. Arresting soil erosion and loss of water through the climate smart Deep Bed method of farming.**

C2.1. Which Tiyeni DBF practice/s did your household use in the following growing season that arrest soil erosion and loss of water? Using the code to land management practices (LMP): 1. Contour terracing, 2. Deep and wide beds.

Crop	Area (acre)	2017/18		2018/19		2019/20		2020/21	
		LMP	Yield	LMP	Yield	LMP	Yield	LMP	Yield
Maize									
Common Beans									
Ground nuts									
Other									

**C3. Improving infiltration and percolation.**

C3.1. Which Tiyeni DBF practice/s your household use in the following growing season that improved infiltration and percolation? Using the following code of Land Management Practices (LMP): 1. Breaking the 'Hard-pan', 2. Mulching (covering of organic material e.g. maize stalk) on top of the cultivated raised dep-beds).

Crop	Area (acre)	2017/18		2018/19		2019/20		2020/21	
		LMP	Yield	LMP	Yield	LMP	Yield	LMP	Yield
Maize									



Common Beans									
Ground nuts									
Other									

**D. INCREASED INCOME FOR SMALLHOLDER FARMERS FROM SALE OF CROPS**

**D1. Building the capacity for smallholder farmers for maximum productivity using sustainable climate-smart Deep Bed Farming methods.**

D1.1. Have you been trained in any sustainable climate-smart Deep Bed Farming methods that help you to maximize production?

Yes  No

D1.2. If yes, who trained you?

D1.3. If yes, when was the training conducted? Use year.

D1.3. If yes which of the following areas of sustainable climate-smart Deep Bed Farming methods were you trained?

No.	Area trained (DBF Package)	1=Yes	2=No
1	Contour terracing		
2	Breaking the hard pan		
3	Deep and wide beds		
4	Zero tillage and restricted access		
5	Mulching		
6	Composting		
7	Intercropping		
8	Off-farm piggeries		

D1.4. How much yield your household realized in the following years?

Crop		Not Using DBF			Using DBF		
		2015	2016	2017	2018	2019	2020
Maize	Area (acre)						
	Yield (Kg)						
Cassava	Area (acre)						
	Yield (Kg)						
Millet	Area (acre)						
	Yield (Kg)						
Sweet potatoes	Area (acre)						
	Yield (Kg)						
Vegetables	Area (acre)						
	Yield (Kg)						
Beans	Area (acre)						
	Yield (Kg)						
Groundnuts	Area (acre)						
	Yield (Kg)						
Soya beans	Area (acre)						
	Yield (Kg)						
Other							

**E2. Building the capacity of smallholder farmers to manage their surplus crop yields for maximum income and eradication of poverty.**

E2.1. What were total cost of production and total revenue realized from selling crops cultivated during the years of Not Practicing and Practicing DBF? Note: TPC means Total Production Cost (sum of Land Rent (MK), Seed, Fertilizer, Pesticide, Ganyu (MK), Transportation) and TR means Total Revenue (MK).

Crop		Not Practicing DBF			Practicing DBF		
		2015	2016	2017	2018	2019	2020
Maize	TPC						
	TR						
Cassava	TPC						
	TR						
Millet	TPC						
	TR						
Sweet potatoes	TPC						
	TR						
Vegetables	TPC						
	TR						
Beans	TPC						
	TR						
Groundnuts	TPC						
	TR						
Soya beans	TPC						
	TR						
Other							

**End of questionnaire**

## **Appendix 2: Focus Group Discussion Checklist**

### **1. Reduce food insecurity**

What level of reduction in food insecurity have you realized from the farmers who are both practicing and not practicing DBF? (in % **OR** 1. Food Secure 2. Mildly Food Insecure 3. Moderately Food Insecure 4. Severely Food Insecure).

### **2. To empower smallholder farmers**

2.1. Explain any change/impact in farming practice that has rebuild soil fertility using good husbandry practices in your field which arrest soil erosion through the climate smart Deep Bed method of farming?

2.2. Tell us any change/impact in this farming practice that has rebuild soil fertility and arrest loss of water.

### **3. Increased income for farmers from sale of crops**

3.1. Since you started practicing this type of farming, have you noticed any change/impact in income from sale of crops?

3.2. Does the project helped you in producing surplus crop yields that maximum income and eradication of poverty?

## **Appendix 3: Key Informant Interview Checklist**

### **4. Reduce food insecurity**

4.1. What level of reduction in food insecurity have been realized from the farmers who are both practicing and not practicing DBF? (in % **OR** 1. Food Secure 2. Mildly Food Insecure 3. Moderately Food Insecure 4. Severely Food Insecure).

### **5. To empower smallholder farmers**

5.1. Explain any change/impact in farming practice to smallholder farmers who are using good husbandry practices which arrest the loss of water? (Practicing and not practicing DBF).

### **6. Increased income for farmers from sale of crops**

6.1. Do you see any change/impact in income for farmers from sale of crops as the result of capacity building for smallholder farmers that maximum productivity using sustainable climate-smart Deep Bed Farming methods?

6.2. Explain any change/impact realized from building the capacity of smallholder farmers to manage their surplus crop yields for maximum income and eradication of poverty. (Mention the crop/s).