MORINGA VALUE CHAIN ENTERPRISE DEVELOPMENT (MOVED) ACTIVITY (72061221CA00008) BASELINE SURVEY REPORT

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DISCLAIMER

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Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

AG	Annual General
AKIS	Agricultural Knowledge Innovation System
AMELP	Activity/project Monitoring, Evaluation, Learning Plan
BCM	Moringa Oil Refiners 'Association
BEP	Break Even Price
BEY	Break Even Yield
CAGR	Compound Annual Growth Rate
CC	Climate change
CISANET	Civil Society Agriculture Network
COMPASS	Community Partnership for Sustainable Resource Management
CSA	Climate Smart Agriculture
EPA	Extension Planning Area
FBOs	Farmer Business Organisation
FGDs	Focus Group Discussions
FOs	Farmer Organizations
FRIM	Forestry Research Institute of Malawi
FUM	Farmers Union of Malawi
GI	Gross Income
GL	Green Livelihoods
GM	Gross Margin
GTP II	Growth and Transformation Plan II
HANL	Harnessing African National Livelihoods
HH	House Hold
ICRAF	World Agroforestry Centre
IRR	Internal Rate of Return
KII	Key Informant Interview

LUANAR	Lilongwe University of Agriculture and Natural Resources
MAI	Ministry of Agriculture and Irrigation
MBS	Malawi Bureau of Standands
MCCI	Malawi Chambers of Commerce and Industry
MCHF	Maluso Cooperative Union
MEDI	Malawi Entrepreneurs Development Institute
MFIs	Micro Finance Institutions
MIRTDC	Malawi Industrial Research and Technology Development Centre
MOA	Ministry of Agriculture
MoBIH	Moringa Business Incubation Hub
MOVED	Value Chain Enterprise Development
MOVED	Business Model Canvas (MMC)
MTHUO	Malawi Traditional Healers Umbrella Organization
NGO	Non-Government Organizations
NPV	Net Present Value
OPV	Open Pollinated Varieties
PPP	Public Private Partnerships
SDA	Seventh day Adventist
SOs	specific objectives
SPSS	Statistical Package for Social Scientist
SWOT	Strengths Weakness Opportunities Threats
TA	Traditional Authority
THAM	Traditional Healers Association of Malawi
ToR	Terms of References
TVC	Total Variable costs
USAID	United States Agency for International Development
VC	Variable Costs
VSL	Village Savings and Loans
WSU	Washington State University International Programs

EXECUTIVE SUMMARY

Introduction

Green Livelihoods is implementing Moringa Value Chain Enterprise Development (MOVED) Activity with funding from USAID under agreement number 72061221CA00008. The overall goal/objective of the MOVED activity is to foster creation of green entrepreneurship-based income sources and contribute to reduction of vulnerability of small holder farmers to effects of climate change. *Moringa Oliefera* is a wonder tree with numerous uses of all parts of the tree including food, medicines, oil and fodder.

This baseline study was commissioned to bench mark indicators for the project which in turn will be used to assess the performance of the project. The baseline was also commissioned to conduct a local, national and international market assessments for *Moringa* and its products.

The study was conducted in project impact areas of Traditional Authorities (TA) Pemba, Ndindi, Maganga and Kulunda in Salima district. Qualitative and quantitative methods were used in the study. A total 256 beneficiary households took part in the study. Household Interviews, Key Informant Interviews (III) and Focus Group Discussions (FGDs) were used to collect data. These were conducted physically and virtually where physical meetings could not be possible. About 77% of the respondents were females and 23% were males clearly depicting the involvement of women in MOVED activity.

Main Findings

Part 1: Establish the status of the project outcomes and output indicators as outlined in the project logical framework

Percentage of households in targeted areas whose investment-income / capital has increased

About 33% of the households reported investment capital for various income sources with an average annual household income of MK148,794.00(US$186). The project targets to increase percentage of households by 80% whose investment income is increased. However, it should also be clear by how much the income is to be increased

Percentage of households investing a portion of their income on improving their resilience

In this study, proportion of households investing a portion of their income on their resilience was assessed by looking at the household Physical asset base, social capital and advanced technologies in Agriculture these included Climate smart Agriculture, drought tolerant crops and those practicing Irrigation.

The results showed that 33% of the households are investing in at least 3 resilience options with about 29% youth and 21% female. On the other hand, results showed 15% of the households invested in all the options of resilience.

Result Area 1: Increased income levels of smallholder farmers in the targeted T/As

An average analysis of the amount of income shows that Maganga had the highest income levels (US$213) followed by Kuluwunda (US$188). This is attributed to high income made from businesses and Fishing.

Result Area 2: Improved household economic, food-nutrition security and environmental health through moringa integrated agroforestry farming coupled with VSLs/MFIs linkages.

About 71% of the households indicated to have at least experienced food shortage. The study further found that that 51% of the households experienced food shortage in the month of February whilst a minimum of only 5% experienced food shortages in months of June and July. This finding is in line a common trend in Malawi as most of the households have adequate food during and after the harvest period and become lean from December to March. In terms of meals per day, the study show that 66% of the households were able to afford to 3 meals per day during the normal period of the year while only 13% managed to have 3 meals per day during the lea period of the year.

PART 2: Market and Value chain analysis of Moringa Production

Currently *Moringa* trees are grown as live fences or hedging around homestead areas in the study area. At baseline the study showed that 11% of the respondents generated income from *Moringa* Value chain and wild foods. It was further established that on average 0.1 ha (0.25 acres) has been spared for *Moringa* production per household. Those not yet in production also indicated willingness to allocate about 0.2ha to *Moringa* production.

The study found positive Gross Margins (GM) for both for *Moringa* own production and Moringa enterprising (Trading) which means that the sampled farmers make profit irrespective of the type of farming system. The current level of practice was however estimated noncompetitive. The gross margins were higher for an ideal intensive production with a population of 4000 trees per ha.

Strengths and opportunities are abound for the enterprise, they include high value and increased local and international demand. However, the high-level informalities in the value chain is causing economic inequalities with only the upper stream players benefiting from it. This is evidenced in Salima where the average farm gate price for *Moringa* leaf is MK500/Kg (US$0.6) versus the market price of MK2500/KG(US$3). Again, this is on the lower side when compared with, the global *Moringa* Products Market estimated at US$ 5 billion in 2019 and expected to reach US$ 8.4 billion by 2026. The global Moringa Products Market is expected to grow at a compound annual growth rate (CAGR) of 8% from 2020 to 2027 (Moringa Global Industry outlook 2020-2026).

In a nutshell *Moringa* value chain is not fully developed in Malawi with high levels of informalities and disintegrated value chain characterized with unregulated and unprotected markets. Moving forward, the study recommends development of a sustainable and cost-effective community-based seed system. It is envisaged that this will help in creating another product (*Moringa* seed) for farmers to enterprise on with readily available markets in the villages and beyond. The project should also consider facilitating the formation of regulations of entry of the moringa market both for local and international buyers. Efforts should also be made to lobby and advocate for a special policy to promote moringa value chain in the country as it has numerous benefits from which the country can significantly benefit from amid climate

change related effects. This feat can be easily achieved if the project builds capacity of the producers leading to adoption of improved standards of production and traceability to raise the profile of the Malawi origin (Moringa Innovation Hub) and leverage on the current vegan international market opportunity.

Conclusion and Recommendations

This section is summarised in a tabular form which synchs the conclusion and recommendations. The section first concludes and suggest recommendations on the findings of the first part (Bench marking). The section finalises with conclusions and recommendations of the second part of the assignment which was to conduct a value chain and market analysis

PART 1: Establish the status of the project outcomes and output indicators

Conclusion	Recommendation
The findings show that at least 10% of the households are earning from Moringa value chain through selling own moringa and trading. This is an opportunity for MOVED Project to upscale the existing potential to foster green entrepreneurship to increase community resilience to climate change effects. The activity will also tap from the willingness by households to invest a portion of their income in resilience (15%) which includes providing physical assets, social cohesion and Good Agricultural technologies/Practices	While the activity will be harnessing the old grown trees, It should also deploy an intensive production system to yield shorter payback period, positive IRR and NPV considering the project life is only for two years.
T/As Pemba is more advanced in terms of income source from Moringa both in terms of trading and selling from own Production of the Four (4) T/As. This is followed by T/A Maganga while most of the clubs in Ndindi are new and have not been enterprising in Moringa. However, it is evident from the results that Moringa enterprising itself shows to accrue more annual sales than other crops combined despite the minimal number of trees due to unorganized and conventional approaches to moringa production	Develop Productive alliances that should inform the activity in its primary production and processing activities in terms of quantities and quality Compile a field operation manual to guide extension, agronomic off-taking activities from the farmers
The groups that have just been facilitated by the MOVED activity are yet to be trained into fully operational Farmer based organization especially on governance related issues. However, it is promising that these newly formed farmer clubs will sustainably perform since they are to be linked to already existing identified cooperatives to capacitate them but also act as market platforms and entry points for MOVED activity	There should be a clear road map and Terms of Reference (ToR) on how the secondary Farmer groups (Cooperative, Pre-operatives, Associations) will work with the clubs towards achieving a common agenda to sustainably run the MOIHUB. This should be done in these formative days of the activity The MOVED activity should develop a clear road map on from the organising the groups to MoIHUB
Land that has been allocated for *Moringa* production for individual households and that allocated at community level is not measured to a certain availability in quality and size.	The plots at household and community level should be measured using the GPS in collaboration with ministry of lands and Agriculture to ascertain commitment

PART II: Market and Value chain analysis of *Moringa* Production

Conclusion	Recommendation
There is limited knowledge of available genetic diversity present in *Moringa* species to warrant serious breeding programmes for meaningful scaling up in Malawi. Furthermore, commercialization of *Moringa* products in Malawi is still very informal making it difficult to get reliable information of production exports volumes	The activity in collaboration with department of research and land resource should run farmer-based research trials to assess climate suitability, economic returns and health benefits for various species. Develop a sustainable and cost-effective community-based seed system. This will help in creating another product (moringa seed) for farmers to enterprise on with readily available markets in the villages and beyond
Interaction with some private firms, it was discovered that in terms of the export market, at present, promotion of *Moringa* products is on an individual firm level. While this has been effective for these individual firms, the international market is small, and differentiation in the market could benefit from collective efforts in export promotion.	This entails that MOVED project should ensure that farmers are organized to leverage on emerging international markets. Establish links with different organizations to link the activity to various off takers like some in Netherlands and such as contacted are Centre for the Promotion of Imports from developing countries (CBI), Netherlands Enterprise Agency (MMF), Dutch Good Growth Fund, PROFOUND, Natural Ingredients Experts (IN2NI) Through the Concept of MIHUB, MOVED should initiate a process to facilitate formation of moringa multi-stakeholder platform composing of all chain actors and supporters in the value chain as tabulated in the AKIS actor analysis-actor identification in table 9 Sensitization and campaigns about the value of *Moringa* in as regards the potential to household nutrition and medicinal attributes to both human and livestock. This will to ignite locally available untapped markets in the country
Moringa value chain is not fully developed in Malawi with high levels of informalities and disintegrated value chain characterized with unregulated and unprotected markets	Through the multistakeholder platform, facilitate the formation of regulations of entry of the moringa market both for local and international buyers. Lobby and advocate for a special policy to promote moringa value chain in the country as it has numerous benefits from which the country can significantly benefit from amid climate change related effects. Facilitate training and adoption of improved standards of production and traceability to raise the profile of the Malawi origin and leverage on the current vegan market opportunity in German which is estimated at 31% and the nutrition status of moringa perfectly fits into this profile
The implementation period of the MOVED activity demands more time than two years to start appreciating results considering that usually first year is usually invested on partnership agreements and taking of the project,	To achieve a quick payback period and reasonable NPV and IRR, farmers in the target area should consider adopting high plant density technology under the intensive method for maximum leaf production. It is advised that at least planting 10,000 plants per hectare will enable farmers to break even easily.

CHAPTER ONE

1.0 Introduction

This report presents findings from a baseline study commissioned by Green Livelihoods (GL)[1] funded by USAID/Malawi through agreement number 72061221CA00008 hired Harnessing African National Livelihoods consulting firm to conduct a baseline survey for *Moringa* Value Chain Enterprise Development (MOVED) Activity including local, national and international market assessments for *Moringa* products. The activity is targeting 2000 beneficiaries comprising of women, youth and men groups to strengthening their livelihoods through promotion of integrated green entrepreneurship and driving commercialization of moringa value chain products.

Through some of the already scoped existing cooperatives for a start, the activity intends to establish *Moringa* tree farms, set up and amplify market regulated processing of tradable and consumable *Moringa* products (i.e., Powder, oil, 'moringa tea bags', water purifiers etc.) and augment youth and women groups that are not yet registered cooperatives to register so as to ensure *Moringa* business growth via inclusive market development processes. New cooperatives will be mobilized and capacitated responsive to increased *Moringa* product demand on the market.

The business augmentation will culminate into the establishment of Nutri Products' centrally hosted and co- managed '*Moringa* Business Incubation Hub – (MoBIH)' in Salima district. The MoBIH will be directly linked with the management of the cooperative led consolidated *Moringa* orchards. In addition to *Moringa* tailored training to be implemented, MOVED project will support the 2000 targeted beneficiaries with various capacity building initiatives around seed systems quality assurance, production, processing and marketing of *Moringa* products. Starting on a small scale with seed multiplication arrangements, other health valuable but high market value chains/crops that include ginger, garlic among others will be promoted to provide farmers with motivation towards the moringa business setups. These additional value chains will also be used as flavorings or additives to different final moringa products such as 'moringa tea'. The activity will also facilitate adaptive research, documentation and sharing of experiences and lessons to inform MOVED's business intensification, co-opting emerging business youth groups that would inform expanded value chain development to reach economies of scale in Salima and other upscaled to project areas.

[1] GL is a smart agri-innovation focused registered NGO with a mission to drive innovative climate smart agri-preneurship in Malawi. GL started its operations in 2006 focusing on marginalized groups like youth and women to make agriculture more appealing, profitable and sustainable

1.2 Theory of change and MOVED activity Objectives

1.2.1Theory of change

The project has three components of and these are Community, MOVED/ Entrepreneurship and Climate Change. These components are thought to lead to the desired change as follows;

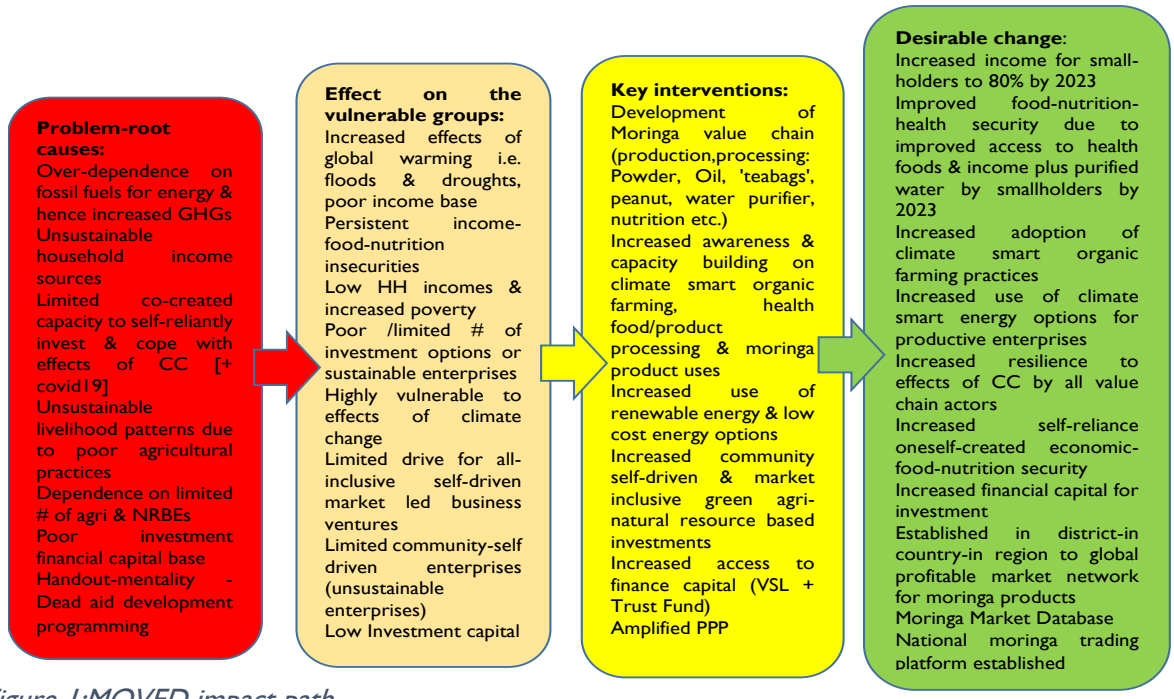


Figure 1:MOVED impact path

i. If there is increased awareness and capacity building on climate smart organic farming and health benefits of *Moringa*, use of renewable energy and
ii. Increased community driven and market inclusive green agri-natural resource management-based investments and
iii. Increased access to finance capital (VSL and Trust Fund) for green-enterprises, leveraging Public Private Partnerships (PPP).

These are envisaged to achieve;

- Improved household and community economic, food, nutrition security (increased green-enterprises income)
- Increased resilience of smallholder farmers on effects of climate change (reduced vulnerability)
- Increased inclusive and sustainable wealth creation for Malawians (CDCS DO3).

1.2.2 MOVED Activity Objectives

The project has the following strategic objectives and expected outputs:

The main objective of the activity is "To foster creation of green entrepreneurship income sources and contribute to reduced vulnerability of small-scale farmers to negative effects of climate change in Salima district by 2023".

MOVED activity will pursue the following areas of specific objectives (SOs);

i. SO1) Increasing community-household 'investment-financial capital 'through promotion of market inclusive and commercialization of *Moringa* integrated value chain businesses.
ii. SO2) Increasing household economic, environment and health security through Moringa integrated agroforestry farming and cooperative approached investment-financing

1.3 Scope and Objectives of the assignment

The baseline study was commissioned to bench mark indicators for the project which in turn will be used to assess the performance of the project. Furthermore the study was to conduct a local, national and international market assessments for *Moringa* and its products. The baseline survey established benchmarks for indicators that will inform the Activity/project Monitoring, Evaluation, Learning Plan (AMELP) plan and form the basis for measuring the project outcomes; and secondly the baseline conducted a local, national and international market assessments for Moringa as required. Refer to the table below which summarizes the twofold study objectives

Table 1:Scope and study objectives

Baseline survey	**Market and value chain analysis**
i. Establish the status of the project outcomes and output indicators as outlined in the project logical framework	i. Assessing the viability of *Moringa* raw materials and products for local and export potential
ii. Set bench marks for the project indicators based on current status	ii. Identifying opportunities for building regional *Moringa* value chains and exploring the impact of Free Trade Agreements on Moringa value chain
iii. Ascertain the relevance and sustainability of the set objectives	iii. Elaborate the moringa market landscape, size, segments, trends and influential *Moringa* companies for potential partnerships (off-taker buyer agreements)
iv. Make recommendations to MOVED team based on the findings and provide information that will assist in guiding project implementation and a proposed plan of action.	

1.4 Organization of the Report

In addition to this introductory section, the report consists of five sections. Chapter two outlines the methodology guiding the research process to achieve baseline objectives and also discusses the variables and data sets used in the study. Chapter three is devoted to the findings of the baseline investigation – it outlines socio-economic characteristics of farmers in the study area and presents the findings based on the indicators under the MOVED project. The fourth and final Chapter draws main conclusions by presenting a summary of the key findings making recommendation to guide the implementation of activities by Green Livelihoods in collaboration with relevant stakeholders.

CHAPTER TWO

2.0 Methodology

This baseline study used a detailed framework to guide the research process, allowing the likelihood of achieving research objectives. In this study, both quantitative and qualitative research design were employed. This helped the study to gather pieces of information that could be counted mathematically, while collecting information on people's perceptions towards topics under discussion at the same time

2.1 Study Area

The study was conducted in Salima district where the activity is being implemented in the four respective T/As thus Ndindi (*Chipoka EPA*), Maganga (*Tembwe EPA*), Pemba (*Katelera EPA*) and Kulunda(*Chinguluwe* and partly *Tembwe* EPA). Among other things MOVED project through GL is promoting production of *Moringa* since its project inception in June 2021

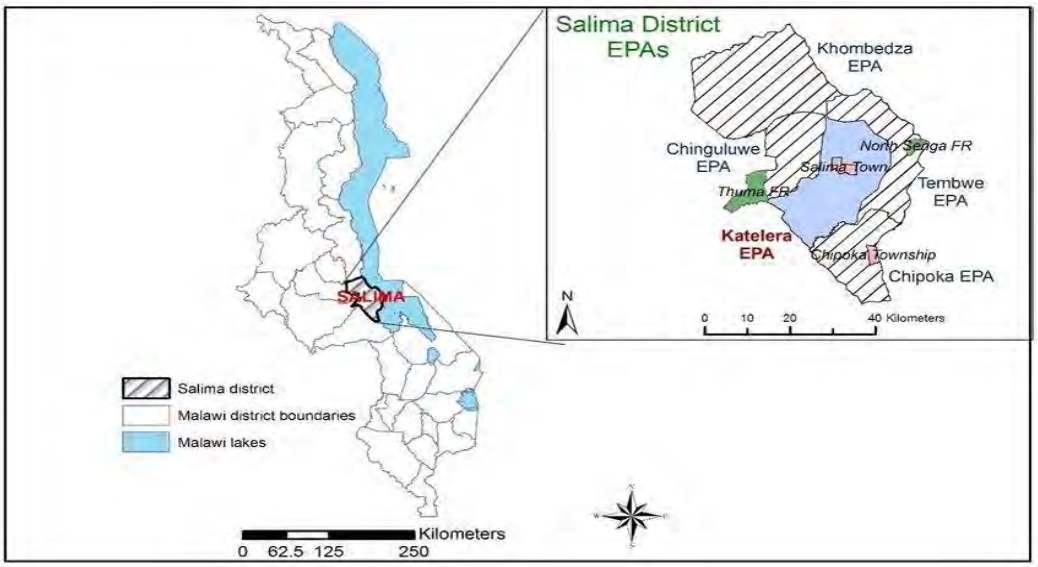


Figure 2:Geographical area of Baseline Study

2.2 Sampling and Sample Size

2.2.1 Sampling procedure

The study deployed multistage sampling approach from district to T/As and finally beneficiary households of the MOVED activity. At the time the study was being conducted about (N=705) beneficiaries out of (N=2000) were mobilized into farmer clubs. The district, Salima, was purposefully sampled since it is where the MOVED activity is being implemented, similarly all the four (4) T/As were purposefully selected. Both purposeful and simple random sampling was deployed to select the clubs and beneficiary households. Refer to the illustration below;

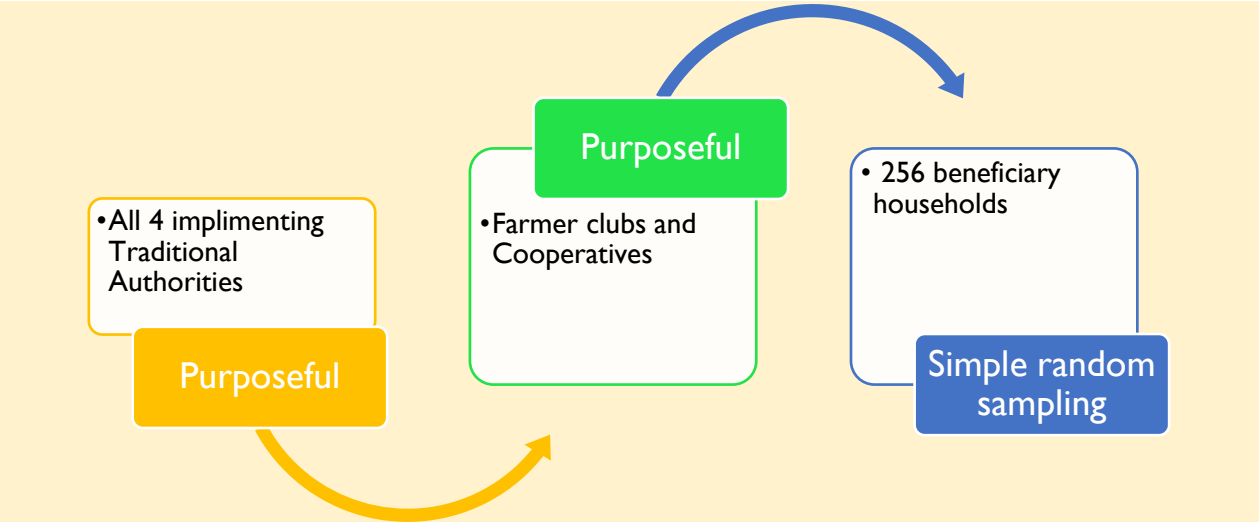


Figure 3: Sampling procedure of the MOVED activity baseline

2.2.2 Sample size

Since sampling population (705) was known at the time of study the formula below was used to calculate the sampling size. As such with assumptions; 5% margin of error with a 50% distribution of response /standard deviation and 95% confidence level. The formula adopted in calculating the sample size and variables used are presented in the table below;

$$sample\ size(n) = \frac{N * X)}{(\mathrm{X} + \mathrm{N} - 1)}$$

Where, $X = Z_{\alpha/2}^2 * p * (1-p) / MOE^2$,

Table 2: Sampling and Sample size

T/A	Total number of club members	Target samples size	Actual sample size	EPA
Ndindi	105	37	40	Chipoka EPA
Maganga	250	89	77	Tembwe EPA
Kulunda	170	60	98	Tembwe and Chinguluwe EPA
Pemba	180	64	41	Katelera EPA

Total	**705**	250	256

Source: MOVED baseline

2.3 Selection and Category of Respondents

The study selected representatives from various categories of stakeholders to best inform the baseline as indicated in Table 3. They were basically from 3 main groups namely: a) Implementers which included; GL at National and district level, Development partners and National IPs, b) Policy Makers and Institutional Support Systems represented by Staff from selected government Line Ministries, Districts and Agencies; and c) Beneficiaries from communities represented by Farmer club members, Community Facilitators and Community leaders.

Table 3: Category of respondents

	Sub groups	**Disaggregated by**	**Respondents**	**Data collection approach**
Implementors and partners	Green livelihoods-MOVED Team and partners, Nutriproduct, seed masters	▪ HQ, MLW-Co, regional reps	Country director, Project Officers, Monitoring and Evaluation Manager	• Virtual /tel - KIIs and groups interviews • Face to face Interviews
	Development partners	▪ Funders	USAID,	• Virtual /tel-KIIs & group interviews • Face to face
	National Organizations	▪ Forestry Institute of Malawi	staff	• Virtual and/or tele phone interviews /KIIs
Policy makers & institutional capacity dev officers	Line Ministries	▪ Trade and industry ▪ Department of Forestry including Forestry Research Institute of Malawi		• Virtual /tel-KIIs • Face to face
	Agencies	▪ MBS ▪ Fairtrade ▪ Rainforest Alliance ▪ Poison Board	Certification department	• Virtual /tel-KIIs & groups discussions and • Face to face interviews
	Districts Salima	▪ Policy & District Assembly officers ▪ service provider, and staff ▪ Moringa chain players and supporters	Forestry Trade officer ▪ *Moringa* traders, stockists, ▪ Wholesalers Retailers	• Face to Face / tel /KII interviews
Beneficiaries	Community level	• Scoped Cooperatives/Farmer based organization members	• Farmers • Assemblers	• FGDs /Face to face,/tel KIIs and observations interviews

				• Household interviews

2.4 Data Collection

Before data collection exercise the research assistants were trained and trained on data collection methodologies and data probing skills. A pretest was further conducted to evaluate the quality of the questionnaire and make appropriate adjustments.

The study used both primary and secondary data (published and unpublished information). Primary data was obtained at first hand through structured inter-personal interviews with the smallholder farmers and was recorded electronically with Kobo Collect Software that was run by android system. The questionnaire was designed and administered to smallholder farmers to capture demographics characteristics, socio-economic status, involvement in *Moringa* value chain and profitability of the value chain. On the other hand, secondary data was sourced from internet, published texts and statistics and was used to beef up literature review of the study.

2.5 Data Entry, Analysis and Report writing

The study used two distinct sets of data; quantitative and qualitative. Data cleaning, editing and coding were done before analysis. The qualitative data from the Participatory Rural Appraisal (PRAs) mainly the FGDs as well as the stakeholder's meetings were categorized unto thematic areas and then summarized and documented in the report. The quantitative data collected through questionnaires was coded and entered in SPSS and statistical analyses (in SPSS, Stata, and Excel) were performed to get frequency, contingency tables and cross tabulations amongst others. The outputs were carefully analyzed and reported together with the issues raised summarized from the qualitative data. SWOT and Gross Margin analyses were also conducted to assess the strength, weaknesses, opportunities and threats and profitability of Moringa.

2.6 **Study Limitations and strategies**

LIMITATION	**STRATEGY**
High levels Information asymmetry especially from middlemen in the *Moringa* value chain due to high levels of informality	Banked on the FGDs with Farmer groups Use of secondary data
Traditional/Homestead approach of moringa production made it difficult to calculate gross margins	Used FGDs to document variable costs on ana acre and KII on some costs Provided three scenarios of gross margins the current practice, ideal and proposed for the study site w
Inadequate statistics in government departments about the moringa production and exports in Malawi	Used data from neighbouring countries such as Tanzania and Mozambique and other international

	countries (India, Nigeria) where Moringa Value chains are advanced

CHAPTER THREE

3.0 Results of the baseline study

3.1 Baseline Sample Coverage and Characteristics of the Respondents

The major demographic characteristics included in analysis were; Household composition by Age, Gender of respondents, education background. Means, percentages and frequencies were used to analyze the demographic or socio-economic characteristics of the samples. This was intended to describe demographic variables of the sample and further understand its influence towards research objectives and findings at later stage within discussion. Demographic pattern is one of the most important factors of a farming community as it is the primary determinant of labor for crop cultivation. Hence, a proper appraisal of its size, growth composition and quality is considered as a pre requisite for an effective planning for balanced and sustainable socio economic development.

3.1.1 Study population classification by age group

The sample size of the study was 256(59M; 197F). From this sample total number of household members was 1578. The figure 4 below indicates the total number of household members categorized by age. Classification of population by age group provides an idea of the composition of the family by size and availability of labor force – as age may influence labor, it may therefore determine production efficiency. Data from the baseline reveals that 28% of household members are youth (15-29) followed by those within the age of 30-64 representing 20%.

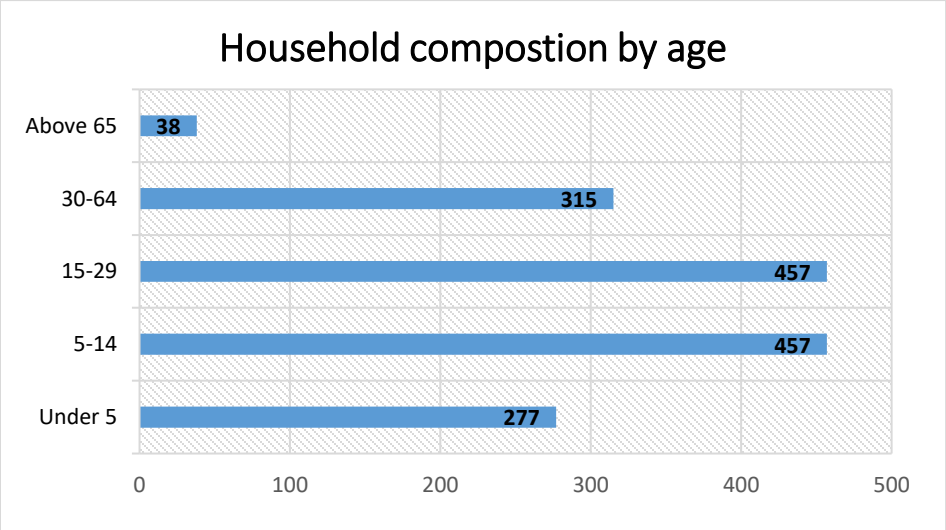


Figure 4: Household composition by age

3.1.2 Gender of respondents and household head

Gender is one of the key aspects in agricultural value chains especially that of *Moringa.* One of the reasons agricultural sectors in many developing countries is underperforming, in part because women, who

represent a crucial resource in the rural economy through their roles as farmers, almost everywhere face more severe constraints than men. According to the results, while 80% of household were male headed the study respondents was dominated by women. Results show that 77% of the respondents were females and 23% were males. This is a clear indication that the MOVED activity at the time is predominated by women. This conforms to results by Saavedra Y and van der Maden E. (2015) in Nigeria where about 70-80% of women participated in Cultivation of Moringa leaves.

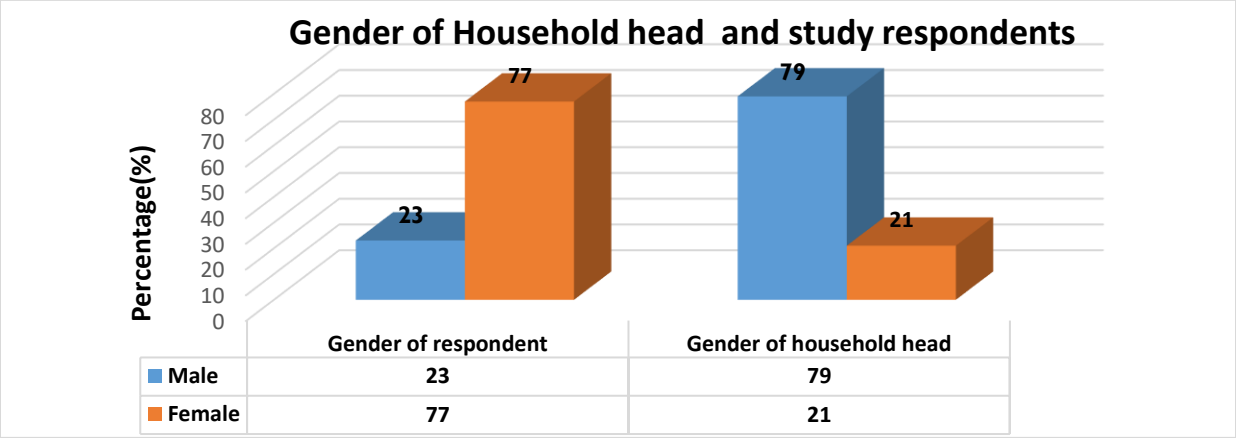


Figure 5: Distribution of Gender *Source: MOVED Baseline Survey 2021*

3.1.3 Level of Education

As far as farming business is concerned, decoding extension service messages and adopting of agricultural innovations by farmers is contingent on the levels of education accessed by the targeted beneficiaries.

Table 4:Level of education for household heads

Education level	Frequency	Percent
Primary	166	64,8
JCE level	29	11,3
MSCE level with certificate	11	4,3
None (never attended any school before)	50	19,5
Total	**256**	**100,0**

MOVED seeks to advocate for improved production and productivity of *Moringa.* products through innovations that require a certain level of literacy with the farmers in order to understand the basic extension service messages offered to them analysis of level of education showed that about 80,4 attained some education with 65% attaining primary school and 15.6% secondary school. Household heads who never attended formal education were 19.5% of the targeted population as shown in the table 4. The study found out that the majority of the smallholder farmers have the minimum level of literacy required to understand and adopt the innovations being introduced in the agricultural sector.

3.1.4 Marital status

Marital status can influence production through increasing access to production resources such as land and labour. The absence of a family member especially a husband can leave the woman with little or no land as traditionally land has been controlled by men. The results in table 5 shows that at most (70%) of the respondents are married and 12.5 % are single. The unmarried category was largely skewed towards the youth. In light of the discussions of the research findings there is need to encourage every farmer irrespective of their marital status to participate in *Moringa* value chain and let them understand what is needed before final take-off of the *Moringa* value chain. The community need to treat singles, widows, the separated and divorced as equal farmers who can produce even in absence of the partners.

Table 5:Marital Status

Status	Frequency	Percent
Single	32	12,5
Married	179	69,9
Polygamy	3	1,2
Separated	4	1,6
Widowed	15	5,9
Divorced	23	9,0
Total	**256**	**100,0**

Source: MOVED Baseline Survey, 2021

3.1.5 Main occupation

The occupation of a farmer has a bearing on the levels of income they generate which in turns affect the level of investment they may do. Importantly, occupation will affect whether farmers decide to adopt a technology or try out new enterprises and their being risk takers or risk averse. The study found out almost half (48.04%) of the respondents were peasant farmers. This was followed by wage laborers at 18.75%, fishermen at 12.89% and business persons at 8.59%. This finding is important as the project can easily benefit from the presence of the majority of the farmers by helping them diversify to green entrepreneurship through *Moringa* value chain.

Table 6: Respondent's occupation

Main Occupation	Freq.	Percent
Peasant farmer	128	50
Semi-commercial farmer	10	3.91
Wage laborer/worker	48	18.75
Fisherman	33	12.89
Artisan/carpentry	4	1.56
Housewife	11	0.39
Business person	22	8.59
Total	256	100.00

3.1.6 Land Ownership

One of the targeting criteria is in the MOVED activity is that a beneficiary should at least have own land. In addition, the approach is that groups that have been formed should be allocated some land by the local authorities. In Malawi, access to land for the rural poor is essential for food security and economic development. Land ownership entails availability of an important resource in as far as MOVED project is concerned.

The study assessed land ownership by asking the respondents how much own land the household has and how it was acquired. In addition, how much land is allocated to *Moringa* from their own land in acres. The findings show that on average the households in the study area owned 0.8 Ha of land. In terms of allocation to moringa production, the households indicated to have allocated on average, 0.08Ha to moringa production with T/A Kulunda on the minimum and T/A Maganga on the maximum. About 66% (170) of the households have spared selected sites to plant *Moringa* trees

Traditional Authority	**Frequency**	**Land allocated (Ha)**
T/A Ndindi	37	0.08
Kaulunda	69	0.04
Maganga	51	0.12
Pemba	13	0.08
	170	0.08

The current practice of *Moringa* production is informal and predominantly used for fencing. The current Land allocation at homestead level showed that farmers have at least 0.035 acres at homestead level from

which on average farmers have about Eight (8) trees and 99% of the smallholder farmers reported this land is basically under hedges.

PART 1: ESTABLISH THE STATUS OF THE PROJECT OUTCOMES AND OUTPUT INDICATORS AS OUTLINED IN THE PROJECT LOGICAL FRAMEWORK

3.2 Foster creation of green entrepreneurship income sources and contribute to reduced vulnerability of small-scale farmers to negative effects of climate change.

In recent years, green entrepreneurship has gained commercial tone as an important component of agriculture having significant contribution to the share of the agricultural sector hence, playing an important role in most of the developing countries. Diversification of agriculture is considered as an important strategy for agricultural development around the world, and the importance of herbal crops as is widely recognized as a feasible means of diversification and creation of additional employment opportunities in rural areas especially for women. Growing herbal crops can provide gainful employment to a larger majority of the farmers and agricultural labor throughout the year, while promoting trade, earning foreign exchange and fighting against malnutrition's common menace simultaneously.

The overall goal/objective of MOVED activity is to foster creation of green entrepreneurship-based income sources and contribute to reduction of vulnerability of small holder farmers to effects of climate change. This goal has two indicators thus; i) Percentage of households in targeted areas whose investment-income / capital has increased; and ii) Percentage of households investing a portion of their income on improving their resilience.

3.2.1 Percentage of households in targeted areas whose investment-income / capital has increased

Investment income or capital is being as defined as money received in interest payments, dividends, capital gains or profits realized from sale of assets and/or other products. Investment income refers solely to the financial gains above the original cost of the investment. Additional to *Moringa* value addition, MOVED will encourage Village Savings and Loans among targeted beneficiaries. Households are counted as having an increased investment income as a result of the USG assistance thus their involvement in capacity.

building and business trainings contributing to knowledge or access to investment in *Moringa* business. This will also include gains from other businesses that have been invested in Moringa. The activity of MOVED project targets to increase income of 80% of the beneficiaries. It is further important for the activity to answer the question "B*y how much investment income will increase*?". In order to set a benchmark for this indicator the study collected contextual information on the income sources[2] in the respective communities was documented. Figure 6 shows the source of income of households in the targeted communities. The figure further analyses the proportion of households earning a living from the identified sources of income. The study showed that 35% of the respondents were earning through fishing while 19% were earning their income through business followed by livestock sales pegged at 15%, results showed 7% of the households earned cash income from crop farming. The results further showed that selling moringa from own homestead trees (3%), Trading Moringa leaf (7%), Village savings (3%). Furthermore, investment income or capital was measured by estimating average household income by source in the study area. The average annual household income was MK148,794.00.(US$186) MOVED activity sorts to increase household income from this benchmark by equipping business – minded households with relevant "Agri-preneurship" skills, moringa value chain development and commercialization plus climate smart-organic farming practices, business management, market linkages, value addition, to render communities able to engage in self-driven plus self-led contract farming and profitable markets on Moringa products as well as other related value chains. The figure presents estimated income by source.

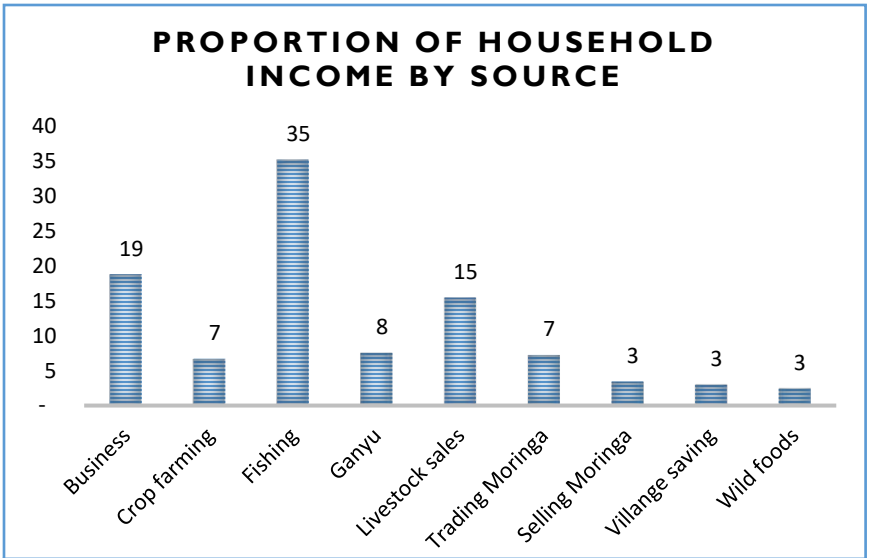


Figure 6: Analysis of Proportion of households by income source

[2] Respondents were grouped according to their source of income which included Business, crop farming, fishing, livestock sales, trading *Moringa* by buying from other farmers, selling *Moringa* from own trees/production, Village Savings and Loans (VSLs) and wild foods among others sources of income.

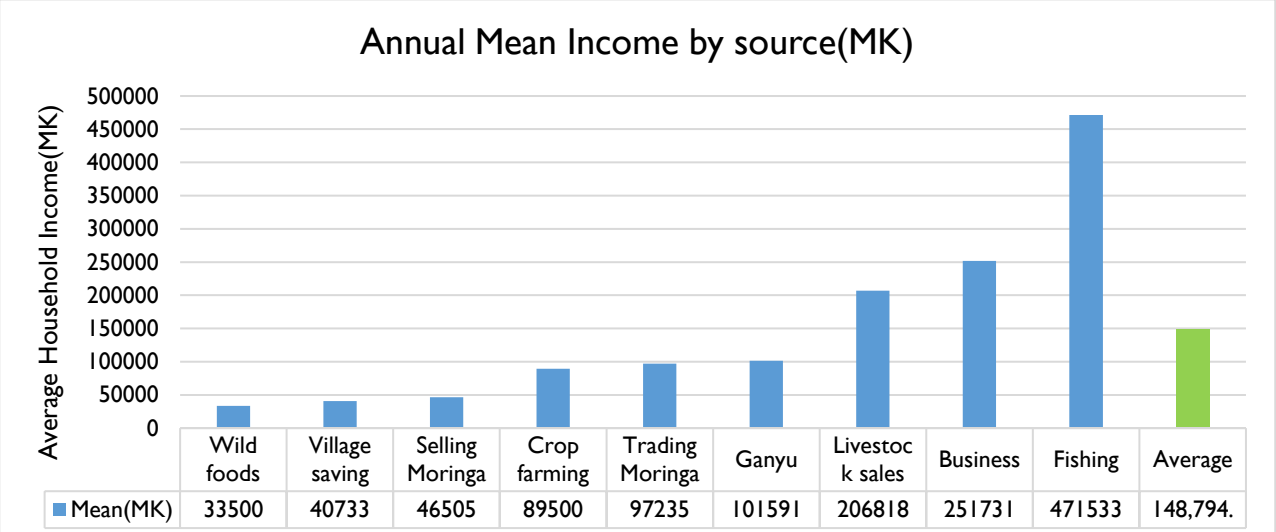


Figure 7: Average household income by source

Increased investment income is linked to investing in a new or old *Moringa* business. Those who were already investing in *Moringa* business, may increase investment income depending on the realized profits. Income generated from was twofold thus from own moringa trees operationalized as selling moringa (US$58) and moringa trading (US$121). The results show that 100 Households indicated generating average income from the above sources in the reporting period which represents 39%. The activity would like to see 80% of the households increase their income. However ever there is need to further set a target of by how much the investment income capital will be increased

3.2.2 Percentage of households investing a portion of their income on improving their resilience

Climate change and weather variability are key factors affecting food systems in most parts of sub-Saharan Africa (Kotir, 2011), especially among rural subsistence farming communities (Shisanya and Mafongoya, 2016). This has been seen recently in Malawi, where agriculture is predominantly rain-fed and practiced by 76% of Malawi's population (National Statistics Office,2017). Agricultural resilience is about equipping farmers to absorb and recover from shocks and stresses to their agricultural production and livelihoods. Some shocks are short-term, others long-term. Some come suddenly while others are predictable and some are more severe while others slowly erode farmers' ability to farm.

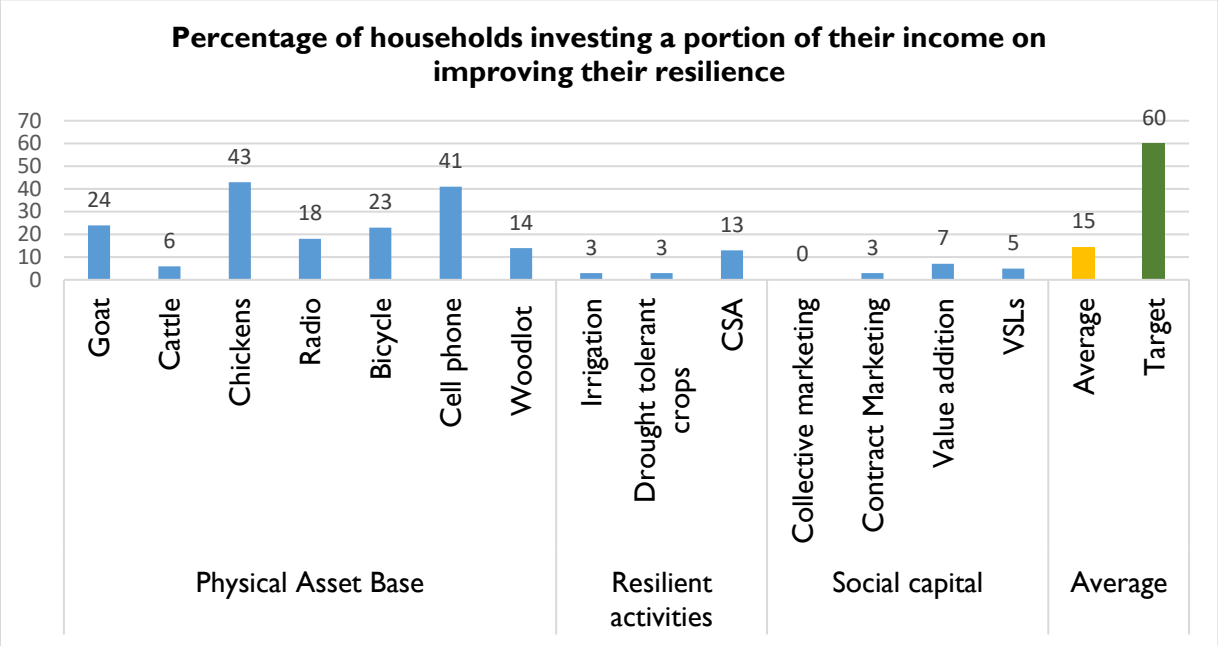


Figure 8: Percentage of households investing in resilience Panel A

The paper adopts USAID's definition of resilience as the ability of people, households, communities, countries and systems to mitigate, adapt to and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth.

As such interventions by the activity will focus on the four key capacities to strengthen household and community resilience. The four being anticipatory[3](Radio, Phones, trainings), absorptive (VSLs)[4] adaptive (Resilience activities and Asset base) [5] and Transformative[6](Resilience activities and asset base) capacities.

In this study, proportion of households investing a portion of their income on their resilience was assessed looking at the household Physical asset base, social capital and advanced technologies in agriculture such as Climate smart Agriculture, drought tolerant crops and those practicing Irrigation. The results showed that

[3] Work with communities to increase their capacity to plan and adapt to shocks/stressors through informed planning with reference to climate change information available.

[4] Climate sensitive cash and asset transfer programs and activities that build savings that can support the households in times of food shortages through groups such as Village Savings and Loans (VSL).

[5] MOVED will implement climate-resilient, nutrition-responsive agricultural technologies such as reforestation, agroforestry, climate-smart agriculture, and soil and water conservation to increase household coping capacity, both in the short-term and long-term cases of shocks and stresses.

[6] This is the capacity to make intentional change to stop or reduce the causes of risk, vulnerability, poverty, and inequality, and ensure the more equitable sharing of risk so it is not unfairly borne by people living in poverty or suffering from discrimination or marginalization

on average 15% invested their portion in resilience with physical asset being relatively higher due to the pass on programme which was initiated by Care Malawi for chickens and goats. On the other hand, social capital which was assessed in terms of membership to VSLs, Value addition, contract farming and collective marketing proved to be on the lower side. A further analysis in panel A of figure 8 below shows that 33% of the households are investing in at least 3 resilience options with about 29 youth.

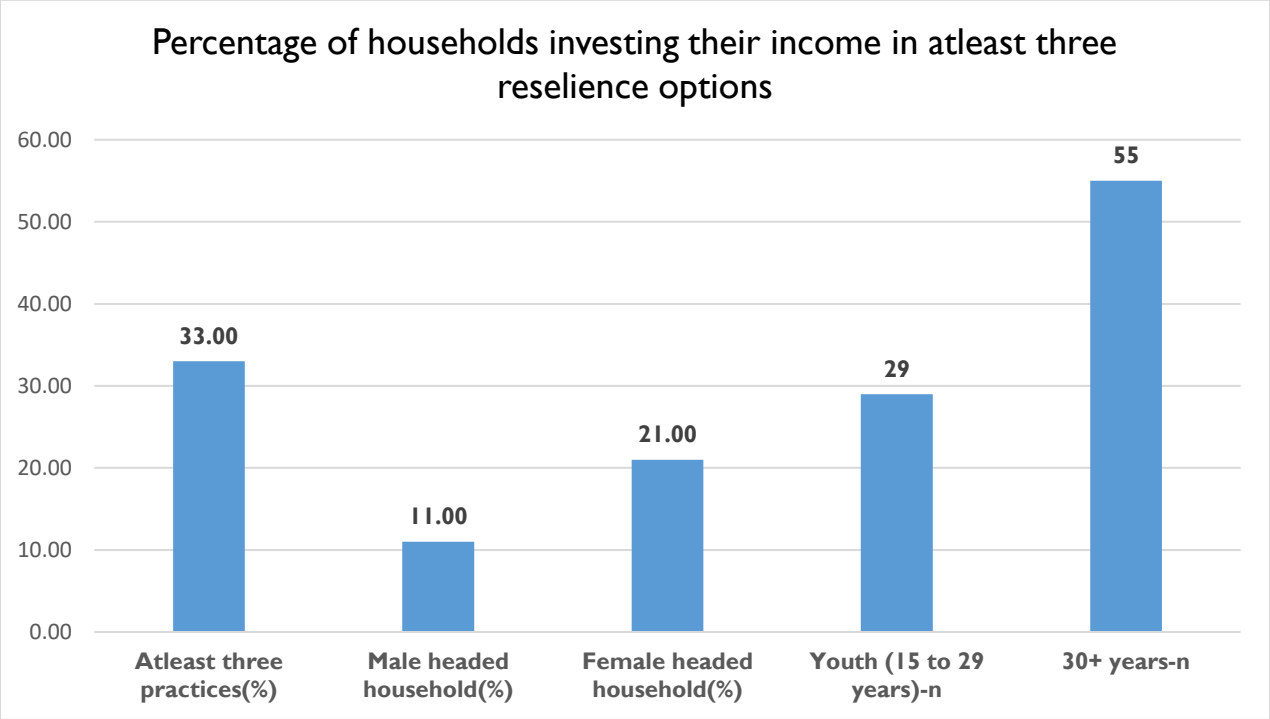
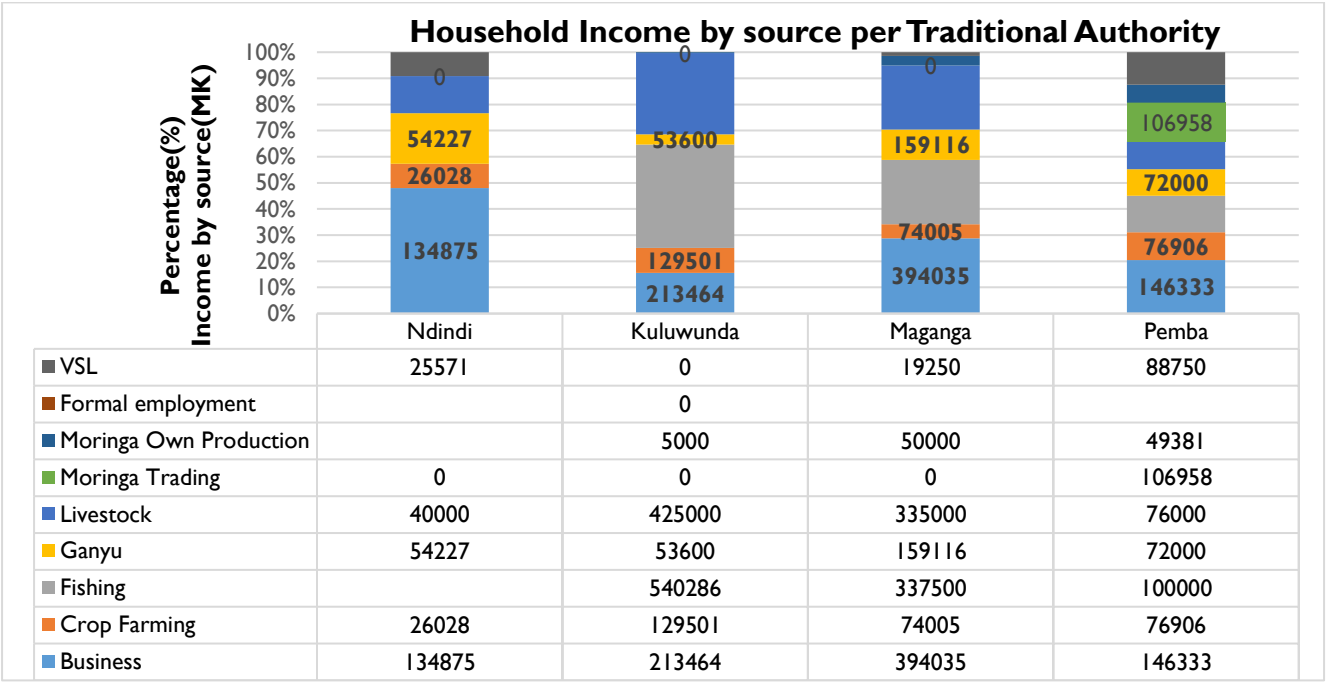


Figure 9:Percentage of households investing in resilience *Panel B*

Result Area 1: Increased income levels of smallholder farmers in the targeted T/As

GL is operating the MOVED activity in four T/As from which farmer groups are being engaged. It is relevant to benchmark levels of income across the four T/A at onset of the project as presented in figure 9



	Ndindi	Kuluwunda	Maganga	Pemba
VSL	25571	0	19250	88750
Formal employment		0		
Moringa Own Production		5000	50000	49381
Moringa Trading	0	0	0	106958
Livestock	40000	425000	335000	76000
Ganyu	54227	53600	159116	72000
Fishing		540286	337500	100000
Crop Farming	26028	129501	74005	76906
Business	134875	213464	394035	146333

Figure 10: Household by source at Traditional authority

The results show households from Pemba are benefitting more in Moringa value chain through selling from own Moringa trees and trading. From the households that were interviewed, T/A Ndindi registered no income realized form Moringa. At the time the study was being conducted the groups that were mobilised in Ndindi from Upper Chipoka had not started enterprise in Moringa production unlike lower part of Chipoka where more moringa is found but groups were yet to be mobilized in this area at the time of the study. An average analysis of the amount of income shows that Maganga (US$213) had the highest income levels followed by Kuluwunda (US$188). This is attributed to high income made from businesses and Fishing.

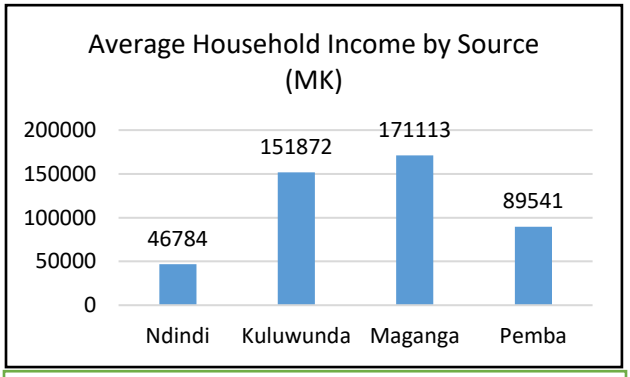


Figure 11:Average household income by T/A

This result area has three output indicators. These are i) number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance; ii) % of assisted

*However according to key informant from Lifidzi herbal in Dindi it was clear that members from the pre-cooperative source moringa from the kwa kuchipoka area near the lake, the West of Chipoka (*commonly known as Kwa ku Chipoka*) where there a lot of Moringa trees . I for one had invested MK30,000(US$37) from which I realized a revenue of MK150,000.00(US$187). I was buying moringa leaf at order price of MK200(US$0.2/ 20-liter pail and sold it for MK900(US11 per KG of powdered Moringa.*

Chairlady Lifidizi herbal farmer group

cooperatives, microenterprises, marketing/aggregating groups and credit unions with improved governance and iii) and Value of annual sales of producers, farms and firms receiving USG assistance

3.2.3 EG.3.2-24 Number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance

The indicator sought to document the total number of agriculture system actors participating in the USG-funded activity who have applied improved management practices and/or technologies promoted by the USG anywhere within the food and agriculture system during the reporting year. The project target is to reach to 1000 beneficiaries with improved management practices or technologies by 2023. The study focused on farmers that had cultivated Maize and Rice as these were key crops grown in the study area. In addition, the analysis further focused on practices in moringa production.

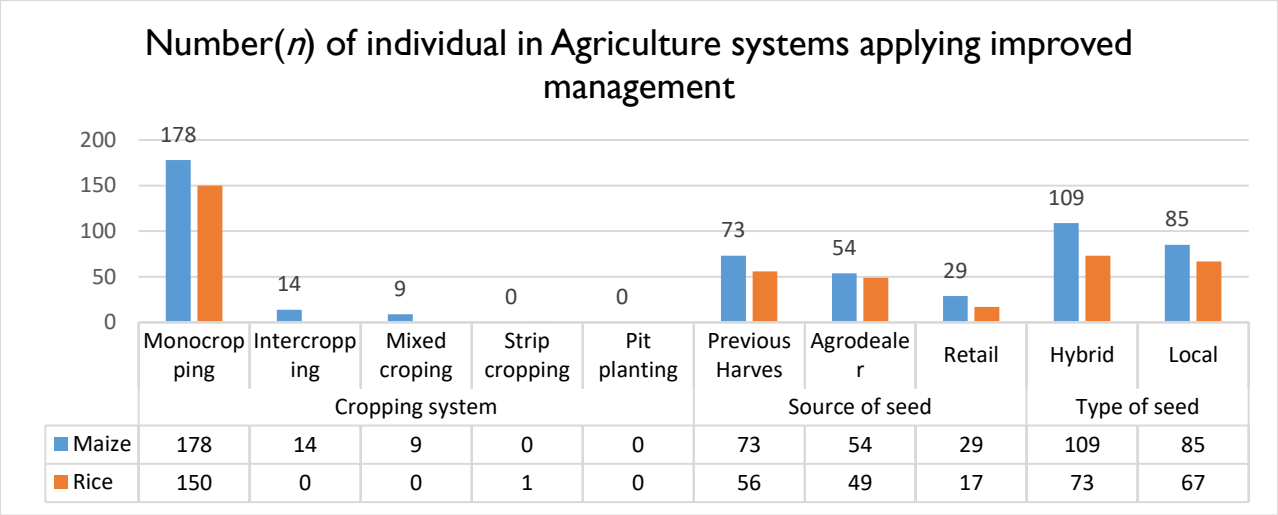


Figure 12: Number of individuals applying improved system in Agriculture systems

Improved management practices and technological change and adoption by different actors throughout the agricultural system will be critical to increasing agricultural productivity and supporting stronger and better functioning systems, The results from figure 11 shows that 209 households applied improved systems with 48% female headed households.

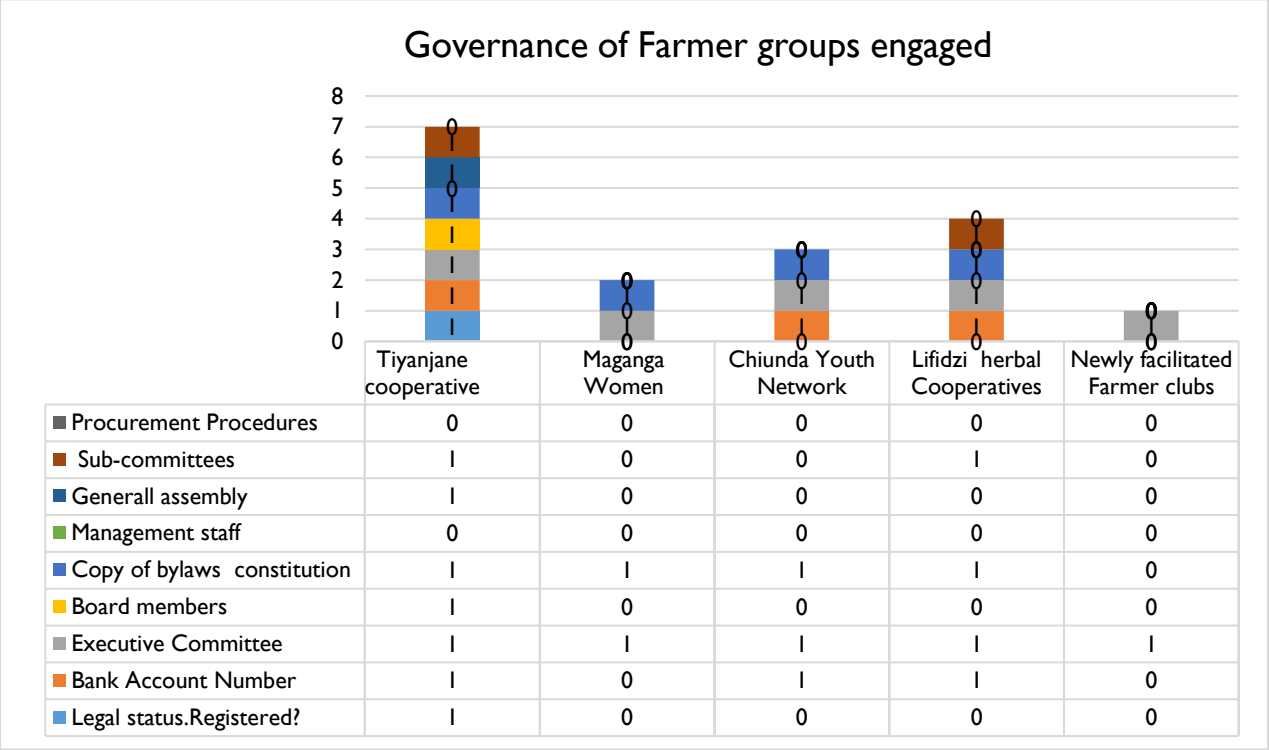
3.2.4CDP IR1: % of assisted cooperatives, microenterprises, marketing/aggregating groups and credit unions with improved governance

One of the key activities of the MOVED activity is to establish a Cooperative-led Moringa Business Incubation Hub – MoBIH. Being cooperative led it is important that the Farmer based organisations (Clubs, Associations, Cooperatives) adhere to the governance demands for effective and sustainable running of the MoBIH and the FBOs themselves. Through the FGDs and KII the study established that in the inception stages of the activity GL is continuing mobilising farmers through Moringa farmer clubs in the respective Traditional Authorities. GL is further revamping and continuing working with some existing cooperatives

to synergise and strengthen governance for the clubs at grass root level. The project sorts to strengthen governance from farmer clubs at grass root level (Primary cooperatives), Secondary cooperatives and Tertiary prescribed as MoBIH. In this study assessment of the level of governance for the cooperatives and pre-cooperatives that MOVED activity is in cooperation with. The activity set up respected this process through problem-solution identification and it will be amplified during the implementation and management phase.

Sustainability is a critical aspect in this activity as it started with co-designing, co-resource mapping and yet to continue through community-government-private sector collaborative engagement during implementation processes. For example, the activity will support the intensification of moringa value chain development and product development by initially working with already established cooperatives such as: *Tiyanjane, Maganga Women, Hill side youth,* and *Lifidzi herbal* cooperative and status of the newly facilitated farmer clubs. The figure below presents findings on the levels of governance based on 9 elements of governance of Farmer based Organizations. The analysis focused on existing FBOs that the MOVED activity is working with and those that have just been mobilized. Results show that there is one registered cooperative (Tiyanjane cooperative) with about 7 points out of 9 which qualified to have improved governance. This was seconded by Lifidzi herbal cooperative with 4 points who are yet to be trained in cooperative member education. However, Lifidzi is a potential group as the group members have been exposed to numerous trainings[7] relevant to the moved activity agenda

[7] Business Management Trainings, Moringa Processing into powder, Village savings and Loans, Improved farming practices



	Tiyanjane cooperative	Maganga Women	Chiunda Youth Network	Lifidzi herbal Cooperatives	Newly facilitated Farmer clubs
Procurement Procedures	0	0	0	0	0
Sub-committees	1	0	0	1	0
Generall assembly	1	0	0	0	0
Management staff	0	0	0	0	0
Copy of bylaws constitution	1	1	1	1	0
Board members	1	0	0	0	0
Executive Committee	1	1	1	1	1
Bank Account Number	1	0	1	1	0
Legal status.Registered?	1	0	0	0	0

Figure 13: Governance of farmer groups engaged

Number of cooperatives receiving technical assistance to access output markets.

About 34 farmer groups (30 were newly established by the activity) farmer groups were engaged during the study. Four (4) of the cooperatives were already existing and GL is engaging as secondary cooperative and activity entry points. From the 30 newly established farmer groups none of the m at the time of study was being assisted to access output markets. From the Four secondary cooperatives, 3 indicated to have been linked/accessed with markets for their produce. Lifidzi herbal has an off-taker for the Moringa leaf powder but it is no longer existing and members stopped enterprising in Moringa because there is no market. The other two cooperatives linked to markets trade in legumes and cereals. Summarily, from the farmer groups that the study engaged (34), 3 cooperatives were technically assisted to access output markets. This entails the importance of MoIHUB which would be a precursor for Moringa production and other related products.

3.2.5 EG3.2-26: Value of annual sales of producers, farms and firms receiving USG assistance

The baseline considered the interventions of the activity to be moringa based, Climate smart and agroforestry based which has a bearing on crop productivity. The analysis of value of annual sales focused on sales realized from Moringa (own production and trading) and from crop farming. The results show that

on average households realized MK77,747.00(US$97) on annual basis with Moringa Trading is contributing more (US$121) followed by crop sales (US$112). The results captured at this stage were only for household producers/farms. The firms/middlemen that were interviewed were not willing to unveil data on the revenues in the moringa value chain.

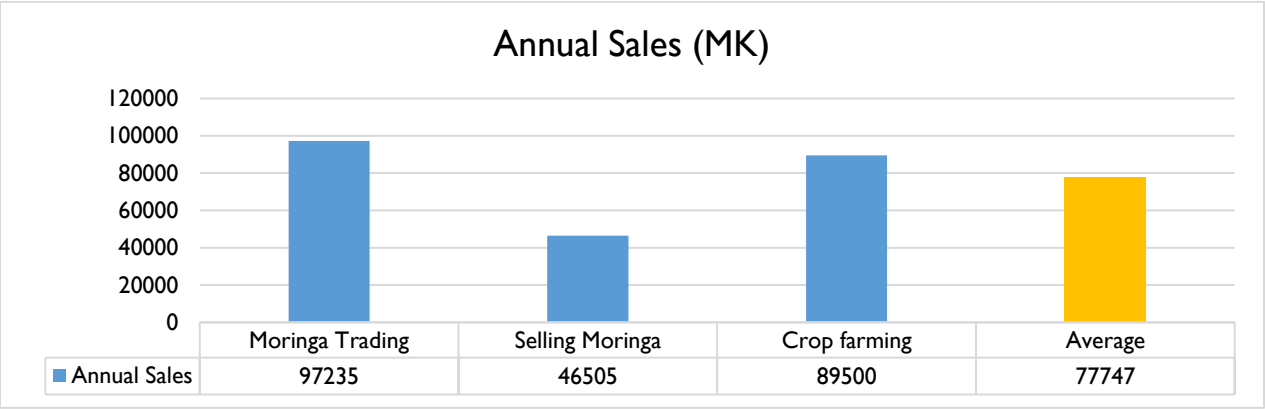


Figure 14: Annual sales

Result Area 2: Improved household economic, food-nutrition security and environmental health through moringa integrated agroforestry farming coupled with VSLs/MFIs linkages.

The result area has two indicators thus i) Percentage of people reporting increased economic benefits derived from sustainable natural resource management and ii) conservation as a result of USG assistance (FACTS 4.8.1-6) and Value of non-donor resources mobilised by the community. However, since the indicator taps on food and nutrition security a further analysis was conducted to document food and nutrition security

3.2.6 Food and nutrition security

Further analysis was conducted to determine the proportion of households with year-round access to sufficient food for the family needs. The results showed that 71% of the households in the study area at least indicated to have experience food shortages in the recent past 12 months from the time of study.

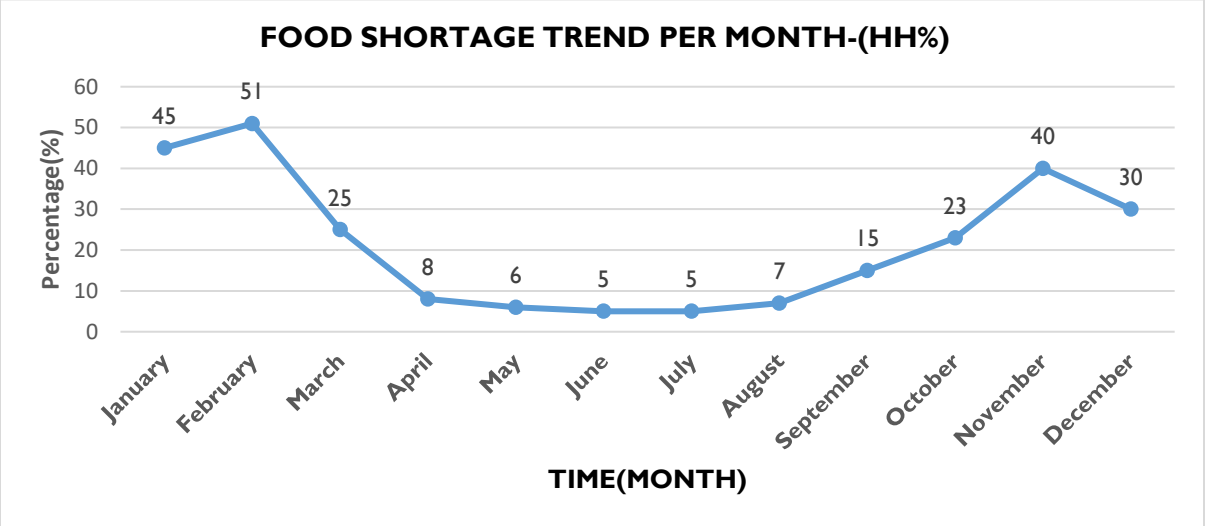
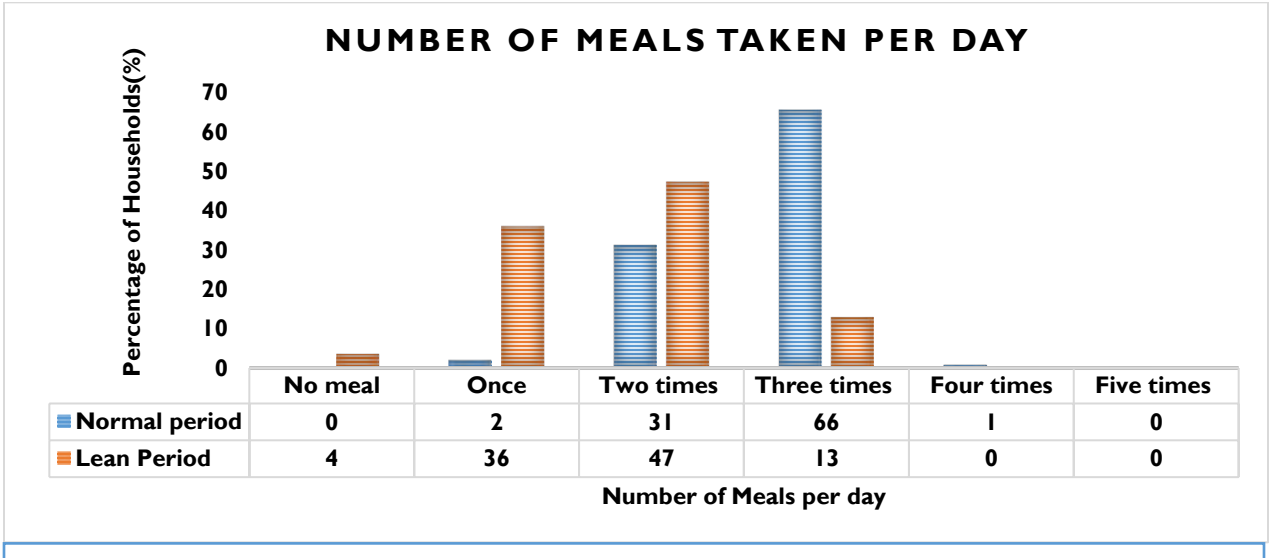


Figure 15:Trend of food shortage by month

A monthly trend results show that 51% of the households experienced food shortage in the month of February whilst a minimum of only 5% experienced food shortages in months of June and July in the study area. The analysis follows a common trend in Malawi as most of the households have adequate food during and after the harvest period and lean from December to March as shown in figure 14 above.

Number of meals taken per day and food groups consumed

A further analysis of food security was conducted to benchmark the number of meals consumed and the quality of meals in terms of number of food groups consumed using a 24-hour dietary recall method.



The results show that 66% of the households were able to afford to 3 meals per day during the normal period of the year while only 13% managed to have 3 meals per day during the lea period of the year.

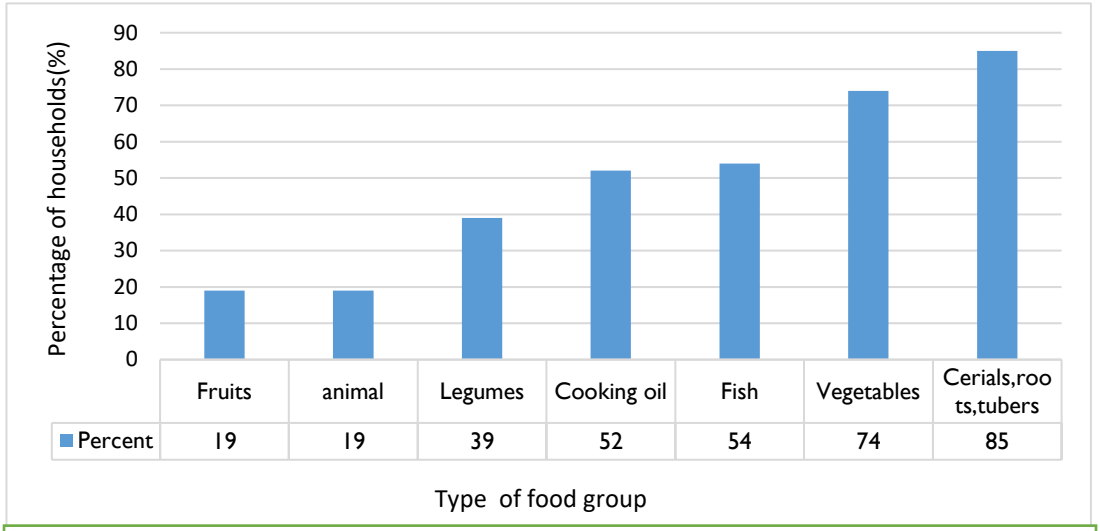


Figure 16: Analysis of Food groups consumed

Figure 14: Percentage of people's increased economic benefit of USG

It is during this lean period where nutrition issues arise. *Moringa* will be very key during these times as a extra source of income and most importantly as a food additive to ensure nutrition resilience in the target communities. In terms of food groups results show that at most 12 % consumed 3 food groups while 20% consumed 4 food groups there was no household that indicated consuming six food groups. The figure below analyses percentage of households by type of food groups consumed. It shows that energy food are high consumed (Over 80%) while fruits animal products are least consumed (19%)

3.2.7 Percentage of people reporting increased economic benefits derived from sustainable natural resource management and conservation as a result of USG assistance

The activity intends to increase income from green Entrepreneurship. Specifically, through Moringa value chain, Soil and water conservation technologies and climate smart agriculture. At baseline the study showed that 11% generated income from Moringa Value chain and wild foods. Soil and water conservation and CSA

leads to increase in crop productivity which is an intervention which may lead to increase in crop sales to and may further attributed to increased economic benefits at project evaluation.

3.2.8 Value ($) of non-donor resources mobilized

The indicator is a sum of the total value of non-donor resources[8] contributed to achieve local development

[8] Non-donor resources include financial or in-kind resources (ie: volunteer hours, meeting space, equipment and supplies,

priorities as a result of USAID projects and activities. The analysis considered valuing the land the household and community has allocated to moringa production. It was observed that most groups sourced their own seed to develop moringa tree nurseries as seed from the project was yet to sourced. In addition, Labour is an important factor of production is equally valued to estimate community contribution towards the MOVED activity

Table 8: Non-Donor resources mobilized based on projected targets

Non donor resource	Qty	Value per unit (MK)	Total Value
Land(ha)	20	30000(US$37)	1,500,000.00 (US$1873)
Moringa seedlings(kg)	39236	200(US$0.25)	7,967,200.00(US$9946)
Labour	20	40000(US$50)	800,000.00(US$999)

3.2.9 Number of individuals who have received USG supported training in organic Moringa production and processing, and/or climate smart agriculture practice

Some of the elements of Organic moringa production hinges on clean seed (Thus seed or stem cuttings), biological control of pests, crop rotations, green/organic manure, mineral bearing rock powders for liming, animal manure and off farm manure. Moringa production and commercialization is fairly new in Malawi. This is not exceptional for farmers in Salima who the MOVED activity targeted to organize and commercialize moringa production and processing. While it is evident that activities of moringa harvesting from the homestead (Hedges) planted trees ignited by informal traders, the study finds that organic approaches to moringa production is yet to surface in the intervention areas of MOVED activity. The results show that 21%(40F;15M) of the households were trained in moringa production while 10% (18F;7M) were trained in moringa processing. However, this is an opportunity to tap from the existing knowledge and induce the organic approach of Moringa production and processing.

knowledge resources, etc) from any source excluding international bilateral or multilateral donors

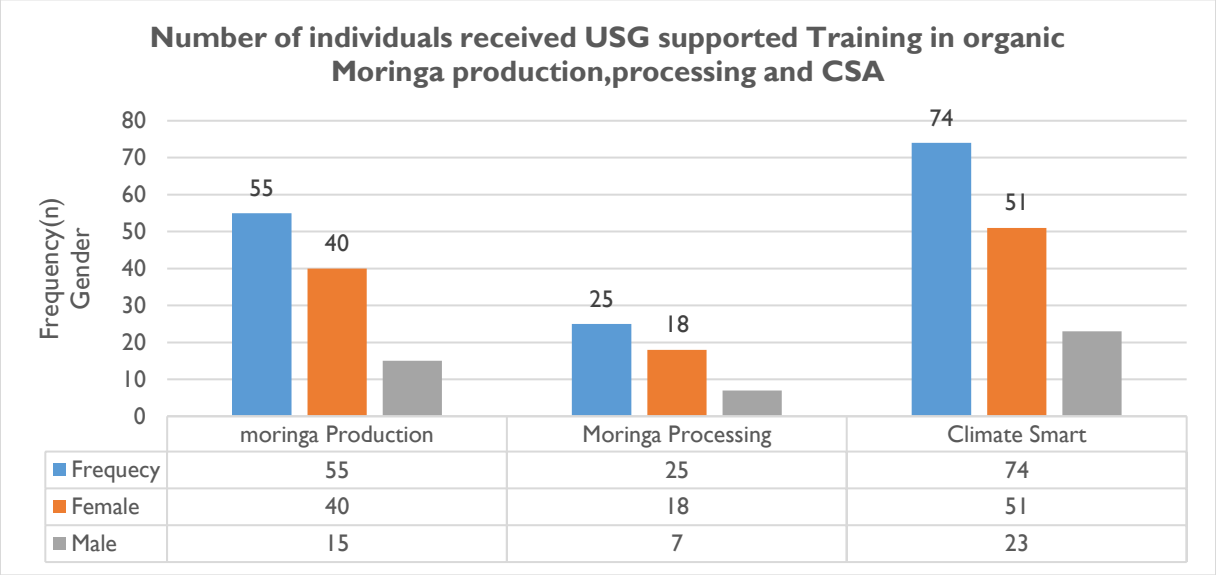


Figure 17: Number of individuals received USG supported Training

The trainings on *Moringa* processing were facilitated by the middle men. Some of the other trainings pointed out included moringa harvesting, cleaning, drying and home processing to moringa powder. Other NGOs such as CARE Malawi and COOPI oriented the households in *Moringa* utilization such as moringa powder used as an ingredient to boost immunity, improve body nutrition for children and the sick, used as relish. In terms of CSA, results show that 29%(51F;23M) have been trained in CSA composing of.

3.2.10 Number and size (in Ha) of land for individual and/or cooperative M*oringa* farms established (10 Ha per cooperative)

This indicator measures the area in hectares which has been committed to *Moringa* production either as old or newly established farms. USG support will be provided through training, inputs and information in Moringa management in these farms. Number will count the number of farms established while Size in hectares will count total land area. This will not include individuals who are practicing mixed cropping of Moringa and other crops as well as individuals planting *Moringa* as live fence or few around the house. That will only be recorded as number of trees planted and will not count for this indicator.

There is no specific size of a land or plot qualifying to be a farm, however, plots where only Moringa is being farm will be measured using tape measures or mobile apps and record its size. The baseline study collected data on land allocated to moringa production after the sensitisations by GL. The current number of trees(n) owned by the households. And for those that have not yet allocated any land, willingness to allocate land to moringa production was estimated. The current common practice of moringa production in the study area is the use of moringa trees live fences or hedging around homestead areas. At the time of the baseline study, it was established that the average amount of land that has been spared for moringa

production is 0.1 ha (0.25 acres) per household. A further analysis at T/A level showed that Pemba had the highest with 0.4acres followed by Maganga with 0,03ha then Ndindi (0.1ha) and lastly Kulunda with 0,076ha. Those had not yet allocated any land were willing to allocate about 0.2ha

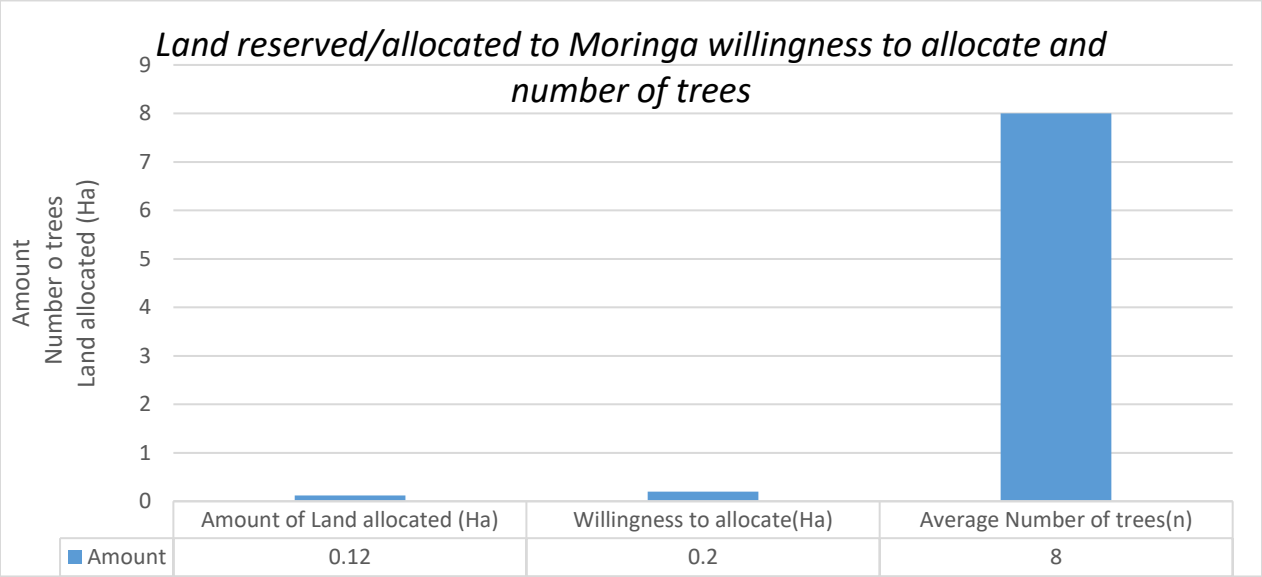


Figure 18: Land reserved/allocated to Moringa and willingness to allocate

During the focus group discussions, it was established that on average some of the farmer groups were allocated average of 1 acre land for moringa production the local Authorities (Chiefs). This indicator needs actual GPS measuring of land allocated for moringa production to be certain and precise of the land size. The activity is targeting to attain 50Ha of land from respective 5 cooperative/farmer groups, thus 10 Ha per cooperative.

One of the key observations in the respective T/As is the beneficiary groups have a challenge to find a piece of land as clubs. In cases where groups have accessed land on average it is 1 acre against numerous numbers of group members. The project would consider targeting the Hectarage through households. Considering the time frame of the activity a household would easily allocate land to plant moringa tree. This also avoids unnecessary land related conflicts and attaching the benefits of the project to the mercy of the local leadership (Chiefs).

The analysis in figure 15 indicates that individual farmers reserved 0.1 ha for Moringa after the sensitization took place and those that have not allocated are willing to even allocate about 0.2 acres. If these figures are extrapolated to 2000 beneficiaries, it translates to a range of 200-400acres(80-160Ha) of land which is more than the 50Ha being targeted through the cooperatives. However, the activity may identify communal land as demonstration farms co-owned with the clubs.

PART 2: MARKET AND VALUE CHAIN ANALYSIS OF MORINGA

Market analysis of moringa has three objectives thus; i) Assess the viability of Moringa raw materials and products for local and export potential; ii) Identifying opportunities for building regional moringa value chains and exploring the impact of Free Trade Agreements on Moringa value chain and iii) Analysis of the moringa market landscape, size, segments, trends and influential moringa companies for potential partnerships (off-taker buyer agreements).

3.3 Assess the viability of Moringa raw materials and products for local and export potential.

3.3.1 Multipurpose uses of Moringa

The Moringa plant is known worldwide for its nutritional, medicinal benefits and industrial uses. It is one of the most useful tropical trees. Almost every part of the Moringa plant has nutritional value. Refer to the Venn diagram below which summarizes the multipurpose use of Moringa which creates ever growing demand globally

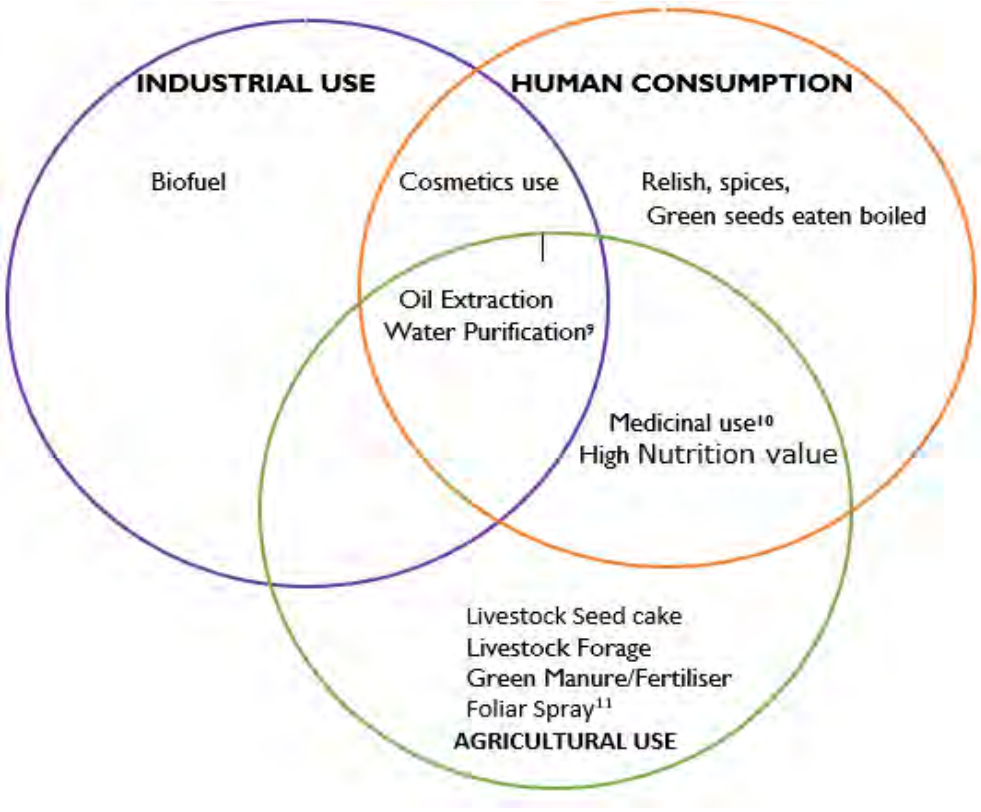


Figure 19: Multipurpose use of Moringa

Source: adapted from Yeray and Edwin (2015)

[9] It works as a primary coagulant as natural bridges are continuously formed between the colloid particles.

[10] Almost all the parts of this plant: root, leaf, bark, gum, leaf, flowers, seed and fruit (pods) have been used for various ailments in the indigenous medicine of South Asia (Anwar et al., 2007).

[11] Plants/Livestock faster growth& resistant to diseases

3.3 2 SWOT Analysis

The nutritional and medicinal benefits of Moringa oleifera are well documented in the literature. However, to further determine the feasibility and viability for the MOVED activity and Malawi economy at large, a SWOT analysis was conducted as presented in table 6

Table 6: SWOT Analysis for viability of Moringa oleifera

Strength	**Weakness**
i. *Moringa* Tree is a Drought Tolerant crop tree/climate change friendly ii. Easy and Fast to grow[12] iii. High value tree crop (Medicinal, nutritional and economic) iv. *Moringa* value chains responds to nutritional and healthy challenges v. Farmer's willingness to allocate land to *moringa* production vi. Farmers' awareness of medicinal and nutritive products of *Moringa*	i. *Moringa* vale chain in Malawi is informal and highly fragmented ii. Undifferentiated product on the market iii. The production volumes are low due to lack of technologies introduced in the value chain iv. Ineffective and un sustainable seed system v. Farmers not organized and operating Individually vi. Weak market linkage
Opportunities	**Threats**
i. Increasing demand of *Moringa* products at local and international markets ii. Unfulfilled diversified customer demand and needs (Health and consumer products; Water purification and animal feed) iii. Willingness of the farmers to produce Moringa iv. Room for Vertical and horizontal partnerships v. Climate change responsive plant	i. Pests and diseases attacking the tree crop ii. Legislative effects: No legislation for Moringa trading in Malawi iii. Limited research and development on *Moringa* value chain in Malawi iv. Influx of Moringa oleifera (leaves, powder and seeds) imports v. Lack of traceability of *Moringa* products sold to the market

The opportunities and strengths were identified for optimal exploitation of Moringa oleifera and incorporation of its trading into the mainstream economy and the MoIHUB.

One of the opportunities is the commercialization of *Moringa oleifera* in other industries such as water treatment which attributes increasing demand at national and international level. However, while the moringa enterprise is promising to the economy, lack of legislative effects to formalize the operations in the value chain poses threat to the perceived benefits for actors. The high-level informalities in the value chain is causing economic inequalities with only the upper stream players benefiting from it. As vindicated from the study in Salima where the average farm gate price for the moringa leaf is MK500/KG(Us$0.6) but versus the market price of MK2500/Kg according to one of the prominent traders in Salima district

[12] Fuglie, L. (2001) The Miracle Tree: The Multiple Attributes of Moringa. CTA, Dakar.

3.3.3 Moringa raw materials and products for local and export

The tree is native to areas of India, Bangladesh, Afghanistan, and Pakistan and is mainly grown in tropical and subtropical regions. It is a fast-growing and drought-resistant tree full of minerals and supporting vitamins. Moringa oleifera and Moringa stenopetala are grown in Malawi in different agro-ecological zones but predominantly districts along the lake and shire river. Moringa oleifera is the most widely cultivated pan-tropical species of a monogeneric family, the Moringaceae, regarded as versatile because of its ability to provide edible food, oil and purify water for local communities. Despite its great importance, M. oleifera is still not well exploited and hence considered as underutilized in Malawi. Various parts of the moringa tree such as bark, fruit, root, leaves, flowers, and seeds are used to make medicine and various products with health beneficial and medicinal properties.

Natural distribution of M. oleifera in Malawi and elsewhere reveals rich variability in fruit types of semi domesticated populations. Distribution pattern among others has had an influence on domestication trends in Malawi in terms of diversity. Despite the great variability of M. oleifera, there is no properly established gene bank or database with either cultivated or spontaneous accessions in Malawi and elsewhere. Absence of elite varieties adapted to local conditions and use of seeds obtained through open pollination from planted plants are some of the major factors that limit productivity. In Malawi, there is limited knowledge of available genetic diversity present in Moringa species to warrant serious breeding programmes for meaningful scaling up. Furthermore, commercialization of Moringa products in Malawi is still very informal making it difficult to get reliable information of production volumes and prices thereby making it unattractive for scaling up.

A quick analysis at famer level indicated lack of knowledge on the nutritive content of moringa and also alternative use of Moringa as some of the reasons why there is low production of the crop among. There is however a growing interest to upscale Moringa species

distribution nationwide as more farmers are made aware of different alternative use of moringa. Moringa oleifera is fairly distributed in specific agro-ecological zones of Malawi and easily adapted to new sites in Chikwawa, Domasi, Makhanga, Ngabu, Mangochi, Mtakataka/Dedza Malawi and salima. This offers an opportunity to be planted much more widely by introducing the species within the existing farming systems as the species can also survive in degraded soils. As such, increased use of the species could have a positive impact on the nutritional, health and economic status of Malawi and households.

Evidence from the study shows that production of Moringa is predominantly homestead and as a hedge crop. It was revealed that on average household in the study area has 8 trees of Moringa. Under the current production on average farmers harvested approximately 125 kg of dry matter of moringa leaf annually. Organized production of Moringa Literature shows that on a hectare under good management the farmer could produce an average of 1.5 tons of fresh leaves/fodder of moringa. In some cases, organic fertilizers are applied for organic moringa and production may go up to 2.5 tons per hectare which can be harvested four times a year.

In the study area it was established that there is huge potential for production. MOVED activity is for two years as such for a quick payback period and reasonable NPV and IRR the paper suggests the targeted farmers in Salima to consider adopting high plant density technology. The table below highlights plant population and corresponding production of fresh matter and dry matter of Moringa leaf.

Table 7:Plant population for Fresh and Dry Matter Moringa

Planting density (plant/ha)	Fresh matter (metric ton/ha)	Dry Matter (metric ton/ha)
10,000	1.5	0.26
30,000	2.7	0.46
350,000	29.7	5.05
900,000	52.6	8.94
1,000,000	78.0	13.26

Source: Muller and Rebelo (Assessed on 06/08/12)

The other Moringa product which has high un tapped effective demand is Moringa seed. It is currently representing the highest volume of exports. In this value chain the primary use of seed is for planting, oil extraction and direct consumption to boost immunity. According to the value chain study commissioned by **MCHF,** Maluso Cooperative Union exported 240 liters of Moringa oil to Japan in 2020, and there is positive indication that there is growing export market for retail units of the product. An interaction with proprietor of Seed Masters, indicated that international market is growing, especially on the semi processed products like powder and Oils.

3.3.4 Cost and margins of Moringa Production

Adegeye and Dittoh (1985), denoted that the profitability of any business can be deduced from the relationship between the cost incurred in running the farm business and the returns accruing to it. After having mapped the Moringa value chain, the team took a next step to understand certain aspects of a value chain in-depth. One of the widely used tool is costs and margins, or more simply said, the money that an actor in the value chain contributes (his/her costs) and the money that an actor in the value chain receives (his/her margins). Measuring costs and margins enabled the researcher to determine how pro-poor a value chain is and whether it is a better fit for smallholder farmers

Costs identification

In Malawi, the most common Moringa processed product is leaf powder otherwise Moringa leaf is predominantly traded. In terms of production most farmers use wild trees as a means of farm fencing or homesteads. The study compares three scenarios in of gross margin analysis on; i) the current practice from the study area in Salima based on the average number of eight (8) trees per homestead, ii. The gross margin compiled for Zakhalango cooperative in Mangochi with a similar intervention on a 1-acre piece of land and iii) a proposed ideal model considering the limited time of the MOVED activity on a 1-acre land. The costs and returns associated with Moringa production in the study area are presented in Table 6.

Table 8:Summary Gross margin for the three scenarios

Scenario	Unit Measure	Yield	Farm gate Price (Mk/kg)	Total Revenue	Total Variable Cost	Gross Margin (Mk)	Break Even Yield	Break Even Price (MK/kg)
Current Practice	8 trees	75.00	500.00	37,500.00	18,300.00	**19,200.00**	36.60	**244.00**
Zankhalango Cooperative farmers	400 trees /acre	125.00	1,500.00	187,500.00	49,700.00	137,800.00	33.13	397.60
Proposed Ideal Scenario	4000 trees /acre	1,260.00	500.00	630,000.00	160,000.00	**470,000.00**	320.00	**126.98**

As depicted in table 8 above, the current practice shows that members have on average 8 trees and are able to break even at a yield of 36.6 kg. The current practice is not competitive despite its positive gross margins which is due to limited production costs. The second scenario of Zankhalango Association in Mangochi, farmers planted up to 400 trees per acre which will produce around 125kg of dry matter with a potential gross margin of MK137,800.00 (Moringa Report, 2021). Considering limited time of MOVED project life, the study recommends that members should plant at least 4000 trees per acre (10000

trees/ha) under the intensive production. The analysis show that farmers will be able to realize a gross margin of MK470,000.00 under intensive farming with a break-even price of MK126.98/kg. The break-even price of Mk126.98/kg is very competitive for the farmers to get higher margin as the current prevailing price is twice more than the breakeven price

The first level of gross margins calculation was done at farm level to understand how much farmers can make from one acre of Moringa woodlot which they are anticipated to plant. The team interacted with farmer representatives from all Traditional Authorities during focus group discussions from which average costs were generated. Using the production data from study plots in Mangochi, under leaf production on average the total production of dried moringa leaf on one acre is about 200 kg. From the literature, the gross margin from one acre (0.4 ha) was found to be around Mk103,500.00 and positive. This is under production of moringa with an emphasis on leaf harvesting with at least 400 trees. The analysis further showed that farmers are able to break even with production of 62 kg of dry Moringa leaf.

The other parameter that study focused much was on gross sales which farmers realized in the past season from Moringa sales. From the interaction with the farmers, it was discovered that farmers at least on average owned 8 moringa trees. The analysis from household data, further showed that on average farmers were able to sale around 65 kg of moringa leaf from homestead production. The average sales form traded Moringa in the study area was found to be **(MK97,235.00**)– middle traders – the interviews with Lifidzi Herbal farmer group indicated that members were able to increase their revenue to five-fold on moringa trading- while from own production farmers reported on average **MK46,505.00**. The low revenue reported could be attributed to low prices offered by the buyers as it was reported that on average moringa was being traded at Mk500/kg.

It should be noted that under good Management practices (following good planting spacing, application of manure and biological control of pest), on 0.4 ha farmers can realize a gross margin of MK340,000.00 with an increase of production by 50%.

3.3.5 MOVED Business Model Canvas (MMC)

A detailed business model for MOVED activity is presented below-

<table>
<tr><th>Key Partners</th><th>Key Activities</th><th>Value Proposition</th><th>Marketing</th><th>Customer Segment</th></tr>
<tr><td rowspan="2">• USAID
• Malawi Bureau of Standards
• Suppliers (Packaging, Branding) Yet to be identified
• Cooperatives
• Nutri products</td><td>• Site selection
• Procurement of moringa processing machines
• Erecting drying benches
• Harvesting
• Processing
• Packaging
• Marketing and selling
• Revamping, Strengthening FOs
• Market linkages
• Research</td><td rowspan="2">Natural
Organic Moringa oil
Moringa Tea bags
Moringa Capsules
Seed and seedlings</td><td>Customers
• GLI Websites
• Media</td><td rowspan="2">Oil and Moringa leaf processors
Pharmaceutical companies
Herbal companies
Herbal FOs
HIV/AIDS patient
Healthy conscious people
NGOs promoting Herbal value chains
Scaled up nutrition programs e.g., School feeding program</td></tr>
<tr><td>Key Resources
• Watering canes
• Seedlings
• Drying benches</td><td>Distribution
• GL offices (in Lilongwe and Salima)
• MoIHUB
• Retail shops
• Factory shops
• Natures
• Super markets</td></tr>
<tr><td colspan="2">Cost Structure
• Packaging
• Labour for processing Moringa
• Branding and marketing of Moringa
• Processing equipment
• Drying benches
• Seedlings
• Processing structure/building
• Utilities</td><td colspan="3">Revenue Stream
Selling
• Moringa Honey
• Raw leaves
• Dry Powdered leaves
• Moringa seedlings
• Moringa seeds
• Moringa oil
• Moringa seed powder
• Moringa seed cake for water purification</td></tr>
</table>

Figure 21: Business model canvas for Moringa

3.4 Identifying opportunities for building regional moringa value chains and exploring the impact of Free Trade Agreements on Moringa value chain

In order to ascertain this an analysis of the whole value chain was made looking at both downstream and upstream players. The first step looked at a simplified schematic of Moringa Value chain which then followed with a detailed analysis of all players involved in the entire chain. The analysis further looked at the cost margins to inform the activity on how smallholder farmers should be involved to maximize return

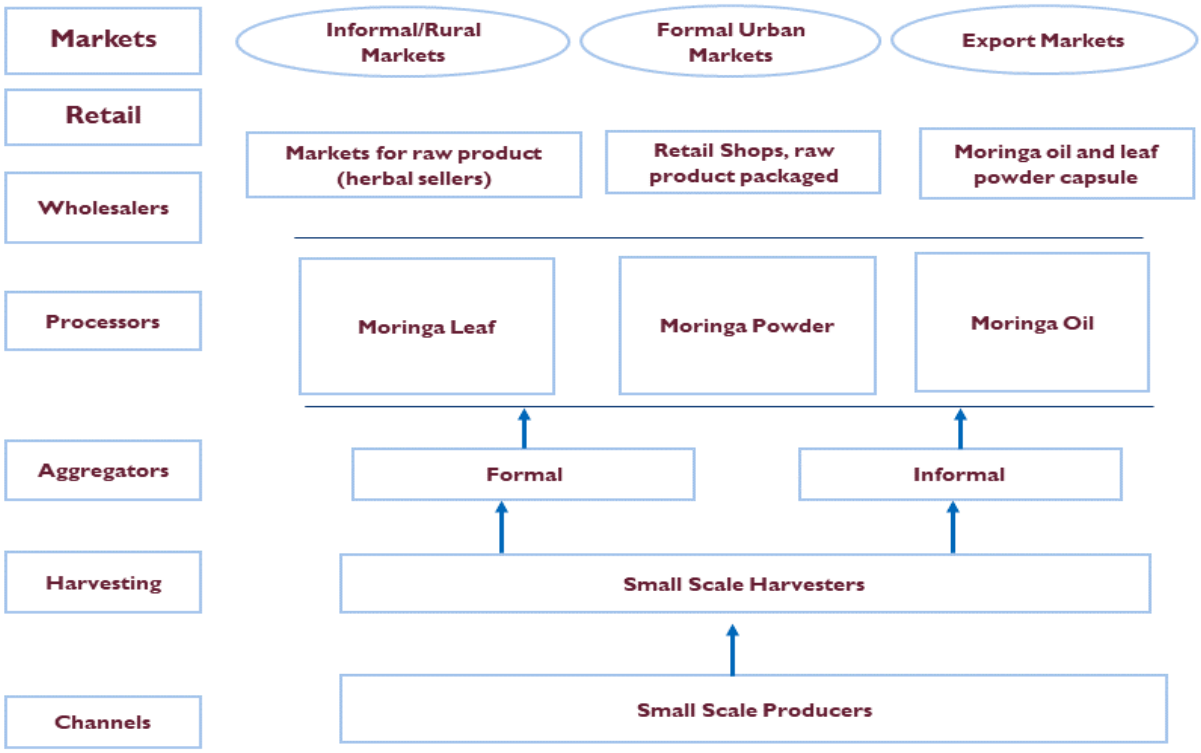


Figure 20: schematic Moringa Value chain

3.4.1 Moringa Value Chain Analysis

Mapping value chain eases a clear understanding of the series of activities with main actors and relationships involved. In this analysis models, figures and diagrams were used to understand the moringa value chain. Different dimensions like the core processes, main actors involved, specific activities undertaken by each actor, product flow, knowledge and also the geographical flow of the product were mapped to provide an overview of the Moringa value chain in the study area.

Handfield and Nichols (2002), describes value chain analysis as a process of examining value chain activities in order to undertake them more efficiently, effectively and economically. It is generally used as a tool to establish a joint vision and identify needs of the existing supply and market barriers, in order to develop intervention strategies. According to Tuvhag (2008), value chain analysis disaggregates the international structure of production, trade and consumption of commodities, and allows for identification of actors and

geographical division. Mapping the actors involved in the Moringa value chain helped in identifying marketing channels that existed in the study area

3.4.2 Moringa Channels

As depicted in the Box 1 below, based on the interviews with different chain players, six major channels were identified to be operational in the study area linked to other chain players in the country and beyond the borders. Moringa farmers purchased seeds from input suppliers within and outside the district. After the harvest, the produce was sold by the farmers to the local traders, wholesalers, processors or retailers. Local traders and wholesalers are involved in local level processing like drying cleaning and grading the leaf. Processors added value to the produce through processing and three value added products being processed are moringa leaf powder, tea bags and moringa seed oil and Box 1 shows the summarized channels that were identified.

Box 1: Identified channels

Channel 1: Input suppliers - Farmers - Local traders - Wholesalers - Processors - Retailers - Consumers.
Channel 2: Input suppliers - Farmers - Local traders – consumers
Channel 3: Input suppliers - Farmers - Wholesalers - Retailers - Consumers
Channel 4: Input suppliers - Farmers - Wholesalers – export market
Channel 5: Input suppliers - Farmers - Processors - Retailers - Consumers
Channel 6: Input suppliers - Farmers - Retailers – Consumers

3.4.3 Value chain Mapping

3.4.3.1 Mapping the core processes

The core processes that the produce went through before it reached the final consumption stage was distinguished and mapped as depicted in **Fig 18**. Input provision especially seed was the major process without which the chain was incomplete. It was discovered that more than 90% of respondents sourced locally available seed or planting materials. Few respondents indicated that they use plant protection chemicals. From the visit in some of the locally raised nurseries, it was discovered that issue of pest infestation was a major challenge.

After maturity, the produce was harvested and it was either collected by the local traders or wholesalers. Processing was the next major phase in the chain, where the produce was being value added and converted

into other forms (Leaf powder and Seed oil) for consumption. About 60 per cent of the produce is absorbed by processors who either sale locally or export either through leaf or powder.

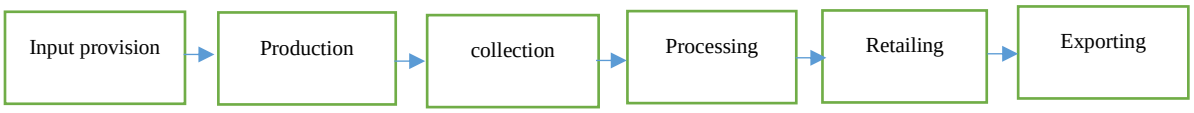


Figure 21: Mapping Core Processes along Moringa Value Chain

3.4.3.2 Chain Actors

The study also tried to map the main actors along the value chain and fig 2 below shows the main actors who were interviewed during the study.

Figure 22: Mapping Moringa main actors

(i) Input suppliers

Input suppliers were those who supplied seeds or cuttings to the farmers for further production. The major inputs for smallholder of Moringa production are seeds, tools, fertilizers and pesticides. The seed systems for the value chain hinges on the local channels, and it was revealed in the study area that more than 90% of farmers sourced own seed and cuttings within the area. This is mostly famer initiatives to plant seed from locally available planting material (Seed and stems). Due increasing demand of moringa products, of recent the department of land resources and forestry started refocusing to invests in the seed system

(ii) Producers of Moringa

Farmers were involved in cultivation and production of Moringa seed and leaves. The common production methods of moringa in the study area was around the homestead. Mostly, the moringa stems are most as poles house and bathroom fences. However, this has paused a threat to moringa value chain as it exacerbates the levels of salmonella attributed to chicken waste around the homestead. To reduce this problem, it is important that farmers should consider production on special group fields away from the homestead to plant moringa trees. In general, for leaf production, it has been suggested that Moringa can either be planted as intensive production, semi-intensive production or as part of the agroforestry system.

(iii) Local traders or commission agents

Local traders or commission agents procure produce from the farmers and aggregate for the wholesalers who usually dealt with bulk purchase and aggregation. In the study area, it was discovered that there was

one dominant player who is the main buyer of moringa leaf in most of the clubs. A further analysis showed that buyers come as far as Blantyre (one of them being Seed Masters) to buy moringa in the area and distribute it further to the other intermediaries in the chain.

(iv) Processors

Processors were involved in the conversion of raw farm produce to other forms such as leaf powder, seed oil and other value-added products. The main activity of processing at community level is leaf drying. Most farmers sun-dry the leaves and usually drying process takes 2 to 3 days depending on the weather and temperatures. Drying is mainly by sun rays, the produce is dried on elevated place, on mat and other traditional materials. Retailers purchased the produce in minimal quantities and stored them in their shelves for resale and consumers were the end users for whom the value was

The core processes as mapped in Fig. 18 above were further broken down into specific activities that were undertaken by the different actors mapped in fig 19, identified along the Moringa value chain. Input provision was taken up by the private seed suppliers and agricultural institutions; production was taken up by the Moringa farmers; collection by the local traders and wholesalers, which involved procuring the produce from different Moringa growing regions in the district, grading them, storing and marketing it further along the chain. Processors were involved in conversion of raw produce into value added products as highlighted in the fig 4 below.

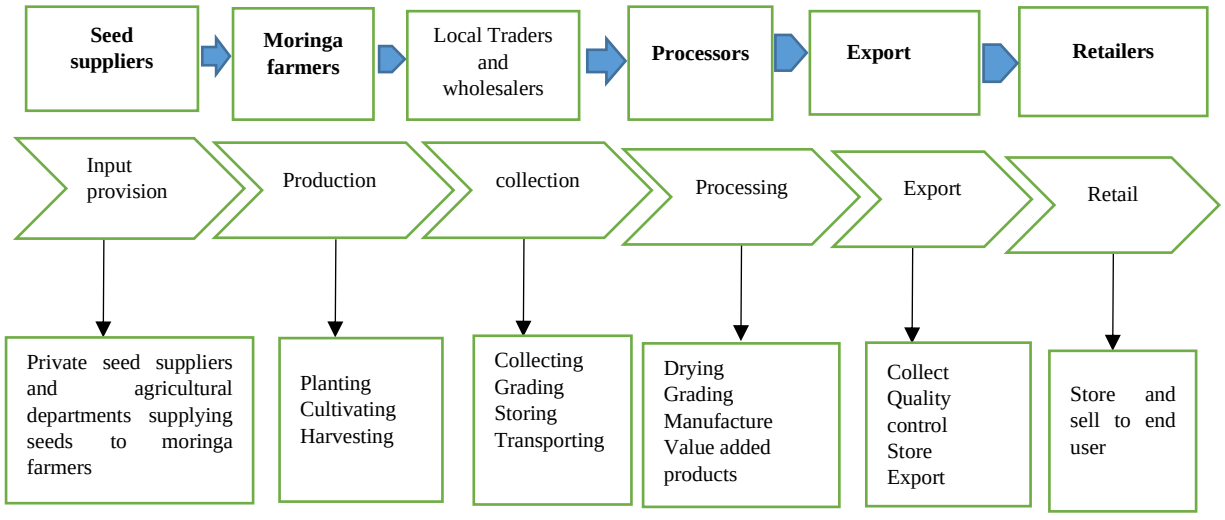


Figure 23:Mapping specific activities undertaken by actors

3.4.3.3 Price Transmission along the Moringa Value chain

The study also looked at price transmission and value changes along the value chain under study. The area of focus were farmers, Local traders, and Exporters (local and regional). The study revealed that there are high price margins for moringa leaf powder within the chain. The local trader's mean price for moringa was 250% percent higher than that of the farmer. It should be noted that there is very little value addition between the traders and the farmers, and the transaction cost are not that significant to warrant such high margin.

The local exporter (aggregator) price was four times higher than what the farmer is being paid and 50% higher than the trader pays. When compared between the Moringa value at farmers' level in Malawi and the price paid at regional level, it is 640% higher. It can be concluded that there is high price variations within the value chain and mostly farmers lose out with more stages along the chain

Table 9: Price Transmission along the Moringa Value chain

	FARMER	LOCAL TRADER	PROCESSOR	
			Local Exporter	Regional Markets
Average Moringa Powder Price ($/kg)	0.625(MK500)	1.87(MK1500)	3.31(MK2651)	4.63(MK3708)
Value change	Base	1.25(MK1000)	2.69(MK2154)	4.00(MK3200)
Percent % margin		250%	430%	640%

source: survey data

3.5 Analysis of the moringa market landscape, size, segments, trends and influential moringa companies for potential partnerships (off-taker buyer agreements).

3.5.1 Market landscape, size, segments, trends

According to the Moringa Global Industry Outlook research study conducted by Moringa global industry outlook, the global Moringa Products Market was estimated at USD 5 billion in 2019 and is expected to reach USD 8.4 billion by 2026. The global Moringa Products Market is expected to grow at a compound annual growth rate (CAGR) of 8% from 2020 to 2027 (Moringa Global Industry outlook 2020-2026).

A Regional analysis shows that Geographically Global moringa products market is split in regions like North & South America, Europe, Asia-Pacific, Middle east and Africa and Rest of the world. Asia-Pacific settled for the leading share of around 35.30% of the moringa products market in 2018. China, India, and Australia and New Zealand are key countries add up to the market expansion in the region. Asia-Pacific is the largest producer of moringa. The production in the region is mostly devoured locally due to the traditional use of moringa in wellness, skincare, and hair care. Asia Pacific is also the quickest increasing local market.

3.5.2 Trends of moringa exports in Malawi

A trend analysis was run from years 2013 to 2021 in Figure 22. The results show that there is there is an increase in export of Moringa from 427Kgs to 43860Kgs in 2019 before dropping to 23303 in 2021. The drop is attributed to global effects of COVID 19 in from 2020. Generally, the trend of exports in Malawi is responding the Global demand of Moringa and its products.

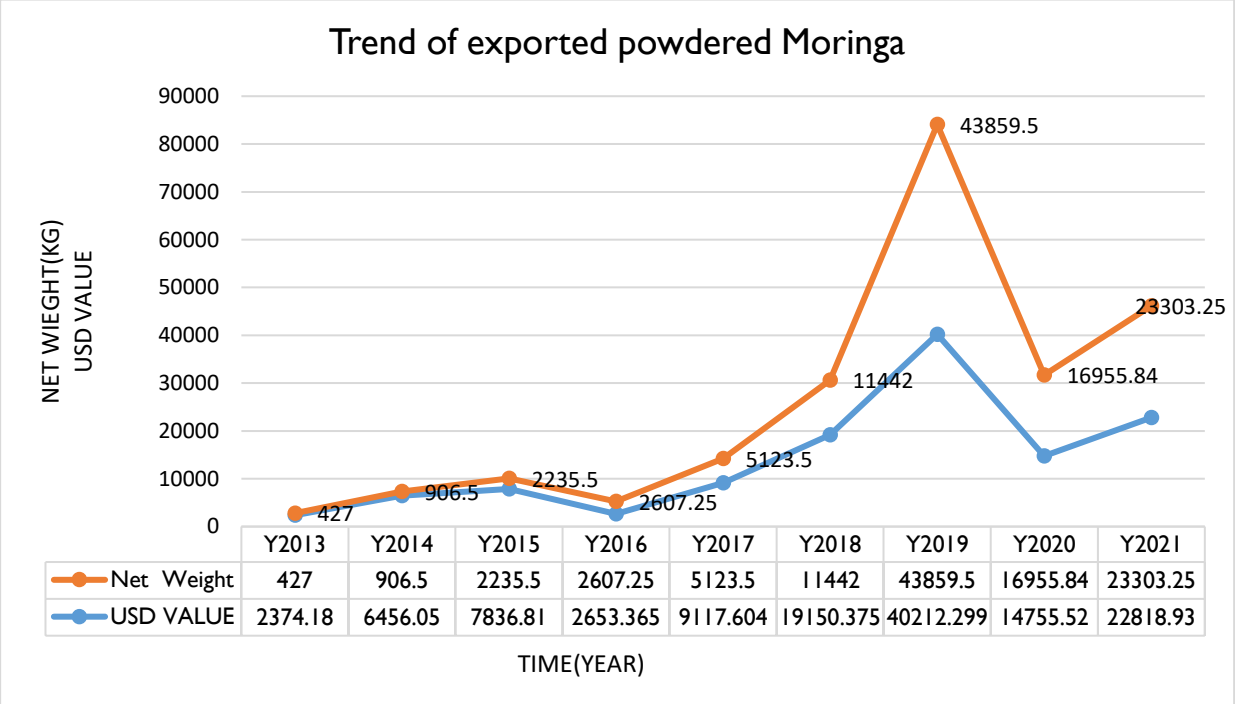
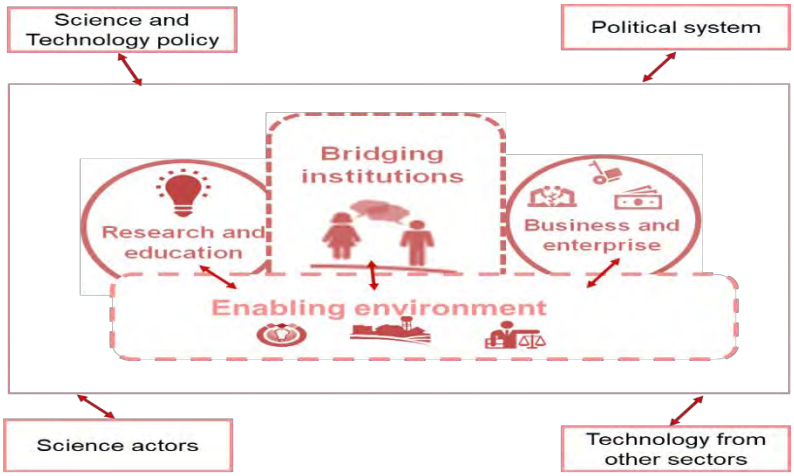


Figure 24: Trend of Malawi exports *Source: calculated from NSO data (September 2021)*

3.5.3 Influential Moringa companies for potential partnerships (off-taker buyer agreements).

To analyze this an Agricultural Knowledge Innovation System (AKIS) model was deployed.

This is a concept used to describe the development and exchange of knowledge and the services which support these exchanges in rural areas. It is a **system** that links people and organisations to promote mutual learning, to generate, share, and utilize agriculture-related technology, knowledge, and information. The study this approach fits well with the Moringa Value chains Enterprise Development activity and the Moringa Innovation Hub.



Source: Dockès et al (2011)

The AKIS has four subsystems[13] as presented in figure with categories of actors[14] in the systems. This is summaries various actors in the Moringa value chain analyzed above. This agricultural knowledge and information exchange is similar to an approach which provides communication. Information and knowledge are regarded as essential for farmers to respond successfully to the opportunities and challenges of the physical, social and policy environments in which they operate. It has been said that empowering the poor is about providing them with information. Knowledge gaps and information problems are key constraints to the efficient functioning of markets and equitable growth and development. Technology refers to the combination of knowledge, inputs and management practices which are used together with productive resources to gain a desired output. Transfer of technology is not merely the means of transferring knowledge, information and skills about technology to its potential users, but also a way of helping them to use these technologies fruitfully to their advantage. information would be important. For the MOVED activity to be successful research, education, extension and supporting system should work in sync. Supporting systems should include financing among others. Refer to the table 7 below

[13] Knowledge creation (Research & Education), Knowledge exchange, intermediary (Bridging institutions) Knowledge utilization (Business and enterprise Policy, coordination and regulations (Enabling environment)

[14] Public authorities/ Ministries, directorates, Farmer based organisations, Research and education institutions, Private business/companies and entrepreneurs and Third sector organisations / NGOs

Table 10: AKIS actor analysis-actor identification

Sub system	Categories of actors in the sub systems			
	Public organisation	Farmer based organisations	Private companies/ industries	NGO/ civil society
Research	• Washington State University International Programs (WSU) • Bunda college department of nutrition • Malawi Industrial Research and Technology Development Centre (MIRTDC) • Universities (Mzuzu University Forestry department, Chancellor College Chemistry Department, LUANAR)			• Malawi Traditional Healers Umbrella Organization (MTHUO) • Traditional Healers Association of Malawi (THAM)
Education	• Ministry of Agriculture and Irrigation (MAI). • The National Herbarium and Botanical Gardens • Malawi bureau of standards • Universities (Mzuzu University Forestry department, Chancellor College Chemistry Department, LUANAR)			• Community Partnership for Sustainable Resource Management (COMPASS) • Seventh day Adventist health department • Kusamala Institute of Agriculture
Bridging institutions /advisory services	• Forestry Research Institute of Malawi (FRIM) • Malawi Bureau of standards (MBS) • Ministry of trade and Industry	CISANET FUM		• National Agroforestry Steering Committee
Business/enterprise actors		• Lifidzi herbal farmer group • Malawi Organic Growers Cooperative • Zankhalango cooperative • AG solutions 2019 Malawi Organic Cooperative • Tiwale business solutions 2015 • Bvumbwe exports	• Individual farmers, Retailers, Pharmacies • BCM *Moringa* Oil Refiners'Association (BCMMORA) • Moringa processors, Traders, aggragators	
Enabling environment	• Ministry of Agriculture • National Forestry Programme 2001 • Edible Oils Standard MBS 51and • MCCI		• Valmore Paints Ltd (Valmore) • Malawi Entrepreneurs Development Institute (MEDI) • Banks	• USDA • USAID • ICRAF

4.0 CONCLUSION AND RECOMMENDATIONS

This section is summarised in a tabular form which links the conclusion and recommendations. The section first concludes and suggest recommendations on the findings of the first part (Bench marking). It then finalises with conclusions and recommendations of the second part of the assignment which was to conduct a value chain and market analysis

PART 1: Establish the status of the project outcomes and output indicators

Conclusion	Recommendation
The findings show that at least 10% of the households are earning from *Moringa* value chain through selling own *Moringa* and trading. This is an opportunity that MOVED Project to upscale the existing potential to foster green entrepreneurship to increase community resilience to climate change effects. The activity will also tap from the willingness by households to invest a portion of their income in resilience (15%) which includes providing physical assets, social cohesion and Good Agricultural Practices	The activity should deploy an intensive production system with a shorter pay period, positive IRR and NPV considering the project life is only for two years.
From the four T/As, Pemba is more advanced in terms of income source from *Moringa* both in terms of trading and selling from own Production followed by T/A Maganga while most of the clubs in Ndindi are new and have not been enterprising in *Moringa*. However, it is evident from the results that *Moringa* enterprise itself brings more annual sales than other crops combined despite the minimal number of trees due to unorganized and conventional approaches to *Moringa* production	Develop Productive alliances that should inform the activity in its primary production and processing activities in terms of quantities and quality. Compile a field operation manual to guide extension, agronomic off-taking activities from the farmers
The groups that have just been facilitated by the MOVED activity are yet to be trained into fully operational Farmer based organization especially on governance related issues. However, it is promising that these newly formed farmer clubs will sustainably perform since they are to be linked to already existing identified cooperatives to capacitate them but also act as market platforms and entry points for MOVED activity	There should be a clear road map and Terms of Reference (ToR) on how the secondary Farmer groups (Cooperative, Pre-operatives, Associations) will work with the clubs towards achieving a common agenda to sustainably run the MOIHUB. This should be done now as the project is beginning The MOVED activity should develop a clear road map on from the organising the groups to MoIHUB
Land allocation for *Moringa* production for individual households and that allocated at community level is not measured to a certain availability in quality and size.	The plots at household and community level should be measured using the GPS in collaboration with Ministry of Lands and Ministry of Agriculture to ascertain commitment

PART II: Market and Value chain analysis of *Moringa* Production

Conclusion	Recommendation
In Malawi, there is limited knowledge of available genetic diversity present in *Moringa* species to warrant serious breeding programmes for meaningful scaling up. Furthermore, commercialization of Moringa products in Malawi is still very informal making it difficult to get reliable information of production exports volumes	The activity in collaboration with department of research and land resource should run farmer-based research trials to assess climate suitability, economic returns and health benefits for various species. Develop a sustainable and cost-effective community-based seed system. This will help in creating another product (moringa seed) for farmers to enterprise on with readily available markets in the villages and beyond
Interaction with some private firms, it was discovered that in terms of the export market, at present, promotion of Moringa products is on an individual firm level. While this has been effective for these individual firms, the international market is small, and differentiation in the market could benefit from collective efforts in export promotion.	This entails that MOVED project should ensure that farmers are organized to leverage on emerging international markets. Establish links with different organizations to link the activity to various off takers like some in Netherlands and such as contacted are Centre for the Promotion of Imports from developing countries (CBI), Netherlands Enterprise Agency (MMF), Dutch Good Growth Fund, PROFOUND, Natural Ingredients Experts (IN2NI) Through the Concept of MIHUB, MOVED should initiate a process to facilitate formation of *Moringa* multi-stakeholder platform composing of all chain actors and supporters in the value chain as tabulated in the AKIS actor analysis-actor identification in table 9 Sensitization and campaigns about the value of *Moringa* in as regards the potential to household nutrition and medicinal attributes to both human and livestock. This will to ignite locally available untapped markets in the country
Moringa value chain is not fully developed in Malawi an is characterized by high levels of informalities and disintegrated value chain characterized with unregulated and unprotected markets	Through the multistakeholder platform, facilitate the formation of regulations of entry of the *Moringa* market both for local and international buyers. Lobby and advocate for a special policy to promote *Moringa* value chain in the country as it has numerous benefits from which the country can significantly benefit from amid climate change related effects. Facilitate training and adoption of improved standards of production and traceability to raise the profile of the Malawi origin and leverage on the current vegan market opportunity in German which is estimated at 31% and the nutrition status of moringa perfectly fits into this profile
The implementation period of the MOVED activity demands more time than two years to start appreciating results considering that usually first year is usually invested on partnership agreements and taking of the project,	For a quick payback period and reasonable NPV and IRR, farmers in the target area should consider adopting high plant density technology under the intensive method for maximum leaf production. It is advised that at least planting 10,000 plants per hectare will enable farmers to break even easily.

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APPENDICES

Appendix 1: Comparison of Gross margins the current practice in study area, Zankhalango cooperative and intensive moringa production

A1.1: Current practice of moringa production in the study area

Gross Margin of Moringa Leaf from a 1 acre					
ID.NO.	**Item**	**Qty**	**Unit Price**	**Total Amount**	**Per Moringa Tree**
A	**Gross Income**				
	Yield (KGs) on 50 Trees	75	500,00	**37 500,00**	**750,00**
		1,5			
B	**Variable Costs**				
2	Land preparation	1	1 500,00	1 500,00	
3	making pits	1	2 500,00	2 500,00	
	weeding costs	1	3 000,00	3 000,00	
4	cost of planting seedlings	50	100,00	5 000,00	
5	Planting cost	1	2 500,00	2 500,00	
7	Pruning	1	2 500,00	2 500,00	
8	Harvesting cost	1	1 000,00	1 000,00	
9	Sacks	3	100	300,00	
	Total Variable costs			**18 300,00**	**366,00**
	Gross Margin pre tree			**19 200,00**	**384,00**
	Return on Variable Cost			**2,0**	2,05
	Break Even Yield (kg)			**36,6**	**0,73**
	Break Even Price (Mk)			**244**	244,00

A 1.2: Gross margin for Zankhalango association (Mangochi)

A	**Gross Income**			
	Yield (KGs)	125	1 500,00	187 500,00
	400 trees			
B	**Variable Costs**			
1	Land rent	1	5 000,00	5 000,00
2	Land preparation	1	10 000,00	10 000,00
3	making ridges/pits	1	10 000,00	10 000,00
4	seed	1	2 000,00	2 000,00
5	Planting cost	1	2 500,00	2 500,00
6	Weeding	3	3 000,00	9 000,00
7	Pruning	1	2 500,00	2 500,00
8	Harvesting cost	1	1 000,00	1 000,00
9	Sacks	2	100	200
10	Transportation cost	1	7 500,00	7 500,00
	Total Variable costs			**49 700,00**
C	**Fixed costs**			
	Solar tent Driers			
11	Nails	1	4 500,00	4500
12	Poles	1	15 000,00	15000
13	Labor	1	5 000,00	5000
14	Plastic sheet	1	10 000,00	10000
15	Nsungwi	1	5 000,00	5000
	Total fixed costs			**39 500,00**
	Gross Margin per 1.0 acre			**137 800,00**
	Return on Variable Cost			**2,77**
	Break Even Yield (kg)			**19,88**
	Break Even Price (Mk)			**397,6**

A1.3: Recommended/Intensive moringa production

	IDEAL GROSS MARGIN ANALYSIS FOR MORINGA LEAF PRODUCTION (1.0 acre)			
ID	**Item**	**qty**	**Unit Price**	**Total Amount**
A	**Gross Income**			
	Yield (kg) [4,000 Trees]	1 260	500	630 000,00
B	**Variable Costs**			
2	Land preparation	1	20 000,00	20 000,00
4	seed	10	2 000,00	20 000,00
5	Planting cost	1	25 000,00	25 000,00
6	Weeding	2	15 000,00	30 000,00
7	Pruning	1	10 000,00	10 000,00
8	Harvesting cost	1	10 000,00	10 000,00
9	Sacks	300	100	30 000,00
10	Transportation cost	1	15 000,00	15 000,00
	Total Variable costs			**160 000,00**
C	**Fixed costs**			
	Solar tent Driers			
11	Nails	2	4 500,00	9000
12	Poles	2	15 000,00	30000
13	Labor	2	5 000,00	10000
14	Plastic sheet	2	10 000,00	20000
15	Nsungwi	2	5 000,00	10000
	Total fixed costs			**79 000,00**
	Gross Margin per acre			**470 000,00**
	Return on Variable Cost			**3,9**
	Break Even Yield (kg)			**320**
	Break Even Price (Mk)			**232,5**

Appendix 2: MOVED Activity Indicator Tracking Table

MOVED ACTIVITY
Indicator Performan

								LOP	
Indicator Number	Source Performance/ Custom= *P/C; Performance/ Standard= P/S;*	Indicator	Level of Measurement	Data Source	Desired direction of change (+) or (-)	Unit of Measure	Disaggregation	Baseline Value	Target
Goal: Foster creation of green entrepreneurship income sources and contribute to reduced vulnerability of small-scale farmers to negative effects of climate change in Salima District									
1	P/C	**Percentage of households in targeted areas whose investment-income / capital has increased**	Population based	Baseline/Endline Evaluation	(+)	Percentage	Gendered Household Type	39,0%	80%
							Numerator	100,00	
							Denominator	256,00	
							Moringa businesses	3,9%	
							Average Annual household	MWK148,794 (US$186)	
2	P/C	**Percentage of households investing a portion of their income on improving their resilience**	Population based	Baseline/Endline Evaluation	(+)	Percentage	Gendered Household Type	33%	60%
							Male headed household	11%	
							Female headed household	21%	
							Numerator	85	
							Denominator	256	
							Youth (15 to 29 years)	29	
							30+ years	55	
evel Impact In	P/C	Number of rural households benefiting directly from USG interventions	Project based	Routine Project Monitoring	(+)	Number	Gendered Household Type	0,00	2000
							Male	202,00	600
							Female	53,00	1400
							Youth (15 to 29 years)	127,00	600
							Total groups		
Result Area 1: Increased Income levels of smallholder far									
1.1 EG.3.2-24	P/C	Number of individuals in the agriculture system who have applied improved management practices or technologies with USG	Population based	Baseline/Endline Evaluation	(+)	Number	Gendered Household Type	209	2000
							Male	161	
							Female	48	
1.2 CDP IR1	FFP	% of assisted cooperatives, microenterprises, marketing/aggregating groups and credit unions with improved governance	Project based	Routine Project Monitoring	(+)	Percentage	Type of groups, By gender	8%	60%
							Cooperatives	2	
							microenterprises		
							producer groups	32	
							Marketing groups		
							VSL/Credit unions		
1.3 EG 3.2-26	P/S	**Value of annual sales of producers, farms and firms receiving USG assistance**	Project based	Baseline/Endline Evaluation	(+)	Currency (Kwa	Sex: Male, Female	MWK77,747(US$97)	TBD
							Male	MWK54755((US$68.3)	
							Female	MWK78376(US$98)	
Result Area 2: Improved household economic, food-nutrit									
2.1 FACTS 2	FFP	Percentage of people reporting increased economic benefits derived from sustainable natural resource management and conservation as a result of USG assistance (FACTS 4.8.1-6)	Project based	Routine Project Monitoring	(+)	Percentage	Sex: Male, Female	11%	1
							Male	2%	
							Female	11%	
							Soil-related fertility and conservation,		
							Irrigation,	3%	
							Water management-non-irrigation based,		
							Climate mitigation or adaptation,	10%	
							Reforestation		
							Other		
2.2 CBLD-10	P/S	Value ($) of non-donor resources mobilized	Project based	Routine Project Monitoring	(+)	Currency (Kwacha and USD)	Four levels of disaggregations	10 174 720,00	TBD
							Type of product		
							Type of producer/firm		
							Age of producers		
							Youth (15 to 29 years)	4 985 612,80	
							30+	5 189 107,20	
							Sex, Male	2 441 932,80	
							Female	7 732 787,20	
1.1.1	P/C	Number of individuals who have received USG supported training in organic Moringa production and processing, and/or climate smart agriculture practices	Project based	Routine Project Monitoring	(+)	Number	Areas of training		2000,00
							Moringa production	55	
							Moringa processing	24	
							Other seeds training (Garlic and Ginger)		
							CSA practices	74	
							Climate mitigation or adaptation practices		
							Sex Male	10	
							female	25	
1.2.2	P/C	Number and size (in Ha) of land for individual and/or cooperative Moringa farms established (10 per cooperative)	Project Based	Annual reports		Number	Total perceived	30HA	50
							Average household	20HA	
							Land with signed land agreements	0	
							Private farmers land	0	

Appendix 3: Study tools for moved Baseline

Tools	
Household Questionnaire	study tools.04.04.22.docx
Focus Group discussions/KII	
Policy Level checklist	
Moringa Traders	