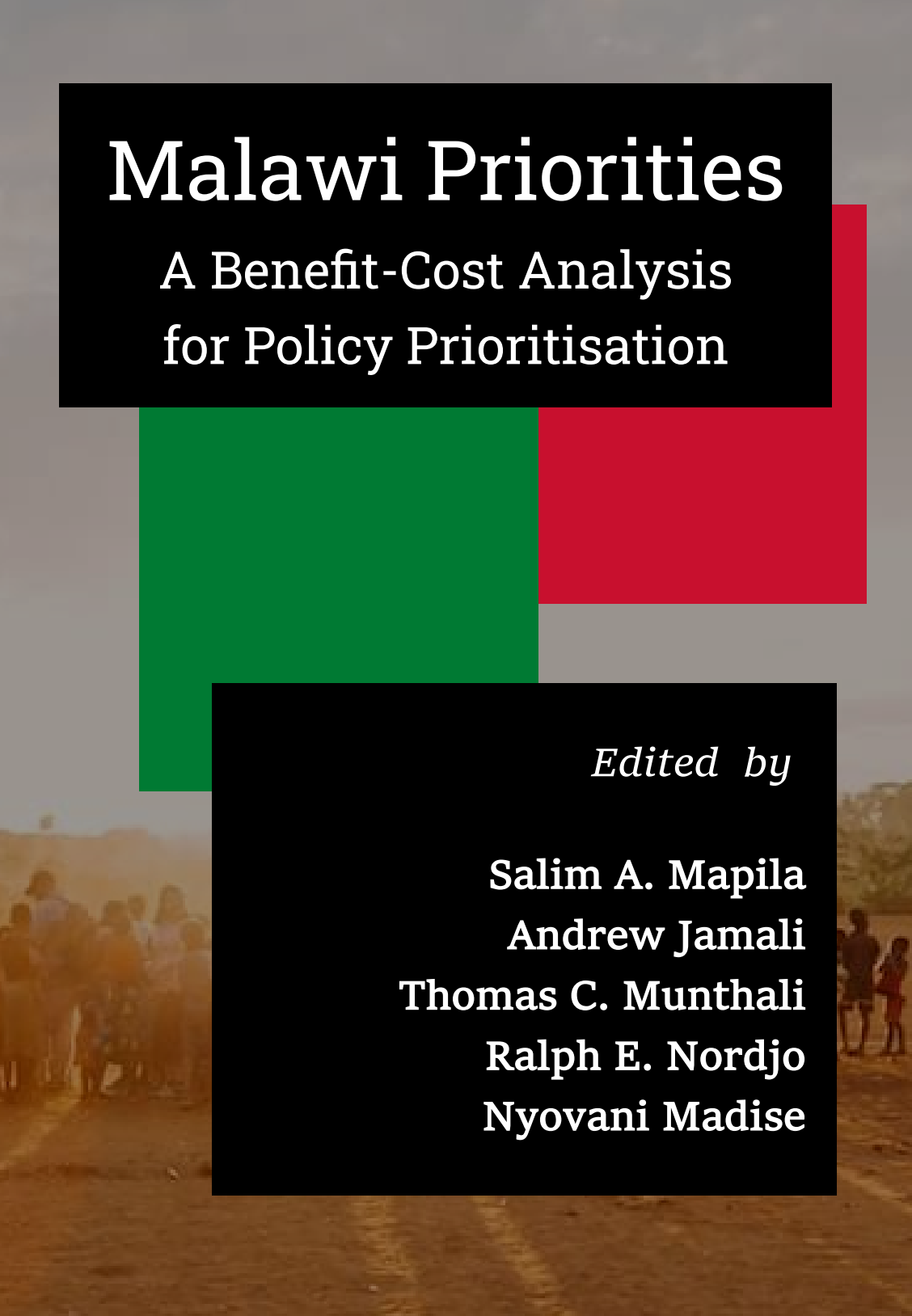
Malawi Priorities

A Benefit-Cost Analysis for Policy Prioritisation



Edited by

Salim A. Mapila
Andrew Jamali
Thomas C. Munthali
Ralph E. Nordjo
Nyovani Madise

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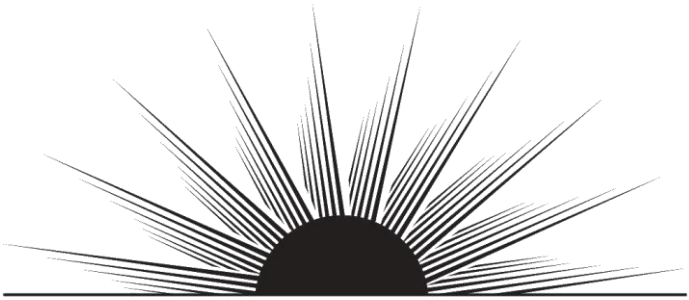

The Malawi Priorities Project

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FOREWORD

Malawi is now in the first phase of implementing interventions towards realising the vision of an inclusively wealthy and self-reliant nation by 2063 through the first Malawi 2063 10-year implementation plan (MIP-1). This plan outlines strategic programmes and projects to be undertaken to realise the vision. Two key milestones are pursued through this plan: graduating the country into a lower middle-income economy by 2030 and meeting most of the sustainable development goals (SDGs).

The National Planning Commission (NPC) is mandated to identify Malawi socio-economic development priorities and formulate the national vision and strategy for social and economic goals considering the country's resource potential and comparative advantage. In this regard, it is essential to formulate innovative and progressive flagship projects for implementation in line with the national vision, bearing in mind the estimated costs and benefits across a wide range of policies, to uncover the best value-for-money. It is for this reason that the NPC partnered with Copenhagen Consensus Center and the African Institute for Development Policy (AFIDEP) to identify and promote the most effective interventions that address Malawi's development challenges and support the attainment of its development aspirations.

Malawi Priorities is a research-based project that seeks to provide the government with a systematic process to help prioritise the most effective policy solutions for maximising social, environmental, and economic benefits for every kwacha invested. The Malawi Priority Project strengthens the link between research and policy development, which is key to the delivery of an inclusive and cost-effective development agenda. The value-for-money analytical approach advanced in this book will influence the conversations on identification and prioritisation of effective policy and programmatic interventions to achieve Malawi's short, medium, and long-term goals and aspirations. The book kick-starts the conversation on priorities and the value-for-money choices to be made along various interventions in Malawi's development endeavours.

In this book, you will find precise and easy to comprehend summary findings from cost-benefit analyses applied to more than twenty research questions in Malawi's strategic development areas, in line with the country's development aspirations. The research questions were drawn from the NPC's research agenda, and extensive consultations with academics, think tanks, the private sector and government. The selection of interventions under each research area was informed by numerous consultations across Malawi's development policy and programme space as well as one academic and two sector experts who provided peer reviews on all analyses. I have no doubt that this book will provide that much needed confidence in the process of identifying and prioritising for implementation those interventions with the highest socioeconomic returns in Malawi's development efforts.

Thomas Chataghalala Munthali, PhD.
Director General
National Planning Commission

About the Editors

Salim Ahmed Mapila, is the Project Manager for the Malawi Priorities Project and a Development Planning Officer at the National Planning Commission of Malawi. He holds a Master of Arts in Economics and a Bachelor of Social Science degree (Economics and Psychology) from the University of Malawi. Salim manages the Malawi Priorities Project under a joint and collaborative arrangement by the National Planning Commission, the African Institute for Development Policy (AFIDEP), and the Copenhagen Consensus Center (CCC) to support the conceptualisation, design and implementation of programmes that generate policy-oriented research evidence for policy makers in Malawi. He is a Development Economist with a rich technical background in medium- to long-term development planning at the national and subnational level. Over the years, he has undertaken numerous assignments that have led to the development of policy documents in socioeconomic transformation, legislative research, public finance management, and budget analysis. His professional trail includes engagements with several national and international research and policy think-tanks, academia, and the national assembly in Malawi.

Andrew Jamali is a Research Manager at the National Planning Commission of Malawi. He holds a PhD in Demography and Social Statistics from the University of Southampton, a Master of Arts in Population Studies/Demography from the University of Kwazulu-Natal, and a Bachelor of Arts in Humanities (Demography and Philosophy) from the University of Malawi. Andrew is a Population and Development expert with over 18 years of experience in population research design and implementation, project design and management, and monitoring and evaluation. His areas of expertise include economic planning, food security and nutrition assessments, gender, youth and adolescent reproductive health, and STI/HIV/AIDS prevention programme design, implementation coordination, monitoring and evaluation, Population Advocacy and Information Education and Communication (IEC) programmes and materials design, as well as impact and value assessments. He has worked in the NGO, private and public sector organisations, involved in designing development projects, conducting research, performing statistical

analyses, and generating statistical abstracts, policy briefs and reports on development projects and programmes. He is a trainer in policy design and assessment, survey methodologies, (quantitative and qualitative) data analysis, population IEC materials development and assessment, sexual behavioural change strategies development and gender mainstreaming in development projects. He is also an expert in foresight and sense-making planning methodologies, which are key to agile response to events happening in development planning spaces.

Thomas Chataghalala Munthali is the first and current Director General of the National Planning Commission of Malawi. Prior to this, he was the Director of Knowledge and Learning at the African Capacity Building Foundation (ACBF), a specialised agency of the African Union that is focused on capacity development and based in Harare. There he coordinated capacity development efforts across the African Union member countries that were aimed at meeting the continent's socio-economic transformation agenda goals. He is a renowned capacity development expert and holds a Master and PhD in Economics from University of Leeds, England. Prior to joining ACBF, Dr. Munthali was the Malawi Country Director for Innovations for Poverty Action (IPA) that also provided support to Zambia. As a seasoned Economist with extensive international experience, he has worked with Malawi's Ministry of Economic Planning where he was part of the team that coordinated the development of the Malawi Economic Growth Strategy; the World Bank, where he coordinated research around exchange rates and infrastructure systems as part of the 2009 country economic memorandum; and UNFPA, where he provided leadership in strategies for harnessing demographic dividend for development. While at ACBF, he coordinated publication of the continental flagships, the Africa Capacity Report and African Financial Governance Outlook (published jointly by ACBF and the African Development Bank). He has also written several journal and workshop/conference papers as well as coordinated the production of tens of publications on capacity development, corporate governance, exchange rates, economic development, financial development, insurance and economic growth, population and development, climate change, etc.

Nyovani Madise is the Director of Research for Sustainable Development Policies and Head of the Malawi office of the African Institute for Development Policy (AFIDEP). She worked as a Lecturer at the University of Malawi between 1983 and 1994. Between 1994 and 2018, she was with the University of Southampton, where she started as a lecturer and eventually progressed to Professor of Demography and Social Statistics. She also served as the University's lead for Equality, Diversity, and Inclusivity, Associate Dean (Research) in the Faculty of Human and Mathematical Science, and Director of the Centre for Global Health, Population, Poverty, and Policy. Nyovani also worked on secondment as a Senior Research Scientist at the African Population and Health Research Center in Kenya between 2004 and 2007. Nyovani currently sits on the Board of Trustees for the Population Council as Bice Chair. She is the first black woman to be appointed to this role. Furthermore, Nyovani has provided advice on international development issues to the UK Foreign Commonwealth Office, UK Department of Health and Social Care; the Dutch SRHR programme of NWO-WOTRO, UK Research and Innovation committees (Global Challenges Research Fund and Medical Research Council Applied Global Health Board). She served on the WHO Strategic Advisory Group on Malaria Eradication, and the WHO advisory group that developed guidelines for a rights-based approach to family planning, and is currently among the 15 scientists appointed by the Secretary General of the United Nations to write the 2023 Sustainable Development Goals Report. Nyovani has over 100 peer-reviewed publications on the social determinants of health in the specific areas of maternal and child health, HIV/AIDS, adolescent sexual and reproductive health, food security, and nutritional status.

Ralph Essem Nordjo is the Project Manager, Africa Directorate with the Copenhagen Consensus Center (CCC). Prior to that, he was the Project Manager for the Ghana Priorities Project (GPP), which is the first national project by CCC in Africa. GPP was a collaboration between the National Development Planning Commission (NDPC), Ghana and the CCC. Ralph holds a Ph.D. in Development Finance from the University of Stellenbosch, Cape Town, South Africa. Prior to that, he was awarded a Master of Development Finance (University of Stellenbosch), Master of Social Science in Development & International Relations (Aalborg University, Denmark) and a B.A. Social Science in

Economics & Sociology (University of Cape Coast, Ghana). He worked on several projects including the Business Sector Advocacy Challenge (BUSAC) Fund, Improving Business Practice (IBP) and as a consultant to the Skills Development Fund (SDF) and Danida' B2B programme. He is a Development Economist with research interests in private sector development, agricultural finance, and welfare analysis. He is currently a lecturer in Development Finance and Economics at the Department of Applied Economics, School of Economics, University of Cape Coast, Ghana.

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*Regrettably, Ben Kalua passed away before publication of this book. May his soul rest in peace and his contributions live on."

INTRODUCTION

Malawi's economy has of late experienced extreme volatility due to global and domestic shocks and policy-programme downturns, resulting in an economic meltdown and degradation in the quality of services in the social sector, education and health being among the key services. The Covid-19 global pandemic at the turn of 2020 and the Russia-Ukraine war in the first quarter of 2022 have had negative ripple effects on the economy, which is evident in the sluggish performance of productive sectors such as agriculture, tourism and manufacturing. The most notable effects of the events have been supply-chain disruptions in the agriculture and manufacturing sectors, which affected access to farm implements and effective functioning of export markets as well as delivery of tourism services. Locally, a series of tropical cyclones experienced in the 2021/22 rainy season further weakened Malawi's socioeconomic position as majority of Malawians suffered livelihood losses especially on farms, as well as infrastructure destruction (roads, housing, markets), which ultimately slowed down economic activities in the country due to low farm output, inaccessible markets points and services and poor storage of agriculture produce because of damaged storage infrastructure.

Recently, Malawi battled and continues to battle with the foreign exchange squeeze due to a low export base that has affected foreign exchange reserves. The devaluation of the local currency against major trading currencies, i.e., the United States dollar and British pound, was aimed at stimulating investment and easing the foreign exchange shortage and has shown signs of progress, with MWK 20 billion worth of imports realised over four months. There are expected recoveries in all productive sectors of the economy, building on from the 3.9 percent GDP growth recorded in 2021. Such recoveries are expected to provide impetus to a revived approach to development programming and operationalisation in the country, which given the status quo, i.e., unfavourable macro-economic indicators, entail that effective planning approaches be undertaken to deliver the set developmental milestones.

Given the context of a thin resources base and tight fiscal space within which Malawi's developmental efforts are being operationalised, careful identification and prioritisation of interventions that could bring about the much-needed socioeconomic transformation is an urgent imperative. It is on this premise that the National Planning Commission (NPC) in partnership with the African Institute for Population and Development (AFIDEP) and the Copenhagen Consensus Center (CCC) undertook an initiative to run Cost-Benefit Analyses (CBAs) that identified and recommended interventions worth investing in and prioritising for action across various sectors of Malawi's development programming. The initiative involved identifying and analysing interventions that could bring about the much-needed socioeconomic transformation in the country by spending additional investments in different sectors in the country's development programme. The CBA is aimed at providing convincing evidence that would empower policy and decisionmakers to make informed decisions on the allocation of resources to socioeconomically high impact and promising interventions in the country's development programmes. Essentially, the CBA sought to provide the government with a systematic process to help prioritise the most effective policy solutions to maximise social, environmental, and economic benefits on every kwacha invested.

How to interpret the information contained in this book

In cost-benefit analyses, benefits and costs are typically measured in currency, in this case, Malawi kwacha. This allows comparison of programmes, which may have very different objectives, for example saving lives versus educating children versus avoiding deforestation. It is important to note that while benefits and costs are measured in currency, this does not merely represent money. There is a vast and considered literature that critically examines how to monetise various outcomes resulting from policies for the purposes of cost-benefit analyses. Therefore, benefits and costs in principle account for all social, economic, and environmental impacts. In practice, it is difficult to assess some of the impacts, especially on the benefit side, like dignity or shame, and so it is likely that almost all interventions will have some benefits that have not been quantified. Yet, where the omissions are

not explicitly discussed, they are likely to be considered quite small and hence the overall rankings remain approximately correct.

Of importance is the traffic light categorisations that are not mostly an assessment of the competency or skill of those overseeing or implementing the programmes. It is typically more driven by the inherent social welfare efficiency of each programme, as assessed in the CBA literature. Programmes with poor objectives can be implemented well and will still do little good, whereas programmes that are inherently very effective can be implemented poorly and yield benefits 15 times higher than the cost (though of course, poor implementation still degrades a programme's yield).

The main takeaway of the report is simple: more money should be spent on EXCELLENT programmes. This can be done by giving excellent programmes higher priority in budgets and ensuring they remain protected from budget cuts throughout the year.

The book uses a traffic light model, which was developed in conjunction with two Nobel Laureates, to assess the Open Working Group's sustainable development goals. All programmes are categorised into one of four groups based on how much economic, social and environmental benefit is obtained for each unit of cost, or the benefit-cost ratio (BCR): EXCELLENT (BCR over 15), GOOD (BCR = 5 to 15), FAIR (BCR between 1 to 5), and POOR (BCR below 1).

An overview of the intervention ratings is provided in the tables that follow.

Sustainable Agriculture

	Challenge	Solution	BCR	Rating
MARKETS	Agricultural markets	Agricultural commodity exchange reform	16.0	EXCELLENT
	Encouraging agricultural exports	Institutions and training for groundnut quality control	1.2	FAIR
	Encouraging agricultural exports	Removal of maize export ban	1.1	FAIR

	Challenge	Solution	BCR	Rating
IRRIGATION	Stimulating farmer uptake of irrigation	Re-orientate extension workers to irrigation support	3.3	FAIR
	Stimulating farmer uptake of irrigation	Help estate farms to finance solar-powered irrigation	<1	POOR
	Stimulating farmer uptake of irrigation	Help farmer organisations to finance solar-powered irrigation	<1	POOR
FOOD	Food and nutrition security	Promotion of Purdue improved crop storage (PICS) bags	2.9	FAIR
	Food and nutrition security	Crop diversification and intercropping	2.0	FAIR

Natural Resource Management

	Challenge	Solution	BCR	Rating
ENVIRONMENT	Environmental management and disaster risk reduction	Improving early warning systems and community response	16.0	EXCELLENT
	Harnessing natural resource management	Infrastructure and modernisation of artisanal and small-scale mining	3.6	FAIR
	Environmental management and disaster risk reduction	Expanding the use of climate-smart agriculture (CSA) to address droughts and floods	3.0	FAIR
	Harnessing natural resource management	Fisheries infrastructure at Chipoka port	1.9	FAIR
FISH.	Fisheries management	Fishing by rotation (day-of-week restrictions)	2.8	FAIR
	Fisheries management	Replacing illegal fishing nets	0.9	POOR

Human Capital & Social Development

	Challenge	Solution	BCR	Rating
HEALTH	Fertility	Post-partum counselling and free access to contraceptive	37.0	EXCELLENT
	Improving neonatal and maternal health	Package of 5 high impact BEmONC intervention	31.0	EXCELLENT
	Improving neonatal and maternal health	Substituting iron and folic acid supplements with Multiple micro-nutrients (MMN) in pregnancy	14.0	GOOD
	Malaria control	Mass media for care seeking for fever	7.4	GOOD
	Malaria control	100 percent PBO instead of Pyrethroid bed nets	6.0	GOOD
	Malaria control	Mass media for improved care seeking for fever + 100 per-cent PBO ITN distribution	6.6	GOOD
	Malaria control	Scale-up indoor residual Spraying (IRS)	1.7	FAIR
	Malaria control	Increase frequency of mass distribution of bed nets	<1	POOR
	Reducing the prevalence of stunning	Complementary feeding promotion	7.2	GOOD
	Reducing the prevalence of stunning	Breastfeeding promotion	5.4	GOOD
	HIV prevention and treatment services to female sex workers	Combined PrEP and ART adherence counselling	2.3	FAIR
	HIV prevention and treatment services to female sex workers	ART adherence counselling for female sex workers	2.2	FAIR

	Challenge	Solution	BCR	Rating
EDUCATION	Improving primary school education	Technology assisted learning	106.0	EXCELLENT
	Improving primary school education	Lesson plans and training for in-service teachers	22.0	EXCELLENT
	Improving primary school education	School feeding	10.0	GOOD
	Improving primary school education	Classroom construction	2.9	FAIR
	Improving primary school education	Hiring teachers to reduce class sizes	1.3	FAIR
	Reducing secondary school dropout rates	Community dialogues on child marriage	114.0	EXCELLENT
	Reducing secondary school dropout rates	Sexual health education and girls' empowerment programme	9.8	GOOD
	Reducing secondary school dropout rates	Conditional cash transfer for unmarried girls	9.2	GOOD
	Reducing secondary school dropout rates	Child marriage annulment and return to school programme	8.5	GOOD
	Reducing secondary school dropout rates	Increase number of secondary schools	3.4	FAIR
	Reducing secondary school dropout rates	Education promotion	2.5	FAIR
	Expanding and improving early childhood education	Expand access to community-based childcare	4.5	FAIR
	Expanding and improving early childhood education	Increase quality and reliability of community childcare	2.1	FAIR

Sustainable Economic Development

	Challenge	Solution	BCR	Rating
URBANISATION & INFRASTR.	Upgrading road infrastructure for tourism	Road maintenance	5.2	GOOD
	Upgrading road infrastructure for tourism	Upgrade and pave 1407 km of roads around selected tourist sites	2.8	FAIR
	Urban planning	Pre-approved prototype plans for housing construction	3.3	FAIR
	Urban planning	E-permits for construction approval	3.2	FAIR
	Improving water service reliability	New river water source & E-Madzi water card in Blantyre	3.2	FAIR
	Improving water service reliability	New water source from Shire River	2.8	FAIR
	Improving water service reliability	E-Madzi Water Card rollout in Blantyre	1.5	FAIR
IND.	Industrialisation and youth employment	Poultry outgrower model for value add in soybean sector	1.3	FAIR
	Industrialisation and youth employment	Credit guarantee scheme for agricultural processors	1.1	FAIR

Governance

	Challenge	Solution	BCR	Rating
	Implementing the national land policy	Land titling reform	73.0	EXCELLENT
	Reforming the power sector	Long-term technical accompaniment and mentoring programme for ESCOM	41.0	EXCELLENT
	Government services to support MSMEs	E-filing and tax nudges for improved tax compliance	6.9	GOOD
	Government services to support MSMEs	Free MSME registration and bank seminar	1.7	FAIR

PART I.
SUSTAINABLE AGRICULTURE

1. STIMULATING FARMER UPTAKE OF IRRIGATION

Julius Mangisoni, Nancy Dubosse, Salim A. Mapila, Joseph Nagoli, Sloans Chimatiro and Brad Wong.

Context

Creating wealth through agriculture has been a long-running development goal in Malawi. Within the country, irrigation is viewed as a valuable opportunity and has increased substantially for smallholder farmers, quadrupling from 15,988 ha in 2011 to 61,977 ha by 2019. It has the potential to open the dry season for cultivation on a grand scale, comparable to rainy season harvests, while also stabilising wet season cultivation, ensuring yields against variable rainfall patterns. As such, it can provide a good opportunity for farmers – particularly the very large number of smallholders in Malawi – to increase their incomes and standards of living. Irrigation holds a prominent place in Malawi's new long-term development vision, Malawi 2063 (MW2063), with the hope that it would *"cater for national food security needs, support agriculture commercialisation and promote exports."*

The Greenbelt Initiative (GBI), launched in 2011, aims to increase agricultural production while targeting approximately one million hectares of land along Lake Malawi and Malombe, the Shire River and the perennial rivers right from Chitipa to the Shire Valley. The food crops targeted by the GBI include maize, rice, cassava, potatoes, pulses, millet and sorghum whilst the cash crops will include cotton, sugarcane and wheat, in addition to other fruits, vegetables, and spices for which Malawi may have a comparative advantage.

The efforts of the GBI are supported by a comprehensive policy framework consisting of the National Resilience Strategy (2018–2030); the National Irrigation Policy (2016); and the Programme for Rural Irrigation Development. Notwithstanding strong national interest in irrigation, encouraging farmers to take up and use irrigation remains a challenge. Four factors that affect farmer adoption of irrigation are the affordability of irrigation equipment,

access to financing, the quality of extension services and access to water. The importance of these challenges is confirmed by the National Irrigation Policy (2016), which identifies inadequate financial resource mobilisation and high development costs among the primary constraints. Furthermore, additional challenges include lack of knowledge about how to use and maintain irrigation technology as well as vandalism and theft.

The constraint around cost at the farmer level is similarly mirrored at the national policy level. Irrigation projects are expensive, requiring economies of scale, consistent water supply, credit or grants, and available markets for produce to reduce or justify costs.

Summary Findings

The current analysis focused on areas around Lake Malawi and the Shire Valley. Overall, two interventions were considered as ways to increase the area under irrigation:

- Reorientation of extension services leading to uptake of gravity irrigation by smallholder farmers; and,
- Use of financial instruments, particularly matching grants, to help finance solar-powered irrigation schemes for estate farms and formally organised smallholder farmers

The study assumes reorientation of services compels 5 percent of smallholder farmers in the target areas to adopt gravity irrigation (56,000 ha). The use of financial instruments leads to 10 percent of estate farmers (44,000 ha) and 15 percent of smallholder farmers adopting solar irrigation (188,000 ha). While these are in line with historical evidence, sensitivity analyses show that the uptake rate has a minimal effect on the BCR.

Following existing studies, the research also assumed that irrigation enables smallholder farmers to expand the area under cultivation during the dry season from an average of 0.27 ha to 0.98 ha, and estate farms to expand their area of cultivation from 48 percent to 90 percent of the potential area. In addition, it is expected that irrigation will reduce the variability of yield for wet season crops, as irrigation can act as insurance against lack of rainfall.

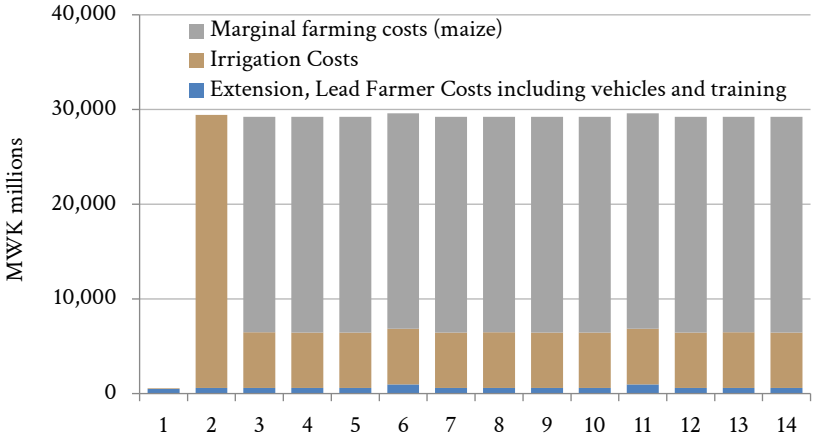
The analysis considered a variety of crops to illustrate the potential differences in BCRs. Noting that one major constraint is market access, the research focused on a set of crops for which there appeared to be a pre-existing market with potentially unmet domestic or export demand. Based on these criteria, the crops selected for consideration were maize, wheat, rice, groundnuts, pigeon pea, soybean, tobacco, cotton, paprika, chillies, cassava and tomato. In both interventions, 100 percent of the benefits are economic.

Intervention 1: Increasing the number of Agricultural Extension Development Officers (AEDOs) for better coverage, leading to an expansion of gravity irrigation among smallholder farmers

The first intervention assessed by the study focused on reorienting extension workers and improving service provision of AEDOs and Lead Farmers (LFs) to provide better and more market-oriented information on irrigation use for smallholder farmers. There are some challenges with agricultural extension services in Malawi currently, i.e., there are insufficient extension workers to reach farmers, they also need to be better trained and have access to more motorcycles to be able to travel to farms. They currently work through a network of Lead Farmers, a system that can be very useful but needs to be revitalised. In this context, the proposed intervention seeks to (1) decrease the ratio of farmers to AEDOs to 1500:1; (2) reorient the work of AEDOs towards farm income growth rather than yield maximisation; (3) improve AEDOs mobility by purchasing motorcycles for every four AEDOs; and, (4) revive the Lead Farmer model by using LFs for last-mile extension services and offering them financial incentives for their organisation of demonstration days and outreach.

Improving these factors is assumed to increase the area under dry-season cultivation by 5 percent, which is likely to be the bottom of the actual range. Given the lack of financial support for irrigation infrastructure, it is also assumed that farmers will adopt the least-cost technology, i.e., gravity. The benefits that accrue will depend upon the crop cultivated. Improving extension services would also have other benefits to farmers who would then receive better advice. However, these additional benefits were not fully estimated.

Figure 1.1: Costs of Extension Officer Reorientation with a Focus on Maize for Illustrative Purposes.



Note: The marginal costs of other crops are presented in the technical report.

The cost of this intervention fall into three broad categories: (1) costs associated with the intervention changing and increasing the number of AEDOs, (2) irrigation infrastructure and maintenance, and (3) marginal change in costs associated with greater areas of cultivation. With regards to the irrigation infrastructure, FAO (2014) estimates the fixed cost for a gravity system at MWK 520,000 (USD 700) per hectare and operation and maintenance costs at MWK 104,000 (USD 140) per hectare annually. The primary cost is the cost of cultivation associated with increased cropped area. A substantial investment is also required for irrigation in Year 2. In contrast, the additional cost of improving extension workers, including lead farmer incentives, is relatively small.

The lifespan of a gravity system is assumed to be, on average, 12 years, with an additional 2 years allotted for planning and implementation of the intervention, a total of 14 years.

There are two anticipated benefits of irrigation. First, there is the change in output associated with expanded cropping during the winter season. This typically represents the largest benefit component of the intervention. Sec-

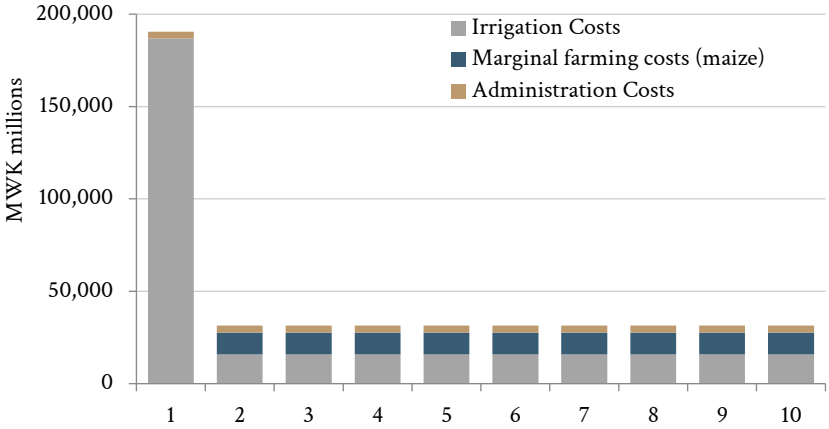
ond, there are the avoided losses in yield variability resulting from inadequate rainfall during the wet season. The research highlights that irrigation of both tomato and paprika crops would benefit from this intervention, with BCRs of around 5–6 in both cases. Cassava, a staple crop, also sees a good yield increase and a fairly good BCR of 3.3; however, the post-harvest losses of this crop are high, and the growing season is relatively long. The returns to irrigated maize do not appear to pass a benefit-cost test.

Intervention 2: Provide financing and grants to smallholder farmers and estate farms for solar irrigation pumps

The intervention proposed is a matching grant or credit combination of financial instruments to stimulate uptake of irrigation technology among both estate and smallholder farmers. Due to the difficulty of accessing funding or an unwillingness to bear the associated risks, the research considered the option of providing preferential financing from the government to Farmer Organisations that can spread the risk and help to get members' produce to market at favourable prices. The research demonstrates that the high cost of solar irrigation pumps makes achieving positive return on investments challenging. Tomato, paprika and cassava appear to be the only commodities that would yield more benefits relative to costs under solar irrigation pumps.

Within this intervention, costs fall into three broad categories: (1) irrigation infrastructure and maintenance, (2) the costs associated with monitoring and management of the financing instrument, and (3) the marginal change in costs associated with greater area of cultivation. In terms of irrigation infrastructure and maintenance, the average cost of a solar PV powered pumping system is MWK, 4.2 million (USD 5,713) per hectare and includes a water storage facility. The main cost of this intervention is the upfront costs of solar pumps.

Figure 1.2: Cost Profile for Financing and Matching Grants for Solar Irrigation, Estate Farms Assuming Uptake of 43,000 Hectares with Maize Focus



Note: The cost profile continues for 20 years but is truncated at Year 10 because the profile is the same for each year.

The estimation of benefits is as per the first intervention: increase in output associated with irrigation during the dry season and a reduction in variability during wet season. Overall, the emphasis of the research remains that both the choice of irrigation technology and the choice of crop are critical drivers of the return on investment, making strategic crop diversification a key component of any irrigation intervention. The importance of these two factors is further demonstrated in Figure 3, which illustrates the divergent BCRs of the same programme, disaggregated by crop and intervention.

Figure 1.3: Summary of Benefit-Cost Ratios of Different Interventions and Crops, Ranked from Least to Most Cost-Effective

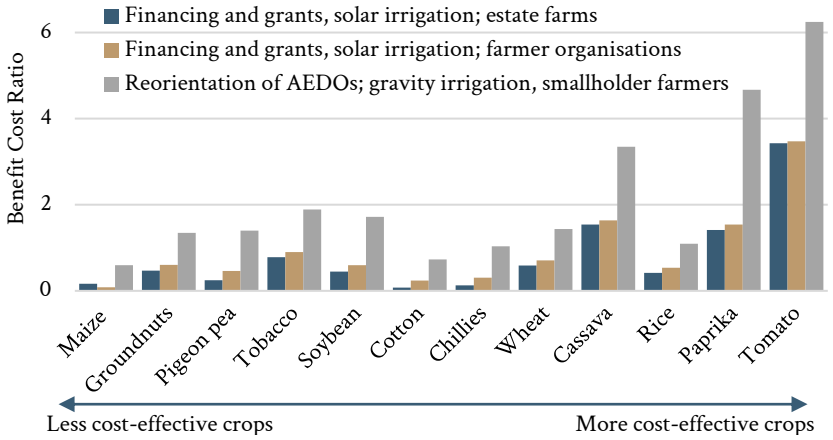


Table 1.1: CBA of Irrigation Interventions

Intervention	BCR	Beneficiaries and area	Investment cost	Benefits
Reorientation of extension services leading to uptake of gravity irrigation	Fair BCRs mostly between 1and 5 (returns vary by crop)	Smallholder farmers 56,000 ha	MWK 30,000M upfront MWK, 5,900M ongoing	MWK 13,000M to MWK 280,000M per year in increased crop production (benefits vary by crop)
Use of financial instruments, matching grants, to help finance solar-powered irrigation schemes	Poor BCRs mostly below 1(returns vary by crop)	Estate farms 46,000 hectares	MWK 188,000M upfront MWK 15,900 M ongoing	MWK 3,500M to MWK 194,000M per year in increased crop production (benefits vary by crop)
Use of financial instruments, matching grants, to help finance solar-powered irrigation schemes	Poor BCRs mostly below 1 (returns vary by crop)	Farmer organizations 118,000 hectares	MWK 797,000M upfront MWK 67,800M ongoing	MWK 46,000M to MWK 933,000M per year in increased crop production (benefits vary by crop)

2. ENCOURAGING AGRICULTURAL EXPORTS

Shannon Davis, Bahman Kashi, Joy Mackinnon, Brad Wong, Charles Jumbe and Frank Kamanga.

Context

Agriculture is the backbone of Malawi's economy. It accounts for almost 80 percent of employment, and 80 percent of the country's total exports. However, Malawi remains highly reliant on tobacco and has been slow to diversify into other crops. As Malawi is shifting its dependence on tobacco as a major foreign currency earner for the economy, it is imperative to examine policy solutions for other traditional cash crops. Improved production and commercialisation of other crops would help to attain the main objective of MW2063: generating inclusive wealth for all in Malawi. Thus, an important question is, "Which high-value crops are suitable to be grown in Malawi and are demanded by countries with relatively low-cost transport links?"

Some of the key barriers that have limited Malawi's ability to export high-value crops include ad hoc export restrictions on key commodities; lack of coherent policy frameworks; low quality of agricultural products (including aflatoxin contamination); low farm productivity; insufficient in-country processing capacity; high storage, processing and transportation costs; poorly coordinated supply chains to address problems of aggregation; quality and safety; and consistency of supply. These issues affect several different agricultural supply chains, including maize, soya beans, groundnuts, and timber. Other supply chains, such as tobacco, tea, sugar, and coffee are better established and more organised, though they also face unique barriers such as low productivity and declining export prices. The following policy solutions for maize and groundnuts demonstrate the greatest potential for export growth and alignment with national priorities.

Summary of Findings

Intervention 1: Remove the export restriction on maize

The social and economic benefits of removing the export restriction on maize outweigh the costs by 13 percent. The benefit-cost ratio (BCR) is 1.13, a small ratio, but since maize is the backbone of the agricultural economy, the economic benefits for maize producers sum up to over MKW 538 billion per year. The economic benefits are created by an increase of maize prices to the levels of neighbouring countries and an increase in production in response to the higher prices.

Although maize prices increase significantly for consumers, about 60 percent of consumers are also producers, so this group would likely have positive net welfare outcomes. The loss for the consumers is only 89 percent of the gain for producers. Specific groups, for example, the landless and urban poor, could be compensated in more efficient ways than an export restriction.

The link between wealth creation and maize price fluctuations

International maize prices are subject to fluctuations that can impact the results of the intervention. The base assumption is an average price of 0.4 USD/kg. A 25 percent higher price would increase the BCR to 1.3 and generate wealth of MWK 290 billion per year. A lower price (less than 0.3 USD/kg) would result in no exports due to transportation costs. Domestic prices in Malawi have and will continue to fluctuate. The average price in Malawi over the past 10 years was 0.24 USD/kg, with a standard deviation of 0.07. The more deviation between local and international prices (in this case associated with lower prices domestically) the greater the BCR and associated wealth creation. This is again because the producer surplus and consumer surplus are more affected by greater changes in prices. The consumers and producers' responses to price fluctuations will also impact the magnitude of wealth creation. However major shifts are unlikely for a staple grain such as maize.

Intervention 2: Teach farmers how to store and grade groundnuts, improve the Malawi Bureau of Standards, and build a test facility to increase farmer income by MKW 6.3 billion annually

Groundnuts are an important crop in Malawi, but for smallholder farmers to be able to compete in international markets, quality certification is necessary. Grading and separating the premium-grade groundnuts for sale in larger formal markets (ESA and EU) would increase the value of farm output.

The presence of poisonous aflatoxin produced by certain moulds when crops are improperly stored is another crucial factor that not only prohibits exports but also has negative health effects. Testing facilities and farmer training would reduce the aflatoxin contamination in groundnuts sold in domestic markets too, thus reducing exposure and consumption of contaminated groundnuts. The improved health as a result of the intervention translates to avoiding 10.8 deaths per year (MWK 0.19 billion per year).

The main cost involved is training farmers using a high-end estimate of USD 75 per farmer, adding up to MWK 42 billion for 750,000 farmers over 3 years. A start-up cost of MWK 3.7 billion is associated with improving the policy, test facilities, and accreditation process of the Malawi Bureau of Standards (MBS), as well as developing the capacity of MBS staff. The annual cost of a test laboratory is MWK 0.3 billion.

Figure 2.1: Summary of Results for Quality Control CBA

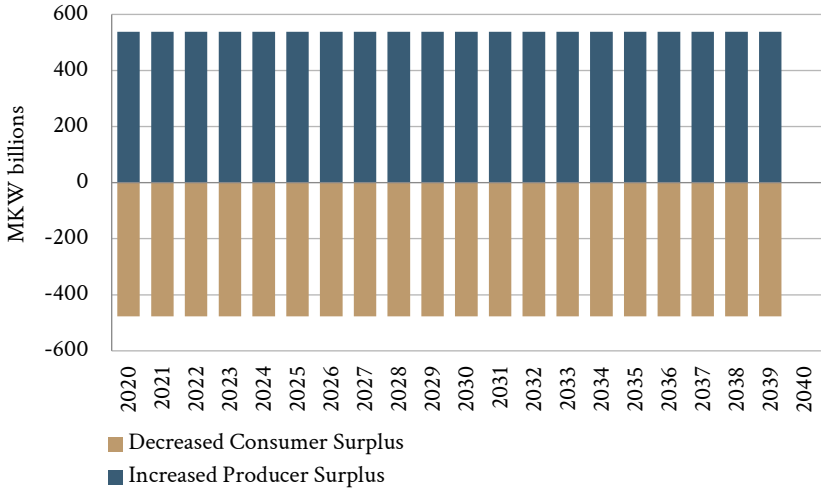
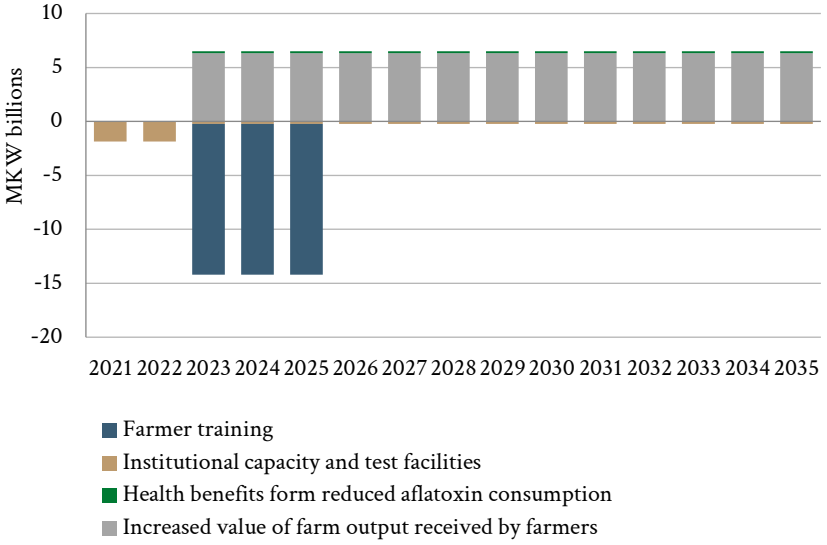


Figure 2.2: Summary of Results for Quality Control CBA



The cost associated with training and institutional capacity to export premium groundnuts and reduce aflatoxin contamination

Farmer education on using pre- and post-harvest techniques to reduce aflatoxin contamination is important for grading improvements. Outreach and training are also crucial for the farmers to access profitable markets. The costs for agricultural-extension activities are estimated using a study by Ksoll et al. (2016), which factor in the use of trained staff rather than village agents, making it an appropriate conservative estimate. Currently, the MBS does not provide testing services. The intervention would aim to establish a testing laboratory that can verify the aflatoxin contamination levels in common crops, such as maize and groundnuts, as well as assist the MBS to develop policies in line with the National Quality Policy and develop an accreditation process. The costs for improving the institutional capacity of MBS are based on the Standardisation, Quality Assurance, Accreditation, Metrology Project (SQUAM), funded by the EU. The project includes interventions aimed at improving the MBS policy framework and capacity for verifying grading standards, thereby providing a reasonable cost estimate. Also included are the annual cost estimations of operations and maintenance of the lab and a consultant to review and update the policy framework and regulations for the MBS.

The link between wealth creation and proportion of premium quality groundnuts

The proportion of groundnuts that qualify as premium is the main driver of both benefits examined in the analysis. Based on the experience of a Mchinji-based Smallholder Farmers Association, which currently sells premium groundnuts through a fair-trade agreement to the EU, the premium proportion is 9 percent. The assumption is that the proportion of groundnuts that qualify as premium would increase over time as more farmers are trained in proper pre- and post-harvest methods. This would lead to increased profits for premium grade products. At 15 percent premium quality, the farmer income increases by MWK 10.5 billion per year. If only 5 percent qualify as premium, the farmer income increase is only MWK 3.5 billion per year, and

the BCR is 0.7, representing a poor investment where the costs of this intervention far outweigh the benefits. Besides, an increased quality in groundnuts production could lead to agro-processing opportunities for Malawi in the groundnuts value chain. It is important to note that the analysis conducted here is based on conservative assumptions about the scale of the sector. In both CBAs, it is assumed that the level of production will remain the same. However, it is reasonable to assume that the stability of policies and the opportunity to sell groundnuts at premium prices would increase investor confidence for expanding the production of maize and groundnuts. It can also be argued that more farmers would aim to improve their post-harvest–handling techniques once they realise the potential for increased revenue from reducing the levels of aflatoxin.

Table 2.1: Summary of CBA of Agricultural Export Interventions

Intervention	BCR	Beneficiaries	Investment cost	Benefits
Training and institutions for groundnut quality control	1.2 Fair (97% economic benefits)	750,000 farmers, and consumers of groundnuts	MKW 42 billion for training, MKW 3.7 billion for building institutional capacity, then MKW 0.3 annual operations	MKW 6.3 billion annual wealth creation from increased groundnut value and exports. 10.8 deaths avoided per year from reduced aflatoxin
Remove export ban on maize	1.1 Fair (100% economic benefits)	Farmers producing maize	Political cost, and the cost of a scheme to redistribute between winners and losers of resulting maize price increases	MKW 61 billion annual wealth creation from maize exports

3. AGRICULTURAL COMMODITY EXCHANGE (COMEX) REFORM

Shannon Davis, Bahman Kashi, Patrick Kambewa, Grace Kumchulesi and Brad Wong

Context

Agricultural commercialisation in Malawi is broadly constrained by poor market systems and unorganised farmers. Further, there are a multitude of other challenges constraining the development of formal agricultural markets in Malawi. According to the World Bank, some of these challenges include

- Inadequate infrastructure for efficient agricultural marketing,
- Policy incoherencies that negatively affect marketing,
- Nascent farmers' organisations,
- Inadequate access to credit and poor financial literacy among smallholder farmers,
- Small farm sizes,
- Excessive climate risk, and
- Reliance on informal rural intermediary vendors, among others.

The COVID-19 pandemic introduced additional challenges to the agriculture sector in Malawi. There have been temporarily disrupted supply chains for key production inputs from South Africa and China, although exports from both countries have seen recent improvements as strict lockdown measures have eased. Malawi's imports were 26 percent lower in April and May 2020 as compared to the previous year (World Bank, 2020). There are also higher costs and delays in trade logistics combined with decreased demand from trade partners.

Many programmes have worked to address the problem of improving access to formal markets, using a wide variety of intervention approaches. The roster of approaches ranges from providing technical assistance for farmers to increase productivity, to facilitating linkages value chain actors, providing

farmers with access to market information (such as minimum farmgate prices), training farmers' cooperatives and groups, and building infrastructure.

Among the most significant overarching issues in market coordination is the poor functioning of key institutions, including the unrealised potential of the commodity exchanges (COMEX). Malawi currently has two commodity exchanges: an Agriculture Commodity Exchange (ACE) and an Auction Holdings Commodity Exchange (AHCX). The two exchanges duplicate efforts, operate sub-optimally, are currently poorly structured, and remain underutilised. For example, the two exchanges have differing policies related to quality control standards, warehouse receipts, and storage facilities. The exchanges also have difficulty communicating their function to producers and suffer from very thin trading levels. Consequently, farmers prefer to sell to intermediary traders at low prices, resulting in lost income.

Summary Findings

The proposed intervention for this analysis is the reform of the two commodity exchanges. This was selected because it has the potential to improve policy-market coordination at a national level, as well as provide a practical avenue for farmer training, storage, and credit systems. The COMEX reform would involve a multifaceted process with defined milestones. The key elements of the reform would include the following:

- A merger of the two COMEX into one, including business and policy restructuring. Given the size of the market in Malawi, having two independent commodity exchanges results in inefficient use of resources (such as storage space) and poor coordination.
- Investment in grading technology
- Specifying several performance benchmarks that the COMEX would have to meet for the government to purchase maize through the platform, thereby increasing volume of trade. Benchmarks would include:
    - Financial stability and transparency
    - Established management systems
    - Use of standardised grading methods

- Help farmers to form cooperatives (or other models) to operate at scale

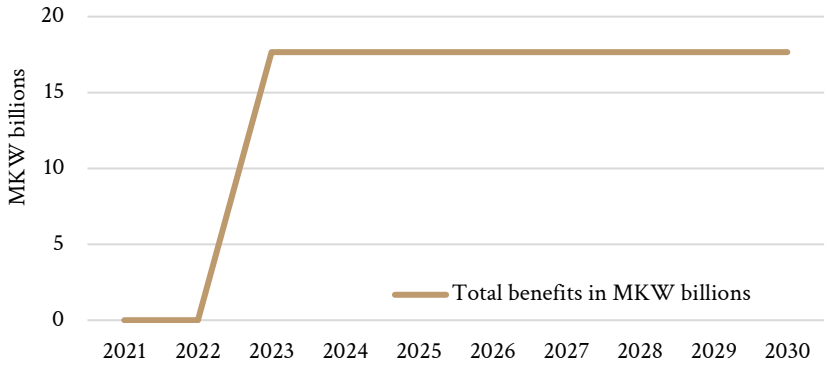
The analysis has been conducted assuming that only 10 percent of total production would be traded through the COMEX.

Increased Revenue for Farmers as Benefits

At present, farmers are typically paid below the minimum farmgate price for their crops when they sell directly to traders at the farmgate. With an efficiently functioning COMEX and stronger coordination among farmers, market access costs are expected to drop, including transport and storage costs.

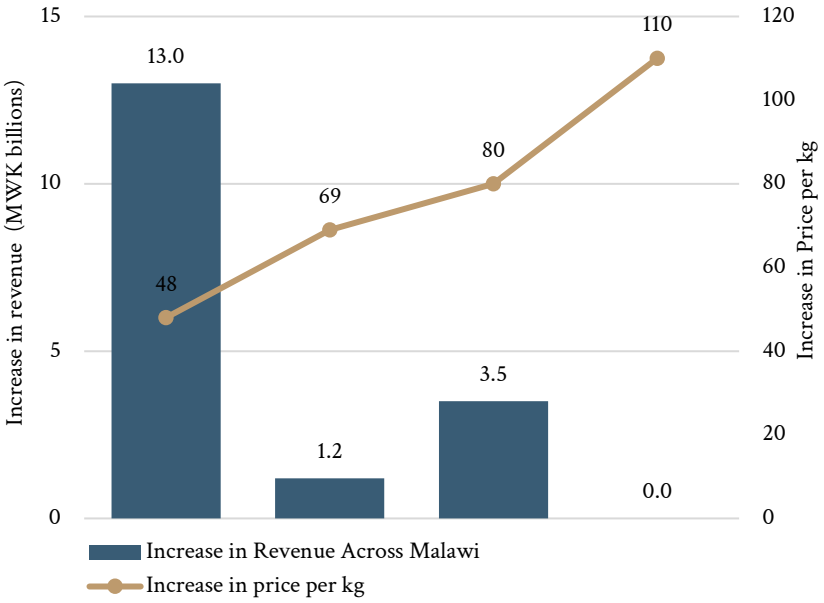
While no benefits are generated in Years 1 and 2 of the intervention, beginning in Year 3, the intervention consistently generates MWK 17.7 billion in increased revenue for farmers. The benefit results from farmers receiving the advertised minimum farmgate prices – higher than what they receive now. For example, the difference between farmgate prices and what farmers receive is as large as MWK 80 and MWK 110 per kg for pigeon peas and chickpeas, respectively. This price differential proves significant when output amounts to hundreds of thousands of tonnes, and in the case of maize, millions of tonnes, that it is even feasible if only 1 percent of farmers sell their output through the reformed COMEX.

Figure 3.1: Increased Revenue for Farmers



Note: For farmers who can receive minimum farmgate prices.

Figure 3.2: Increased Price Paid to Farmers for Their Agricultural Commodities

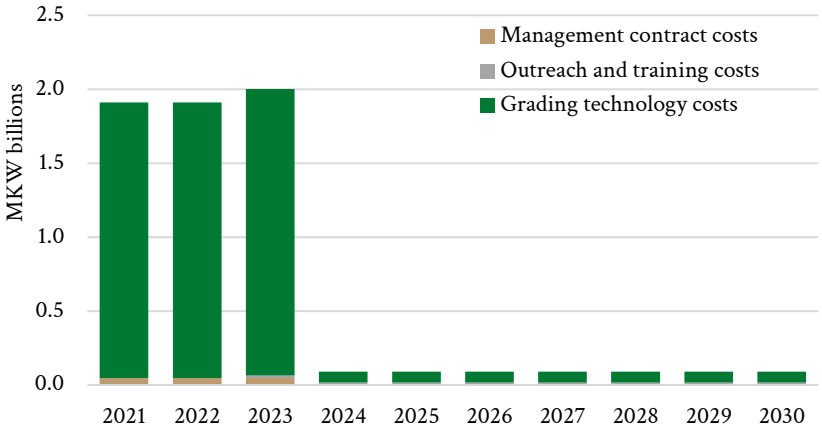


Note: 100 percent of the benefits expressed are economic benefits.

Additional Government or Donor Investment Required:

Overall, 90 percent of the intervention costs are borne within the first three years of the ten-year programme. While the first three years see annual costs hovering near MWK 2 billion per year, after Year 4, this figure drops to MWK 91 million per year, and consistently remains there for the remainder of the programme. Costs primarily fall into one of three areas: the cost of consultants to manage the mergers and monitor performance targets; agricultural extension to assist farmers in forming cooperatives and to establish better communication channels, and grading technology costs.

Figure 3.3: Cost of Selected Interventions for COMEX Over Time



Among these three, grading technology costs represent between 80 to 98 percent of the intervention cost per year, as significant investment must be made in upgrading business structures and COMEX facilities, including aflatoxin testing laboratories. The cost parameters are estimated based on conservative estimates of the cost to reform the policies and business practices for the COMEX.

Table 3.1: Summary of CBA of Intervention to Increase Farmer Revenue

Intervention	BCR	Beneficiary Group	Investment cost	Benefits
COMEX Reforms to incentivize good business practices and maximize value paid to farmers	16 Excellent (100% economic benefit)	Farmers selling their output through the reformed COMEX	MWK 6.5 billion over a ten-year period	MWK 141 billion over a ten-year period

4. FOOD AND NUTRITION SECURITY

Munyaradzi Mutenje, Brad Wong, Saleema Razvi, Charles Jumbe, Jabulani Nyengere and Sipho Billiat

Context

Food insecurity and undernourishment is linked to poorer subjective well-being, lower wages, lower economic growth, and higher mortality and morbidity. In the case of those living with HIV and AIDS, poor nutrition can increase the risk of mortality by 18 percent. Population growth and crop production shocks, in addition to other factors, have led to a significant increase in the number of Malawian households in need of governmental assistance, with the share of population in need of food assistance growing from 2 to 7 million between 2012 and 2017.

In 2020, 6 out of 10 Malawian households were deemed severely food insecure. Depending on the agricultural season, between 36 and 46 percent of Malawian households consumed less than 1,800 calories per day in 2020. The IHS5 found that 70 percent of rural households and 45 percent of urban households reported that they did not have sufficient food.

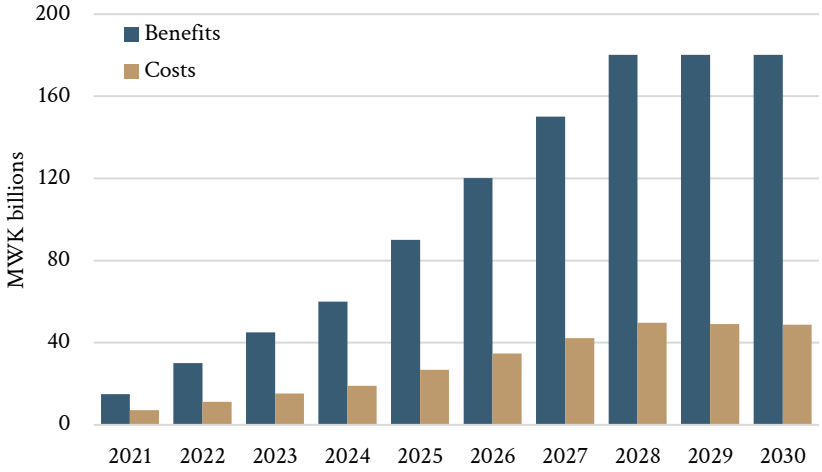
One of the NPC's prioritised research questions in this analysis was "What interventions might deliver sustained food and nutrition security as well as greater dietary diversity within sustainable farming models?" Because food security is a markedly multidimensional issue, this paper focuses on one particular lever that shows potential as a mitigation strategy: sustainable farming models. In the process of identifying cost-effective solutions, two different interventions with significant benefits have been identified using cost-benefit analysis:

- PICS bags Promotion
- Specific crop diversification strategies

Intervention 1: Purdue Improved Crop Storage (PICS) Bags

The first intervention reduces post-harvest losses through promoting the use of hermetic storage bags (PICS). PICS extend the longevity of existing crops, improving storage quality and the subsequent lifespan of harvested grain and mitigating the threat of rot and pests. At a PICS uptake rate of 60 percent across Malawi, the value of avoided grain loss would be equivalent to MWK 64 billion per year.

Figure 4.1: Costs and Benefits of PIC Bag Promotion



These improved bags are reusable and twice as durable, but at MWK 1,490, the cost per bag is five times higher than that of traditional storage methods. The total cost over 10 years adds up to MWK 123 billion, MWK 103 billion representing the extra cost of the PICS bags, and MWK 20 million for promotion. It is likely that the government would need to subsidise the PICS bags initially, although this could be gradually lowered and removed once the farmers understand the value of the improved bags. The BCR of the PICS bags and promotion is 2.9.

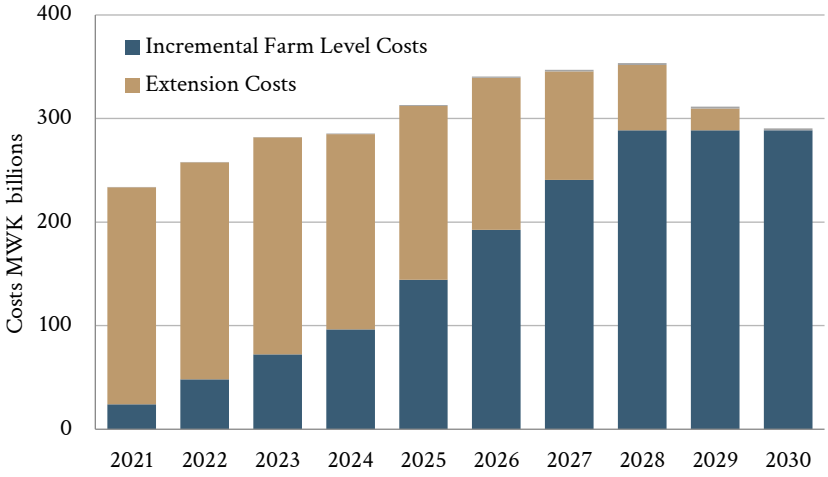
Intervention 2: Specific Crop Diversification Strategies

The second intervention helps farmers diversify into different high-value crops, which provide increased income and greater nutrition. Majority of

smallholders engage in monocropping, which has led to nutrient-deficiency and the need to import other varieties of foods. A comprehensive government engagement and information campaign to encourage crop-diversification would require an investment of MWK 200 to 350 billion annually in terms of increased extension costs, cultivation costs, and breeder seed production. Much of this cost would be borne by the government; if historical and present subsidisation patterns continue, however, this could be reduced over time as farmers become aware of the increased benefits.

Within the proposed intervention, different high-value crops are recommended for different regions, paired with different cropping systems. For example, the intervention proposes bio-fortified sorghum and pearl millet in the Lower Shire Valley, paired with conservation agriculture, stress-tolerant crop varieties, and cereal-legume inter-cropping/rotation. For the Lake shore, Middle, and Upper Shire, drought-tolerant, Pro-Vitamin A Maize, improved Rice, and Bio-Fortified Sweet Potatoes, among others, are suggested, alongside maize/cassava, and pigeon pea/bean inter-crop rotated with groundnuts/cowpea, pigeon pea inter-cropping or cotton.

Figure 4.2: Crop Diversification Costs



Despite these high costs, the strategies would deliver benefits equal to MWK 97 billion initially rising to MWK 1,160 billion in steady state. Over a 10-year

period, the BCR of this strategy is 2.0. While the BCR is relatively modest, it would have a large absolute impact on the Malawian economy with additional net-farm revenue equivalent to 7 percent of GDP in 2030.

Beyond farm income benefits, Malawi would have a surplus of calories, protein and zinc that could be consumed, exported, or used in agro-processing, a key pillar of the country's Vision 2063. This does not mean that these deficiencies would be eliminated at an individual level because it is uncertain how such gains would be distributed across the population. Nevertheless, the results provide hope that Malawi can achieve the required food security at a national level to help meet its goals.

Figure 4.3: Crop Diversification Benefits (MWK)

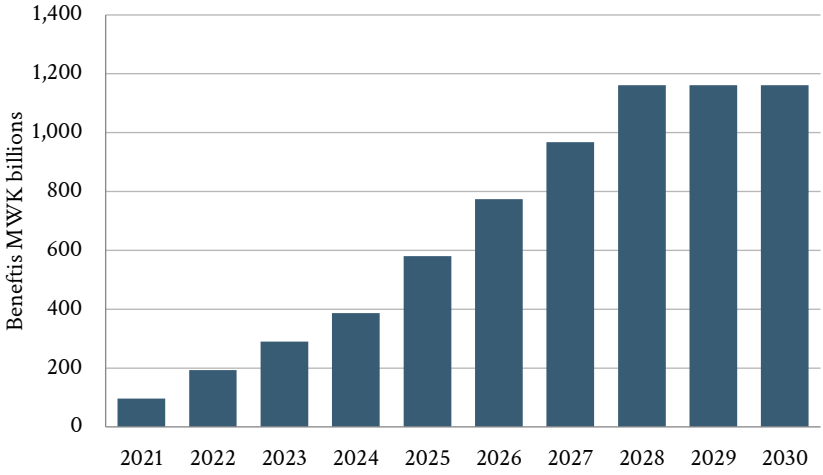


Figure 4.4: Energy Contribution from Crop Diversification Relative to the Status Quo (If Everything Harvested Is Consumed in Malawi)

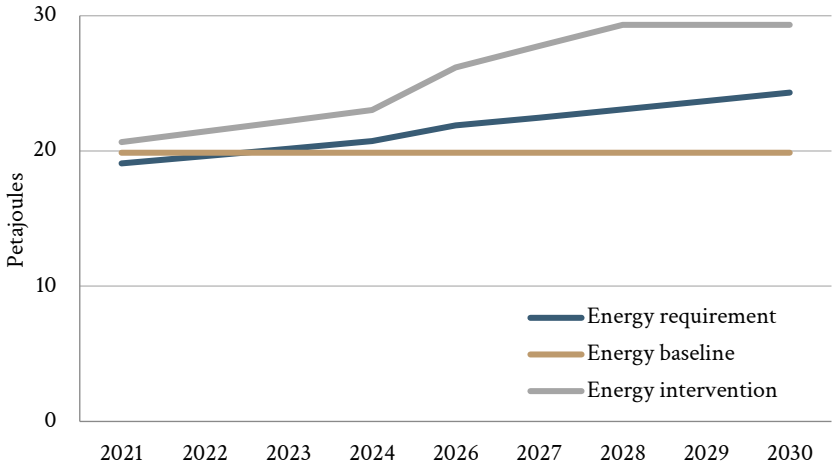


Table 4.1. BCA of Interventions for Food and Nutrition Security

Intervention	BCR	Beneficiaries and cost/farmer	Investment cost	Benefits
PICS Bags Promotion	2.9 Fair (100% economic benefits)	4.2 million farm households targeted 60% uptake of PICS bags MWK 5850 per farmer per year	Starting at MWK 4.6 bn in 2021 and rising to MWK 18bn annually in 2030	Avoided maize losses starting at MWK 5.4bn in 2021 rising to MWK 64bn in 2030
Specific Crop Diversification	2.0 Fair (100% economic benefits)	4.2 million farm households targeted 60% uptake of diversification strategies MWK 64,000 per farmer per year	200 to 350 MWK billion every year with 43% of costs for extension, 57% for incremental farm costs.	Increase farm income starting at MWK 97 bn in 2021 rising to MWK, 1,160bn in 2030

PART II.
NATURAL RESOURCE MANAGEMENT

5. HARNESSING NATURAL RESOURCE MANAGEMENT

Kemal Bagzibagli, Lindsay Wallace, Bahman Kashi, Brad Wong, Andrew Jamali, Friday Njaya, Jabulani Nyengere and Xina Lungu.

Context

Malawi's arable land, forests, woodlands and water and mineral resources are vital for the livelihood, food and nutritional security, economic development, and wealth creation for Malawians. Malawi's terrain boasts a variety of mineral resources, including gemstones and ornamental stones, industrial minerals, construction mineral materials and coal as well as diverse mineral resources, to include gold, uranium, bauxite, heavy mineral sands, rare earths, niobium, tantalite, copper, nickel and iron ore. Its water resources are also plentiful, with Lake Malawi housing between 700 to 1,000 fish species alone. As a national resource, these bodies of water contribute to the country's wealth creation via fisheries, irrigation, electricity generation, and tourism. Artisanal and small-scale operations in the extractive and fisheries/aquaculture sectors are crucial to income generation and poverty reduction, particularly in rural low-income communities.

At present, both sectors are vulnerable to informality, illegal trade, weak institutional capacity and limited and ineffective monitoring. These barriers constrain the sectors' potential to contribute significantly to Malawi's wealth creation despite its national resource abundance. The cost-benefit analysis quantifies the impacts of a subset of interventions that will improve the regulation, value-addition, marketing, and wealth creation in both sectors.

Intervention 1: Artisanal and Small-Scale Mining Landing Centres

Malawi is endowed with a variety of mineral resources. However, the sector is largely unregulated, and the production, processing, and marketing procedures of the value chain performed by the ASM operators are rudimentary.

Additional challenges within the sector include informal and scattered production practices; lack of knowledge and practices of value-addition; deficiency of critical human capital and expertise, e.g., gemologists; lack of capital to mechanise the exploration and extraction processes; limited or no access to international markets; export of minerals in rough form, generating meagre foreign exchange earnings; and, adverse health, safety, child labour, and environmental externalities. This leads to significant economic and social losses for the country.

The selected intervention proposes the construction and operation of zonal landing centres that accumulate the unorganised and inefficient mining operations and provide formalisation, licensing, semi-mechanisation, exploration, value addition, capacity building, and marketing support to the subsector. In addition to its financial and technical support, the intervention aims to ensure the subsector's compliance with laws and regulations, particularly concerning health, safety, child labour, mercury emission, and environmental protection.

In detail, the intervention consists of the following components:

- Building 12 landing centres in various districts,
- Building 3 regional headquarters for the control and administration of the landing centres,
- Building mineral libraries and laboratories in each regional headquarter,
- Building an international marketing centre,
- Providing ASM operators with exploration, digging, and value-addition equipment and machinery,
- Providing capacity building to local miners on each operation step, and
- Sending representatives to international exhibitions for promoting Malawi's processed minerals.

Costs and Benefits of ASM Landing Centres:

The intervention is expected to cost, over a 20-year period, MWK 5,535 million in upfront investments for infrastructure and machinery, with ongoing operational and administrative costs fluctuating between MWK 1,200 and

MWK 1,400 million per year. Every 10 years, MWK 4,911 million would be required for rehabilitation of mined land to mitigate the environmental impacts. This investment is expected to boost gemstone and gold ASM mining revenues by 5 percent as early as Year 2, increasing eventually to 35 percent until the end of the intervention. This is equivalent to MWK 172,800 million in revenues to small-scale miners over the lifetime of the intervention. This arises from a combination of improved production efficiency, expanding into new mineral reserves and increased value addition to extracted resources. The intervention could also generate benefits worth MWK 625 million in terms of avoided injury, improved sanitation at mine sites and avoided child labour, although the research team was not able to quantify this benefit precisely due to the lack of data. For every 1 MWK invested, this programme would yield 3.6 MWK in benefits, which is relatively high for interventions that generate economic benefits.

The primary beneficiaries of the intervention are the ASM miners. These benefits are only the direct impacts of the intervention and do not include potential flow-on effects. Implementation of this intervention would transform the ASM sub-sector into a modern medium-scale one. The formalised and modernised sub-sector could generate more revenues for the operators, create employment opportunities for the youth, and increase Malawi's foreign exchange earnings from value-added mining exports. It is also reasonable for the intervention to improve the Malawi mining sector's attractiveness for foreign direct investments, generating further wealth creation investments.

Intervention 2: The Chipoka Port Fisheries and Aquaculture Infrastructure and Land Development Project

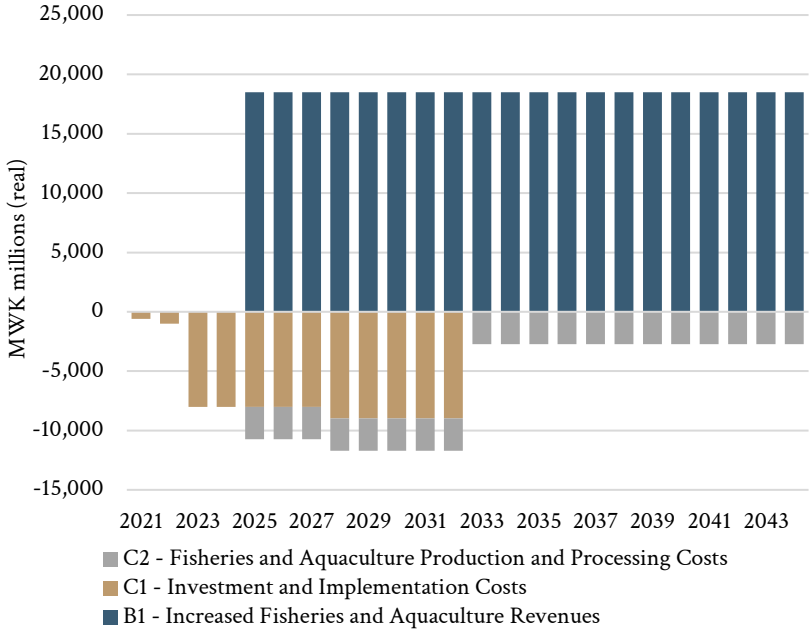
Fishing contributes substantially to the livelihoods and food security of Malawians. Aquaculture in Malawi, both pond-based and cage farming, has great economic potential to be the main driver of sustained fish supply to match the increasing protein needs of the population.

However, its ability to contribute to Malawi's wealth creation and household food security is impeded by informality, lack of sophisticated practices and value-addition and limited links to trade markets.

Figure 5.1. Chipoka Port Fisheries and Aquaculture Infrastructure and Land Development Project

The Chipoka Port Fisheries and Aquaculture Infrastructure and Land Development Project focuses on developing a sector-wide national hub for industrial, commercial, and logistical activities, linking to related vital sectors such as tourism, transportation, agriculture, and urban development. To achieve this, the project targets the infrastructure and functional port area to provide the sector with boat docking and repair, fish storage, processing, packaging facilities, and models for smaller fish farms.

Figure 5.2. Fisheries Cash Flow Over Time



Costs and Benefits of the Intervention

The intervention requires substantial upfront investment and implementation costs of MWK 87,100 million spread out over 13 years to 2033. Production and processing costs begin in 2026 and are estimated at MWK 2,716 million per year. The investment and implementation costs of the intervention cover the development of lakefront hubs and peripheral and localised farms and markets (spokes) containing, among other things, boat docking facilities and repair shops, fish processing facilities and cold storage, cage farms and facilities, fish-feed milling and fingerlings hatcheries.

The intervention is expected to generate value addition worth MWK 18,495 million from 2026 onwards. This is derived from MWK 6,975 million from the processing of fish, MWK 1,800 million from industrial processing and MWK 9,720 million from aquaculture.

Table 5.1. BCA interventions for Harnessing National Resources

Intervention	BCR	Costs	Benefits
Formalization and Modernization of the ASM Sub-sector by District Landing Centers	3.6 Fair	MWK 5,353 million up front investment in infrastructure and machinery MWK 1,200 to MWK 1,300 million per year ongoing costs. MWK 4,900 million for land rehabilitation in 2031 and 2041	MWK 10,165 million per year in increased gold and gemstone revenues MWK 625 million per year in avoided poor sanitation, injury and child labor benefits (uncertain)
Chipoka Port Fisheries and Aquaculture Infrastructure and Land Development Program	1.9 Fair	MWK 87,700 million in up front infrastructure and implementation costs MWK 2,760 million per year in ongoing processing costs	MWK 18,945 million per year in increased fish value addition

6. ENVIRONMENTAL MANAGEMENT AND DISASTER RISK REDUCTION

Alexander Golub, Munya Mutenje, Brad Wong, Sosten Chiotha, Saleema Razvi, Sipho Billiat and Jabulani Nyengere

Context

Malawi has faced continual and compounding disasters over the last few decades, with the Intergovernmental Panel for Climate Change's (IPCC) Fifth Assessment Report (AR5) identifying the country at high risk to the adverse effects of climate change. Rapid population growth, poverty, unsustainable urbanisation, climate variability and change, and environmental degradation further contribute to its susceptibility in that regard. The wide variety of natural hazards that the country is exposed to includes floods, strong winds, dry spells, cyclones, earthquakes, and landslides.

The growth and stability of people's livelihoods, economy, and infrastructure have all been impacted and hindered by extreme weather events. The floods of 2015 and the drought which followed in 2016 raised the national poverty rate and resulted in losses valued at approximately MWK 521,500 million (USD 700 million), while more recently, in 2019, physical damage to the country was estimated at MWK 163,900 million (USD 220 million) because of Cyclone Idai.

Over the past five decades, Malawi has experienced more than 19 major flooding incidents and seven droughts. Mean annual temperatures have been consistently increasing, going up by 0.9 degrees Celsius over the period from 1960 to 2006. There is a high level of variation between average annual rainfalls with very high levels of rainfall in 1989, 1997 and 2015, while by contrast, 1992, 2005, 2008 and 2016 were very dry. These fluctuations add to the necessity of disaster management and relief planning given the wide spectrum of activities needed to build resilience. This cost-benefit analyses

focused on two interventions that are critical to improving Malawi's resilience, as identified by sector experts in the country. These two interventions respond primarily to the occurrence of floods and drought: Early Warning System (EWS) improvements and expanding the use of Climate Smart Agriculture (CSA) practices.

Investing in EWS improvements would generate excellent economic benefits for Malawi

Malawi is highly vulnerable to the impacts of extreme weather events. On average, floods constitute about 75 percent of losses estimated at USD 68 million in a typical year. EWS plays an essential role in the mitigation of damage from natural disasters by providing an essential but marginal reduction in exposure. The ultimate role of EWS is to help potentially exposed communities better prepare for an upcoming extreme weather event: protect property, leave potentially exposed areas for shelter, move livestock to the high ground, etc. In other words, EWS improves the last mile coverage of disaster response at the community level.

The short term costs associated with improving Malawi's EWS include conducting hazard, vulnerability and risk assessments along with zoning 15 districts and 2 city councils (MWK 1,117.5 million), providing a return package to households in displaced sites (MWK 372.5 million); reviewing the National Disaster Recovery Framework to incorporate 2019 Post-Disaster National Assessment issues (MWK 260.8 million); and reviewing the disaster impact and needs assessment and reporting to include recovery needs (MWK 186.3 million). Midterm costs are estimated to be MWK 1,378 million and includes rehabilitation and strengthening of automated community EWS (MWK 373 million), establishing and training civil protection committees (CPCs) at MWK 261 million, and training and strengthening the local search and rescue tram with necessary equipment at MWK 745 million.

The analysis estimates that the intervention would avoid about 10 percent of housing and property damage; 70 percent of livestock and 80 percent of health damage in the event of a major flood with proper response to EWS advisories. For a minor flood, a larger fraction of damage up to 25 percent of

the total damage could be avoided. The total benefits accrued would amount to approximately MWK 1,862 million annually for a period of 80 years, a total of just over MWK 149,000 million in present value terms.

Climate Smart Agricultural Technologies

Climate-smart agriculture (CSA) includes farming practices that improve farm productivity and profitability, help farmers adapt to the negative effects of climate change and mitigate climate change effects. In Malawi, CSA practices include the use of drought-tolerant crops/varieties, crop rotation with cereals and legumes, and fertilizer micro dosing, among others, with farmer adoption rates between 30 and 60 percent.

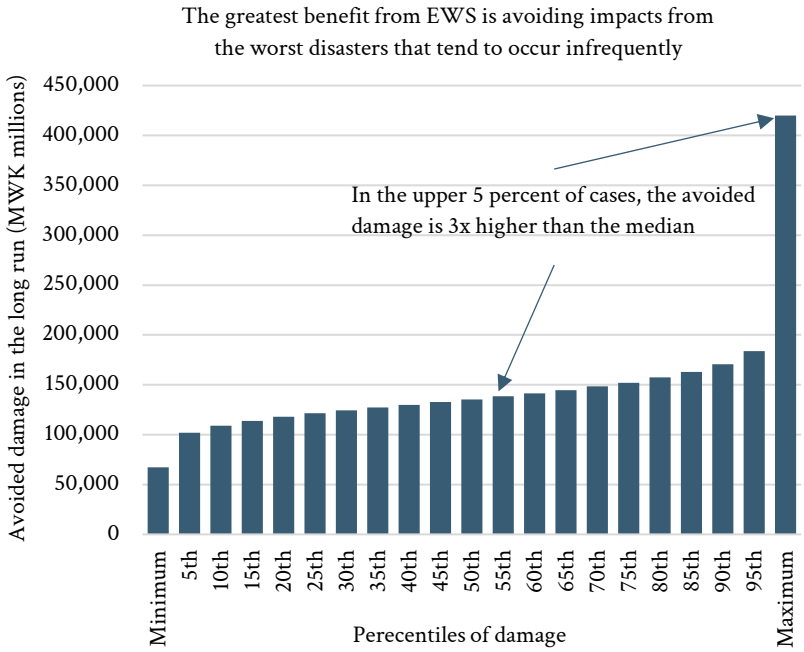
The costs and benefits of a combination of CSA strategies at farm scale are evaluated. It entails the production of drought-tolerant staple grain varieties (maize, groundnuts, and beans) under minimum tillage using recommended spacing and fertiliser rates as well as rice intensification. The adoption rate of this CSA strategy would be scaled up from 10 percent to 60 percent over the course of ten years. The conservation agriculture adoption rate will be achieved through a combination of extension strategies such as field schools, on-farm demonstrations, information, and communication technologies (ICT) and training and visits.

The costs associated with the intervention are the marginal production costs associated with the CSA strategies relative to current traditional conventional practices and extension costs to promote this CSA strategy. This amounts to over MWK 274,355 million, the bulk of which (79 percent) is attributable to the scale-up of extension activities.

Adoption of integrated conservation agriculture practice reduces yield loss due to climate change impact, the incremental farm revenue increasing over 5 years from MWK 8,025 million to MWK 48,151 million at steady state. The second benefit is that of avoided humanitarian aid. CSA is essentially an insurance against droughts and floods, and therefore, it generates the greatest benefit when it is analysed as a response against some disaster (especially against a tail-risk disaster such as severe drought). The probability of severe drought in Malawi is 20 percent or once every 5 years. With 75 percent of

the population requiring aid at a per capita cost of USD 32, the benefit of avoided aid is obtained, averaging MWK 43,412 million per year (over a time period of 15 years).

Figure 6.1. Benefits of Early Warning Systems by Percentile of Damage



The net present value of total benefits is equal to MWK 652,189 million and the total costs MWK 218,168 million. This intervention would yield 3.0 MWK in benefits for every MWK invested.

Overall, the results indicate that out of the two options, improvements in EWS are a more effective use of marginal resources compared to climate smart agriculture strategies. This is not to say that CSA should be overlooked, just that out of the two, EWS improvements should be prioritised by a welfare-maximising decisionmaker with limited resources. The logic behind this finding is that successfully integrating CSA policies requires engaging and changing the behaviour of millions of smallholder farmers in the face of an

important, but relatively slow acting disaster (drought). The scale of engagement required renders this intervention particularly costly. In contrast, EWS improvements require only modest additional costs because the base infrastructure of EWS is already established. The scale of engagement required to enact change is large but can leverage community level structures at much lower cost. The relatively acute and obvious nature of the disaster (flood) also lends itself to more rapid behaviour change if sufficient warning is provided.

Table 6.1. BCA for Selected Interventions on Environmental Management and Disaster Risk Reduction in Malawi

Intervention	BCR	Costs	Benefits
Early Warning Systems (EWS) Improvements	16 Excellent	MWK 3,371 million (upfront capital investment costs in the first year) + ongoing annual maintenance costs of MWK 506 million	Approx. MWK 14,000 million per year with much of the benefit from avoided tail risk During Floods: 10% housing damage avoided, 70% livestock loss avoided, 80% lives lost avoided
Expanding the use of Climate Smart Agriculture (CSA) practices to address drought and floods	3.0 Fair	Incremental farm costs relative to uptake of CSA practices of between MWK 803 million (10% uptake) to MWK 4,815 million (60% uptake) + extension costs (average MWK 43,556 million for 5 years)	Income benefits increase over 5 years rising from MWK 8,025 million to MWK 48,151 million at steady state + avoided humanitarian aid averaging MWK 43,412 million per year

7. FISHERIES MANAGEMENT

Wisdom Akpalu, Friday Njaya, Joseph Nagoli, Salim A. Mapila and Brad Wong.

Context

The fisheries sector in Malawi comprises two subsectors; (1) capture fisheries, which is the dominant sector and (2) the aquaculture sector. For capture fisheries, Lake Malawi is the foremost fishing area, responsible for most of the fish in the region along with Lake Chilwa. The capture fishery in Lake Malawi is highly diverse. It consists of large-scale commercial, small-scale commercial, and subsistence fisheries. Fishing methods include trawling, hook and line, and several others.

There is evidence of extreme overfishing in Malawi. In many fisheries, overfishing manifests as declining catch per vessel over time, a pattern noticeable in Malawian data from 1993 to around 2005. However, the data in Malawi show a potentially precarious trend where catch per vessel started to increase substantially from 2006 to 2018. Reports note that this is likely due to a change towards greater use of more efficient, but illegal unmeshed nets in the country that capture juveniles and spawning fish, reducing the reproduction potential of fish species. This has led to a noticeable change in the composition of species being caught in Lake Malawi, with large pelagic fish being replaced by smaller pelagic fish such as *usipa*. The estimate is that in 2018, the problem had become so severe that 90 percent of nets used were illegal and profits in the sector were more than 5 times the levels that support maximum sustainable yields. A collapse in the fish stock may be imminent without a drastic reduction in fishing effort.

Reducing fishing intensity by applying a rotation policy will avoid a collapse of the fisheries stock

Making craft fish in turns is a feasible policy to halt the depletion of fish stocks. Practically, this would be accomplished by painting boats different

colours and designating the day(s) of the week different coloured craft are allowed to fish. Given the current use of illegal nets, only 2,475 vessels should be allowed in the fishery each day, down from 18,000 vessels currently. The cost of fishing by rotation includes the cost of painting all fishing craft (MWK 271 million) and the cost of sensitising the fishing community (MWK 485 million). There is also the loss of revenue associated with dramatically reducing the number of boats in the first year (MWK 164,346 million). However, from the second year onwards, revenues would be higher than they otherwise would have been because the fisheries would avoid collapse. The additional revenue is MWK 53,687 million per year. Because there are fewer effective craft, the ongoing costs of the entire fisheries sector is relatively small at MWK 4,445 million. The benefit for every MWK spent is 2.8 MWK.

A second intervention – replacing all illegal nets – was also considered in the technical report. However, this intervention did not pass a benefit-cost test. While illegal nets are a significant contributor to the current overfishing challenge, replacing all 60,000 nets within the system would be very costly – around MWK 91,111 million. In addition, this intervention would still leave 18,000 craft competing for the same limited pool of fish, generating large ongoing costs.

Figure 7.1. Costs and Benefits of Fishing by Rotation

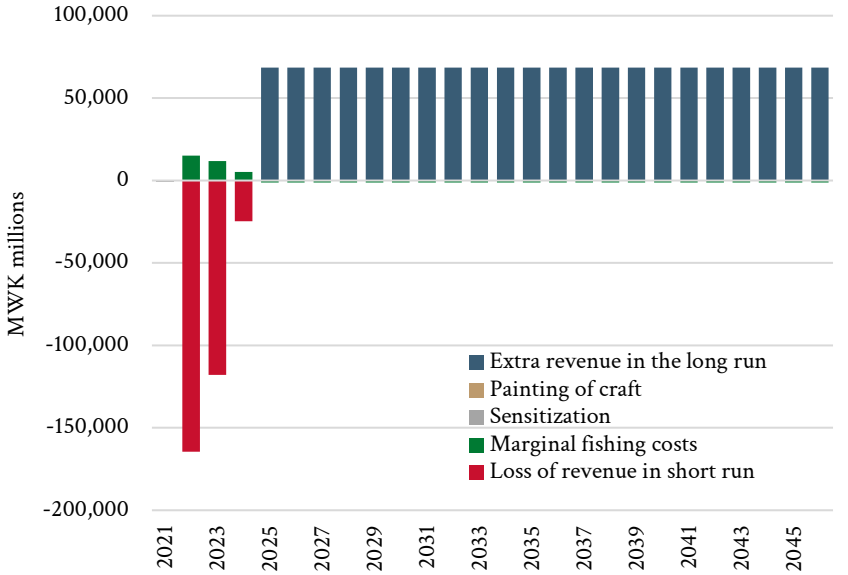


Table 7.1. BCAs for Interventions on Fisheries Management in Malawi

Intervention	BCR	Costs	Benefits
Fishing by rotation	2.8 Fair (100% economic benefits)	MWK 164,346 million in lost revenue for one year MWK 756 million for boat painting and community sensitization MWK 4,445 million per year in fishing costs	MWK 53,687 million per year in revenue due to avoiding a collapse in fish stock
Replace 60,000 illegal nets	0.9 Poor (100% Economic benefits)	MWK 180,163 million in lost revenue for one year MWK 91,111 million to replace all nets MWK 367 million for community sensitization MWK 29,250 million per year in fishing costs	MWK 55,428 million per year in revenue due to avoiding a collapse in fish stock

PART III.
HUMAN CAPITAL AND SOCIAL DEVELOPMENT

8. IMPROVING NEONATAL AND MATERNAL HEALTH OUTCOMES

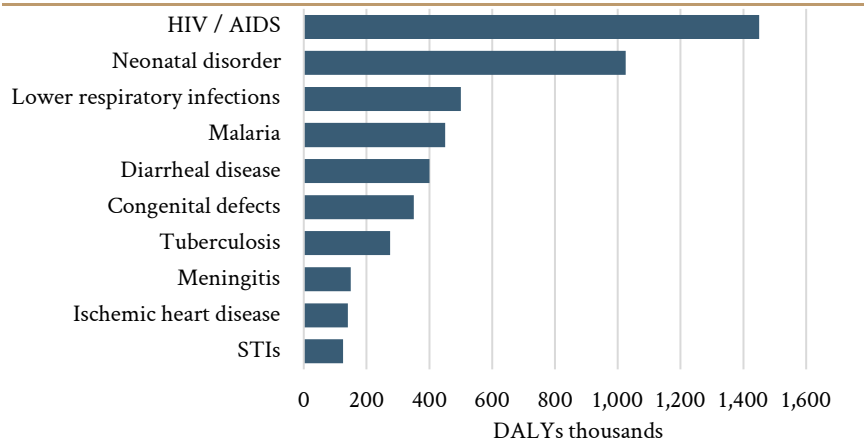
Bjorn Larsen, Saleema Razvi, Nyovani Madise, Salim A. Mapila and Brad Wong

Context

Malawi is one of the few low-income countries to have met the Millennium Development Goal (MDG) for child survival. However, much of the reduction in child mortality has come in the 1-4 age group and improving the mortality of new-borns remains important. The rate of progress has been less than half of that for overall child mortality, with neonatal deaths at 22 per thousand live births in 2018. Neonatal disorders come second only to HIV/AIDS in terms of years lost due to ill-health, disability, or early death.

Malawi also maintains one of the highest maternal mortality rates (MMR) globally, despite consistent improvements since 2000. In least developed countries, the MMR was 427 per 100,000 in 2016. In contrast, Malawi trails behind, averaging 497 deaths per 100,000 births in 2016, with the SDGs target of a global average of 70 deaths per 100,000 births by 2030. Some 90 percent of births are now at medical facilities (either hospitals or health centres) but this has had less impact on maternal and neonatal health than hoped. This is mainly due to the lack of available skilled staff (most health centres, where more than half of births take place, have only two nurses and no doctor). Contributing factors include lack of medicines, a reliable electricity supply and a shortage of some items of equipment. This has led to many health centres and to a lesser extent hospitals being unable to deliver key signal functions for Basic Emergency Obstetric and Newborn Care (BEmONC), or have the resources to effectively provide all 15 interventions associated with the conventional BEmONC package.

Figure 8.1. SEQ Causes of Disability Adjusted Life Years in Malawi, 2017
Source: IHME (2019)



In addition, 90 percent of pregnant women currently take iron and folic acid supplements (IFA), provided during antenatal care (ANC) visits, even if only for relatively short periods. IFA has real benefits, since there are a significant number of expectant mothers who are anaemic or have low levels of folic acid, both of which can lead to poor birth outcomes. While iron and folic acid supplements do have a strong positive impact on MNH at large, within Malawi the problem of undernutrition extends further than this, as many women also have inadequate levels of other key micro-nutrients, such as vitamins A and B12. Although the country has made considerable progress, a cost-effective programme of interventions in maternal and neonatal health would allow Malawi to maximise the impact of allocations toward Maternal and Neonatal Health, increasing the number of lives saved per kwacha spent.

Summary of Findings

This analysis focuses on several packages of interventions to improve Emergency Obstetric and Newborn Care and deliver nutrition supplements to women in pregnancy with the ultimate aim of reducing neonatal and maternal mortality. Fifteen of the interventions form what is considered Basic Emergency Obstetric and Newborn Care (BEmONC) and include hygiene, emergency procedures and postpartum aftercare.

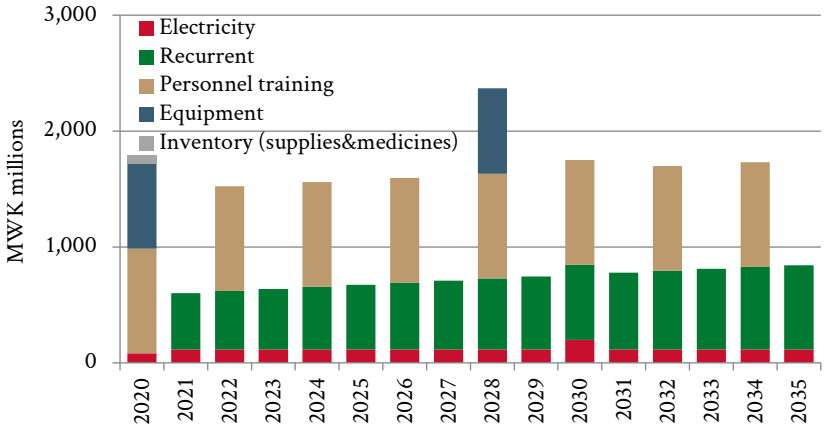
The full BEmONC package has an impressive BCR of 15, but analysis uncovered that 85 percent of the benefits are mostly driven by five interventions in the package. These five interventions form what is called the targeted BEmONC package and consist of kangaroo mother care, assisted vaginal delivery, hygienic cord care, neonatal resuscitation and clean birth environments.

Table 8.1: A Compacted Set of Five Specific Interventions Taken from within the Conventional Basic Emergency Obstetric and New-Born Care Package

Intervention	Description	Equipment or consumables required
Clean birthing environment	A set of simple procedures and protocols to reduce the chances of infection during delivery	Plastic drawsheet, gloves, hand sanitizer or soap and running water, chlorhexidine (antiseptic), cotton swabs, autoclave
Assisted vaginal delivery	Vaginal delivery assisted by use of forceps or vacuum extractor	Lidocaine (anaesthesia), vacuum extractor or forceps, sutures, gauze, syringes, oxytocin, paracetamol, gloves
Neonatal resuscitation	An emergency procedure focused on supporting new-born children who do not readily begin breathing	Hand-operated resuscitator
Kangaroo mother care	Holding of new-born babies with skin-to-skin contact for premature births	Hat and socks for new-born
Hygienic cord care	Procedure of cutting the cord with new or sterilised equipment and use of antiseptic on the stump	Chlorhexidine (antiseptic), cotton swabs, razor blades, umbilical cord clamps

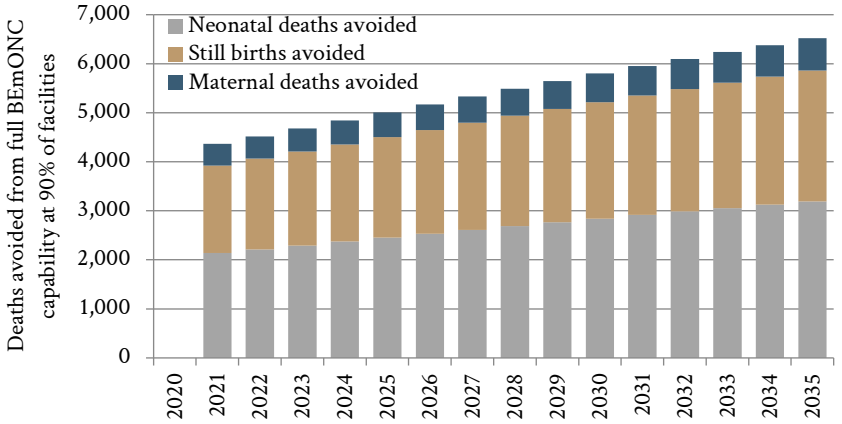
The upfront cost of the targeted BEmONC package in Malawian kwacha is MWK 11,812 million with personnel training representing just over half the cost. In 2021–2022, the cost is around MWK 2,125 million every two years rising to MWK 2,574 million every two years by 2034–2035. The recurrent costs are predominantly staff time and bi-annual training.

Figure 8.2. Costs for Provision of BEmONC5 Services



Over the 15-year intervention period, the targeted BEmONC package is estimated to avert 37,215 neonatal deaths, 2,019 maternal deaths, and 33,602 stillbirths. This is an estimated economic benefit of MWK 370,905 million in present value terms, resulting in a benefit-cost ratio of 31. Evaluated individually, the intervention with the largest BCR is Kangaroo Mother Care (KMC) for premature babies. This is mostly driven by the assumption that KMC does not require electricity generation to be implemented effectively.

Figure 8.3. Lives Saved from BEmONC5 Intervention

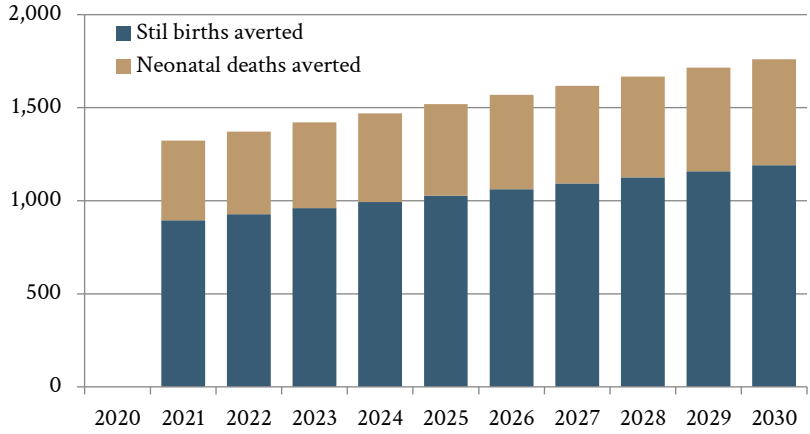


Multiple Micronutrients, rather than iron and folic acid supplements

Malawi has the highest rate of preterm births in the world, and nutrition supplements, such as multiple micronutrients and calcium, taken during pregnancy have been shown to reduce the risk of prematurity. Currently, Malawi provides women with free iron and folic acid (IFA) tablets during antenatal care visits (ANC). The programme appears to work well: in the most recent Demographic and Health Survey, nine out of ten women reported taking iron tablets during their last pregnancy.

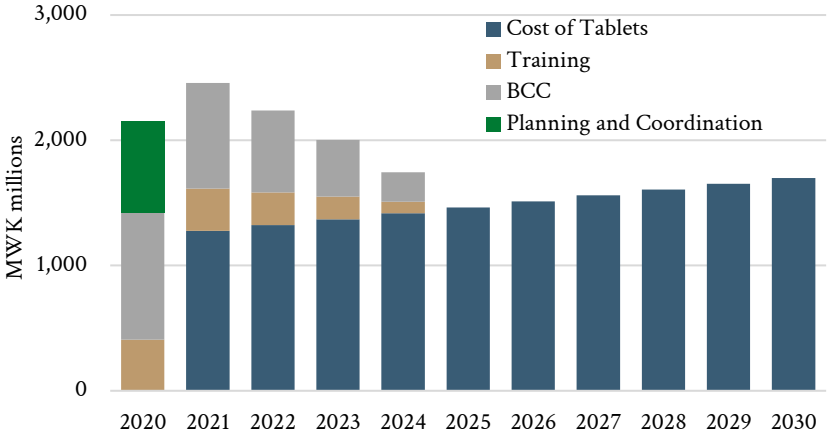
Replacing IFA supplements with more comprehensive supplements such as multiple micronutrient pills would improve maternal malnutrition and reduce neonatal deaths. This intervention would reduce neonatal mortality by 3–4 percent and stillbirths by 6 percent, saving 1,300–1,600 lives annually (Figure 8.4). It would also reduce prematurity by 5 percent and low birth weight by 4–5 percent. These benefits are significant, estimated in the short run as MWK 10 billion in 2021, rising to 21 billion in 2030, from lives saved alone. Additional benefits would accrue to a staggering 47,000 individuals who would avoid being born with low birth weight and 61,000 who would avoid stunting by 2030. Avoiding these afflictions have been shown to raise lifetime incomes by 8 percent and 43 percent respectively, a significant wealth-creation potential/economic benefit when these children reach working age. The overall BCR is 14; therefore, this intervention offers good cost-effectiveness.

Figure 8.4. Lives Saved from Substituting IFA with MMN



Since most women already seek some antenatal care and the health system is set up to provide IFA pills, delivering multiple micronutrients (MMN) in place of IFA is largely a matter of paying extra for the more comprehensive supplements. There is also a modest transitional cost for planning, training and behavioural change communication. At a unit cost of MWK 5 per tablet, replacing current iron supplements with MMN requires only MWK 10,979 million (undiscounted) over 11 years, including an upfront investment of MWK 2,157 million in planning, coordination and behavioural change. Over five years, the expectation is that these costs would reduce to zero as MMN becomes normalised as part of providing routine ANC.

Figure 8.5. Costs Associated with Provision of MMN



On this account, the MMN intervention perhaps has a smoother implementation pathway than does BEmONC.

Table 8.2. Summary of BCAs for Interventions and Costs for Improving Neonatal and Maternal Health Outcomes

Intervention	BCR	Target group	Impact	Lives saved per year	Additional investment
Package of 5 high impact BEmONC interventions	31 Excellent (33% Economic benefit; 67% social benefit)	Births occurring in 90% of hospitals and health centers	-15% neonatal mortality -5% maternal mortality -13% stillbirths	2480 neonates 2240 stillbirths 135 mothers MWK 505,000 (USD 680) / life	Approximately MWK 2.5bn every two years (USD 3.4m)
Substituting iron and folic acid supplements with multiple micronutrients	14 Good (73% economic benefit; 27% social benefit)	All women attending ANC visits	-3-4% neonatal mortality -6% stillbirths -5% low-birth weight	1040 neonates 500 stillbirths MWK 1,050,000 (USD 1410) / life	MWK 1.5 – 2.5bn per year (USD 2.0m – 3.4m)

9. HIV PREVENTION AND TREATMENT SERVICES TO FEMALE SEX WORKERS

Bjorn Larsen, Nancy Dubosse, Adamson S. Muula, Salim A. Mapila and Brad Wong

Context

Malawi has made significant progress in the fight against HIV and AIDS. Some 90 percent of those living with HIV know their status and have been initiated on ART, and 95 percent of pregnant women are screened for infection. Despite these notable successes, stemming new infections remains a concern in the country, with an estimated 32,300 annual new infections in 2019 alone according to the Global Burden of Disease. The continued importance of this issue was illustrated by its inclusion as part of the NPC Research Agenda in 2019.

Providing HIV and AIDS services to female sex workers (FSW) is one important lever to reduce the spread of the disease. This analysis indicates that interactions with FSWs contribute approximately 15 percent of new cases annually in those over the age of 15, with approximately 2,400 new infections among clients in addition to those clients' partner or partners, which loosely doubles the figure. In addition, new entrants into the profession, typically younger women, are at extremely high risk of becoming HIV-positive within the first few years of work, adding to new infections as well as to potential costs to the healthcare system throughout their lifetimes.

As of 2017, there were approximately 36,000 FSWs in Malawi with an estimated HIV prevalence around 60 percent. FSWs face specific socio-cultural barriers, which add greater challenges in addressing HIV and AIDS for this high-risk group. For example, only 49 percent of FSWs report using condoms, citing among other reasons, clients' unwillingness to use them. Limited economic opportunities for adolescent and young women, sub-optimal condom usage, and the migratory nature of FSW work, sets a challenging context for

effective policy development in this arena, making effective use of available funding a critical aspect in Malawi's efforts to manage this issue.

Summary of Findings

Given the context on HIV/AIDS within Malawi, the research was focused on three interventions that were later narrowed to the two most cost-effective options:

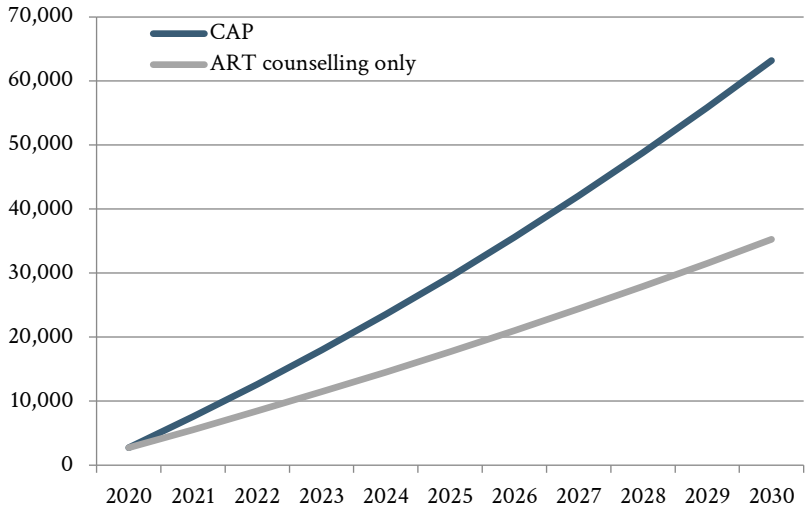
- Comprehensive Ambipolar Package (CAP): This intervention is ambipolar ("working in two directions simultaneously") in that it addresses the challenge from both the prevention and treatment side. It includes provision of post-exposure prophylaxis (PrEP) and anti-retroviral therapy (ART) counselling for FSWs, as well as semi-annual testing, case management and support services. Based on the results of the test, PrEP or ART would be provided through the health system.
- ART counselling alone: As above but with only ART counselling provided. Without working alongside the provision of PrEP, the cost-savings here are reduced due to continued inflow of new infections within the FSW population. Savings and benefits are accrued in the form of infections averted among those interacting with FSWs.

Avoided infections as benefits

If rolled out for 10 years, CAP avoids the largest number of infections at 63,200 to 2030, a third of which are FSWs themselves, with the remainder their clients and the sexual partners of clients.

ART counselling alone leads to 35,300 avoided infections to 2030, all of which are clients of FSWs and their partners. The difference between the two approaches is that ART counselling alone addresses only one pathway to onward infection, whereas CAP addresses two: reducing the share of FSWs living with HIV that are able to infect others because their HIV viral load is unsuppressed and ensuring that HIV-negative entrants into the profession do not contract the disease, thus reducing the overall pool of infected FSWs over time.

Figure 9.1. Cumulated Avoided Infections

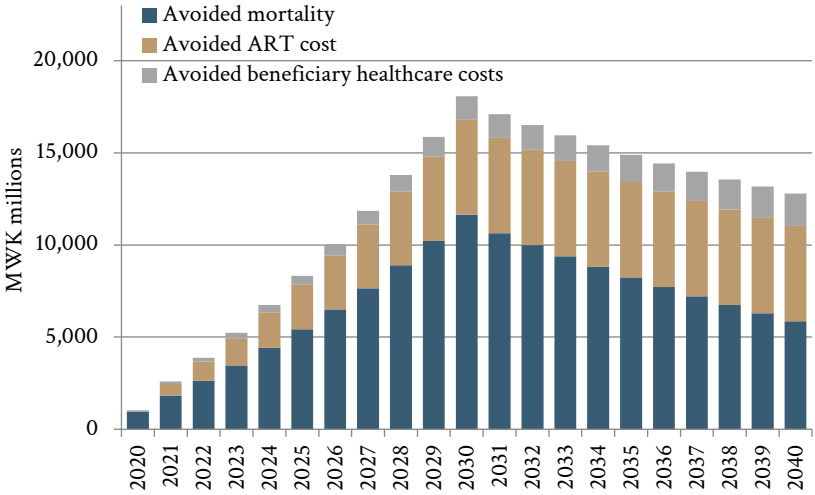


Avoiding infections leads to two main benefits:

- Avoided ART drug costs (estimated at MWK 112,000 per person, per year/USD 150), up to 52 years for FSWs and 38 years for other beneficiaries and,
- Avoided mortality – concentrated among those who would not otherwise adhere to the ART regimen.

By 2040, CAP would avoid 13,340 premature deaths while ART counselling would avoid 6,180 premature deaths. ART savings equal MWK 41 billion (USD 55 million) for the ART counselling intervention alone and MWK 79 billion (USD 107 million) for CAP. These ART savings start within one or two years. In both interventions, approximately two thirds of the benefits up to 2040 accrue to the Malawian population as improved health and reduced healthcare costs.

Figure 9.2. Benefits of Comprehensive Ambipolar Programmes



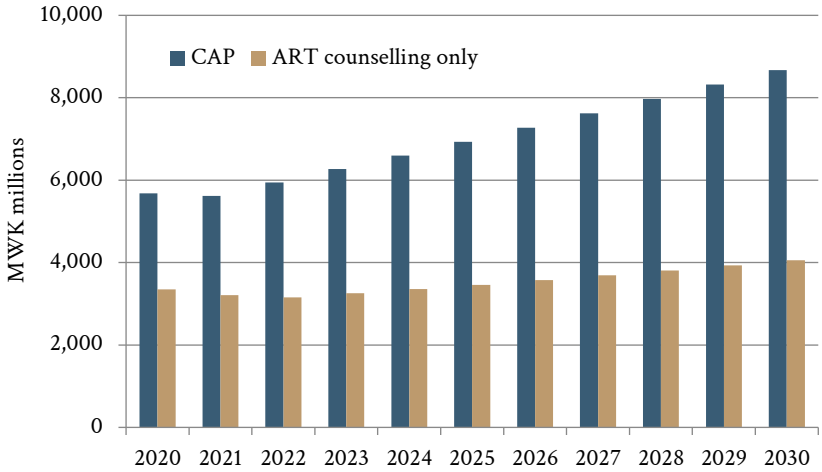
The remaining benefits are avoided ART costs, which accrue to the health system and ultimately the (future) funders of the HIV and AIDS programme. In 2017, international and multilateral donors provided 95 percent of funding for HIV programmes and would therefore reap these savings if this situation continued 10–20 years into the future.

Additional Government or Donor Investment Required

The additional government or donor investment required for ART counselling alone grows from approximately MWK 3.4 to 4.1 billion (USD 4.5 million to 5.4 million) annually between 2020 and 2030, amounting to a total of MWK 39 billion (USD 52 million) over 10 years – this represents an annual increase of approximately 2 percent over the current funding of USD 222 million.

The additional investment required for CAP grows from approximately MWK 5.7 to 8.7 billion (USD 7.6 million to 11.6 million) annually in 2030, amounting to a total MWK 77 billion (USD 103 million) over 10 years – equivalent to an annual increase of approximately 4 percent over current funding. The additional savings on ART will outweigh the increased programme costs by approximately 2040.

Figure 9.3. Government or Donor Investment Required



ART counselling generates almost immediate ART savings in clients and partners, which after the second year are larger than the additional costs of ART provided to FSWs. Within CAP, the additional costs primarily come from the provision of PrEP, which lowers or altogether nullifies new infections and assists in lowering the number of FSWs requiring ART counselling over the long term.

The costs per avoided infection are slightly larger for CAP than ART counselling alone. However, CAP has a slightly higher BCR because almost a third of the avoided infections are for FSWs who are younger on average and less likely to take ART, and the value of life years saved is greater than the value of avoided ART costs. This means that avoiding an infection in a FSW leads to more benefits than in non-FSWs. In contrast, ART counselling primarily generates benefits for non-FSWs.

Table 9.1. Summary of HIV/AIDS Prevention Services, BCRs and Costs

Inter-vention	BCR	Target group treatment adherence	Averted Infections and mortality	Additional investment required to 2030	ART savings and payback period
CAP	2.3 Fair (100% economic benefit; 0% social benefit)	All FSW 72% adherence to PrEP; 85% adherence to ART	63,200 cases to 2030 MWK 1,200,000 (USD 1,627) per case 13,341 deaths avoided to 2040	MWK 5.7 bn in 2020 rising to MWK 8.7 bn in 2030	MWK 0.6 bn in 2021 rising to MWK 5.2 bn in 2030 continuing Total ART savings exceed program costs in 2039 into 2070
ART counselling only	2.2 Fair (100% economic benefit; 0% social benefit)	All FSW 85% adherence to ART	35,300 cases MWK 1,300,000 (USD 1,756) per case 6,177 deaths avoided to 2040	MWK 3.4 bn in 2020 rising to MWK 4.1 bn in 2030	MWK 0.8 bn in 2022 rising to MWK 2.3 bn by 2030 continuing into 2070 Total ART savings exceed program costs in 2040

10. REDUCING THE PREVALENCE OF STUNTING

Bjorn Larsen, Nyovani Madise, Saleema Razvi, Joseph Nagoli and Brad Wong.

Context

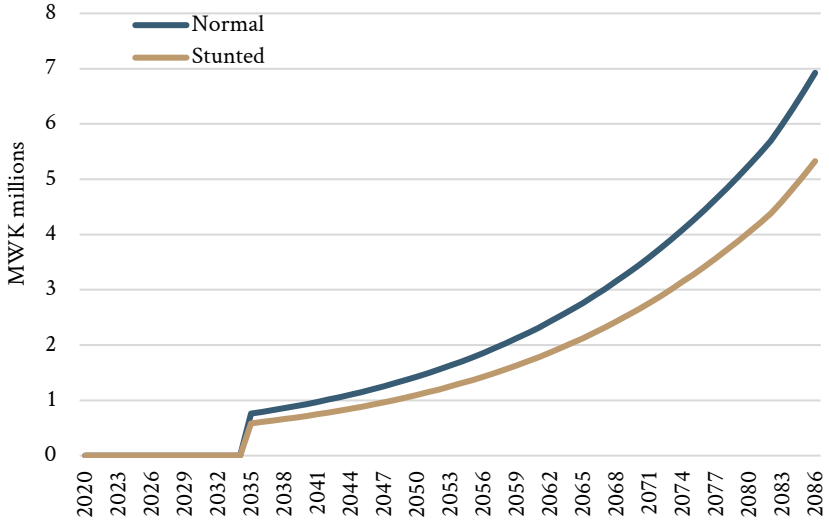
Undernutrition and stunting present several challenges for children in Malawi. The long-lasting harmful consequences include diminished mental ability and learning capacity, poor school performance in childhood, reduced earnings and increased risks related to diabetes, hypertension, and obesity. Stunting cannot be corrected by treatment; it has to be addressed through a multi-sectoral approach via interventions that promote healthy growth in the young child especially in the early years of life.

Malawi has registered notable improvements in reducing low-birth weight prevalence, anaemia, and Vitamin A deficiency. Stunting prevalence has also steadily declined, but, at 37 percent, it remains significantly higher than the global average of 21 percent and the African average of 29 percent. This is a greater problem in the countryside than towns: rural children have a 39 percent likelihood of being stunted, compared to 25 percent for urban children. Since education and wealth are both inversely related to stunting (DHS 2015–16), reducing its incidence has longer term benefits for the country's future productivity in addition to the obvious gains in quality of life for individuals. According to the Cost of Hunger 2012 report, it is estimated that Malawi lost USD 597 million due to undernutrition, which is equivalent to 10.3 percent of the Gross Domestic Product (GDP).

Chronic undernutrition is the primary cause of stunting, but behind this lies a major problem of food insecurity. Low household incomes and low agricultural productivity are the main reasons for the lack of a secure and adequate food supply that affects 39 percent of households, or an average of 9.4 million people within the country. However, the underlying cause of child morbidity and mortality is multifaceted, not solely associated with poverty or

food insecurity. In Malawi, 46 percent of children under-five years who are stunted are among those from the poorest communities compared to 24 percent among the wealthiest communities (DHS, 2016). Early complementary feeding of babies is also common practice (only 61 percent of babies are exclusively breastfed up to six months of age according to 2015 MDHS). Beyond that, just 8 percent of children receive a minimum acceptable diet between 6 and 23 months of age (MDHS 2015–16).

Figure 1. Income Divergence over a Lifetime for Children Born in 2020



At present, nutrition services are delivered through different service delivery platforms including at the facility level through growth monitoring promotion, antenatal clinics, outreach clinics and IMCI. At community level, nutrition services are provided through care groups and frontline workers from health, agriculture, community development, and volunteers. This analysis is focused primarily on Health Surveillance Assistants (HSA), who promote and provide preventive healthcare through door-to-door visits, village clinics and mobile clinics. There are approximately 11,000 in post, each responsible for 1,000 patients; however, they are overworked and operating in a resource-constrained environment.

In light of these challenges, in 2017, Malawi launched the first National Community Health Strategy (2017–2022) in which the government committed to improve basic community health services throughout the country in collaboration with non-governmental organisations. Having a properly resourced, fully functional system across the country is obviously a prerequisite for the achievement of these strategic goals. In this context, it is particularly important to identify how to expand and improve delivery of improved nutrition in a cost-effective way.

Breastfeeding promotion

The prevalence of exclusive breastfeeding in Malawi is estimated to be 61 percent, having dropped 10 percentage points since 2010. In Malawi, the tendency to give traditional liquids and early complementary feeding is common, with studies suggesting that inappropriate complementary feeding was one significant contributor to stunting among children in rural Malawi. This is further complicated by the prevalence (11 percent) of HIV-infected women of reproductive age and the assumption that transmission will occur through breast milk.

Increasing the prevalence of exclusive breastfeeding in the first six months of a child's life, as well as improving the prevalence of continued breastfeeding after weaning and up to 23 months of age, reduces the risk of infection and associated morbidity and mortality of the child. In the longer term, improved cognitive development and reduced risk of non-communicable diseases (for both mother and child) helps to increase human capital.

Figure 10.2. Proportions in Breast-Feeding with and without Interventions

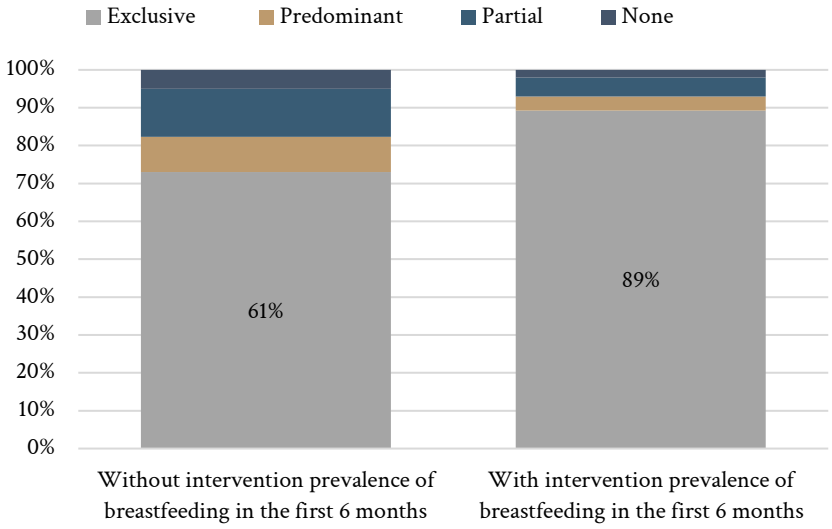
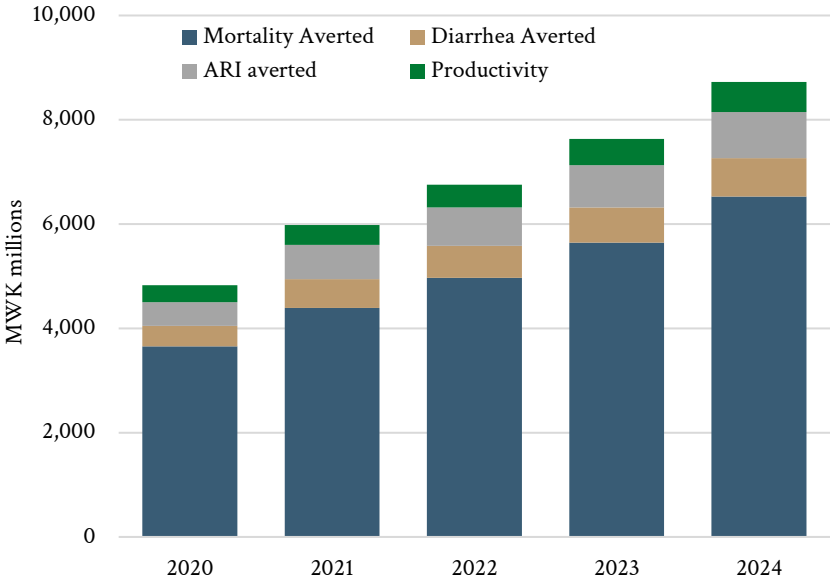


Figure 10.3. Total Costs and Benefits of Breastfeeding Promotion



Bearing this in mind, the proposed intervention involves the promotion of breastfeeding via the HSAs. The target population is 100,000 mothers in the first year, rising to 150,000 in the fifth and final year (this applies to both interventions). This would increase exclusive breastfeeding rates by 21.6 percentage points.

This increase would avoid 334 child deaths, reduce cases of diarrhoea by 31,000 and cases of respiratory infection by over 75,000 for the first cohort. Over a five-year programme, the total number of child deaths avoided from the intervention would be around 2,100 or around 9 percent of avoidable deaths for the beneficiary population. Almost all (93 percent) of these benefits would accrue to the children and their families, with 7 percent of the benefit to the health system in terms of avoided costs of treatment.

The costs of providing breastfeeding promotion include the direct costs of breastfeeding promotion (MWK 7,338 per child); the time cost of breastfeeding promotion (six 30-minute consultations between HSA and mother), and the time commitment required from the mother for exclusive breastfeeding (approximately 60 minutes per day). Over the five-year intervention period, total discounted costs amount to MWK 5,504 million, with 81 percent composed of direct costs.

Complementary feeding promotion (CFP)

Nutrition education can positively influence nutrition outcomes, especially for infants and young children. This intervention targets mothers about to begin weaning their children and is largely intended for food secure households that have the capacity to feed their children but may not have the nutritional knowledge to do so optimally.

There are two components to the cost: the cost of promotion (percent of the total cost), incurred by the government; and the incremental cost of food (percent of the total cost) provided by the mothers to their children, which is paid for by the household. The total annual cost of promotion is approximately MWK 345 million, targeting 100,000 women. The cost of such incremental food provision is estimated at a little over MWK 32,000 per child for

the complementary feeding period (6–23 months). The total costs of the intervention are MWK 4,162 million, starting at just over MWK 600 million annually, and rising to just over MWK 1,000 million annually in the fifth year.

The two benefits are averted child mortality and a 30 percent increase in productivity via higher lifetime earnings of people who do not suffer stunting. The prevalence of stunting (in food secure households only) is estimated to reduce by 7 percentage points (from 29 percent to 22 percent), while 3,100 children would avoid stunting in the first year, rising to 4,679 in the fifth year. Most of the benefits are accrued due to productivity benefits from avoided lifetime income losses, which account for nearly 90 percent of total benefits in this case.

Figure 10.4. Impact Complementary Feeding Promotion on Child Stunting

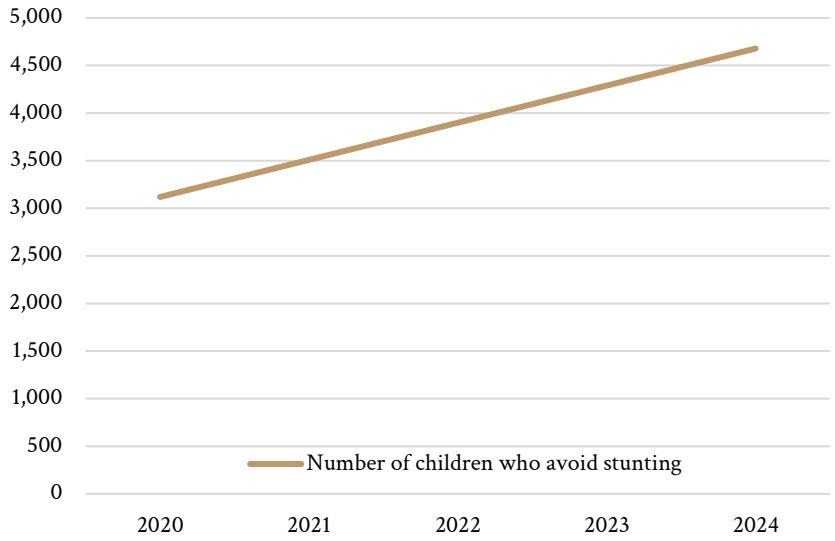


Figure 10.5. Total Cost of Complementary Feeding Promotion Programme

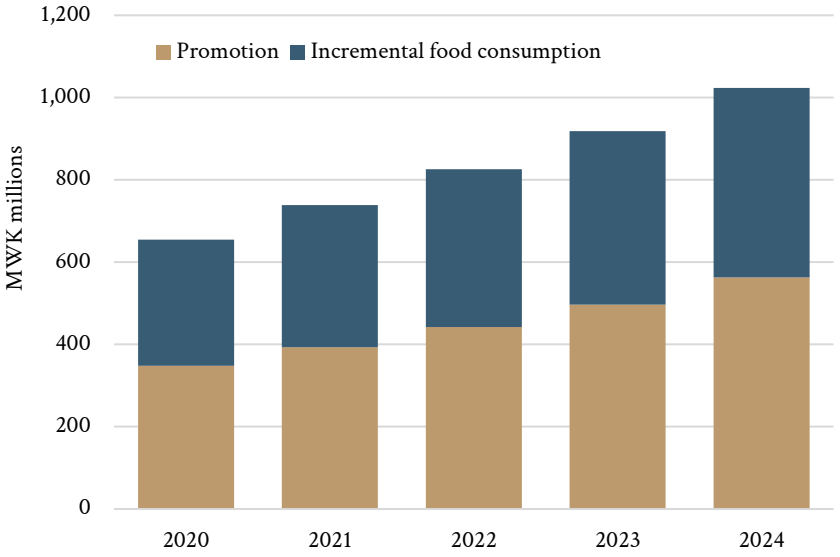


Figure 10.6. Total Benefits of Complementary Feeding

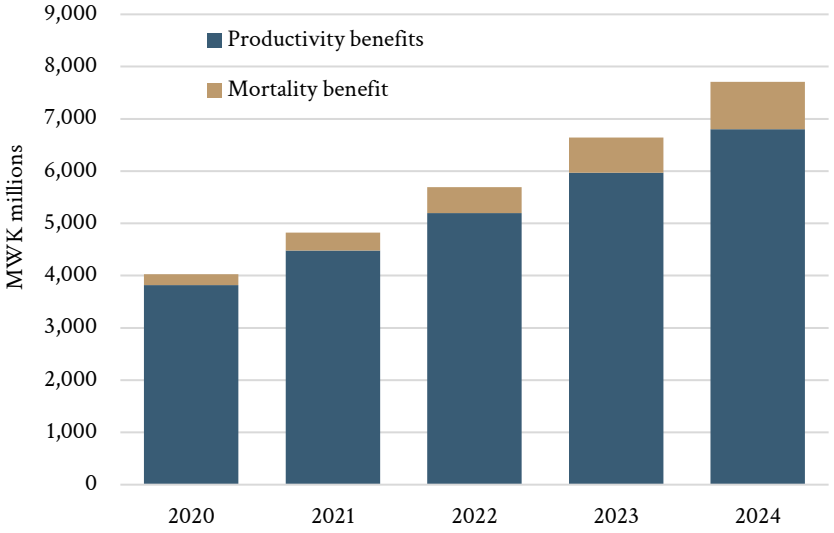


Table 10.1. Summary of BCA on Interventions to Reduce Prevalence of Stunting among Children

Intervention	BCR	Target Population	Averted stunting	Averted deaths	Cost per averted stunting	Cost per averted death
Breast Feeding Promotion	5.4 Good	100,000 mothers in the first year, rising to 150,000 in the fifth and final year	1,650 cases	2,088	MWK 3.7m	MWK 3m
Complementary Feeding Promotion	7.2 Good	100,000 mothers in the first year, rising to 150,000 in the fifth and final year	19,495 cases	331	MWK 0.2m	MWK 12.5m

11. MALARIA CONTROL STRATEGIES: A SCENARIO COMPARISON USING THE SPECTRUM-MALARIA IMPACT MODELLING TOOL

Eline Korenromp, Brad Wong, Saleema Razvi, Nancy Dubosse, Adamson S. Muula, Linly Kufeyani and Adam Guys.

Context

Although Malaria is a largely preventable and treatable disease, it is a significant cause of mortality, morbidity and productivity loss in Malawi. With around 15 percent of the population suffering from the disease in Malawi at any given point in time, it creates a large burden on the health system, accounting for 36 percent of all outpatient visits and 15 percent of all hospitalisations. This study estimates that in 2019, malaria generated welfare losses equivalent to MWK 94,770 million – or 1.7 percent of GDP – when considering mortality, cost of illness, lost productivity and lost learning.

Over the years, the number of malaria cases have been showing a declining trend in Malawi. The Malawi National Malaria Control Program (NMCP) has been quite efficient – investing significantly in vector control, prevention in pregnancy, testing and case management. Traditionally, high BCR interventions are likely already implemented. The continual insecticide-treated bednet (ITN) distribution programme, which provides around one million long-lasting ITNs during antenatal care (ANC) and child immunisation visits have also helped, supplemented by periodic mass distribution campaigns that provide more general coverage. Malawi has also rolled out intermittent preventive treatment for malaria during pregnancy (IPTp) in ANC (which as the literature suggests is a high BCR intervention), with a substantial proportion (78 percent) of pregnant women receiving at least two doses of IPTp. In terms of testing and case management, since 2018 more than 98 percent of fever cases who present at health facilities have been tested for malaria, and

of those infected, close to 100 percent receive Artemisinin-based combination therapy (ACT) as a first-line treatment.

While the approach and focus on reducing the malaria burden is commendable, several challenges remain which, if unaddressed, could retard or even reverse the significant progress made thus far. These include:

- Emerging insecticide resistance, particularly to pyrethroid, leading to reduced ITN effectiveness.
- Suggestive evidence that a significant amount of ITNs in Malawi only last for two years in practice, leaving many people unprotected in the year before each triennial mass distribution campaign. While testing is near universal, only ~ 60 percent of people, or parents of children, seek care for fever (NSO, MDHS, 2015–2016), meaning that a considerable proportion of malaria cases are not diagnosed and treated. This large number of undiagnosed and untreated cases substantially adds to the population-level burden of malaria morbidity, mortality, and transmission as well as economic losses.

This paper is focused on cost-benefit analyses of interventions using the Spectrum-Malaria Epidemiological Projection Model for determining the impact.

Combining PBO nets with mass media to boost care seeking for fever has the highest return on investment

The study recommends transitioning to 100 percent PBO ITN distribution along with a community-informed, mass media rollout for improved care seeking for fever.

NMCP distributes approximately one million ITNs every year during routine ANC and immunisation, and almost 11 million ITNs every three years as part of the mass distribution campaign for the general population. While in the past, the distribution has consisted mostly of pyrethroid-only ITNs, a complete switch to Pyrethroid-piperonyl butoxide (PBO) nets distribution is recommended to address growing insecticide resistance. PBO nets cost MWK

462 more than the standard pyrethroid ITN. With 11 million ITNs being distributed every three years and 1 million in the years in between, this would cost an additional MWK 20,729 million.

The rollout of a mass media intervention for improved care seeking for fever is also recommended. This would require a first year of community dialogues to design context-specific messages (across 10,000 people in 28 districts). Then, from the second half of the first year, dissemination via radio messaging would craft a mass media promotion-specific message to each district. This is expected to increase fever care seeking by 10 percentage points, from 60 percent to 70 percent.

Costing mass media for improved care seeking for fever, we assume an initial message design cost for community dialogues aimed at 10,000 people in each of the 28 districts. The community dialogues would cost MWK 18,625 per person, while the mass media component would cost MWK 75 per capita. Since increased sensitisation will lead to increased care-seeking, the additional costs of RDT and ACT, have been factored in at unit costs of MWK 335 and MWK 2,235, respectively. The total additional investment over 10 years would be MWK 24,718 million.

The combined interventions would require an additional MWK 46,000 million over a 10-year period, or USD 62 million, representing an ~ 8 percent of expected budget of an annual USD 80 million. The time series of costs is presented in Figure 11.1. This intervention has the largest absolute effect of all interventions considered, avoiding expected malaria deaths by 18,129 (a 45 percent reduction) and expected cases of malaria by 10.4 million (a 25 percent reduction) from 2022–2030.

Figure 11.1 Costs of Community-Informed Mass Media + PBO ITN

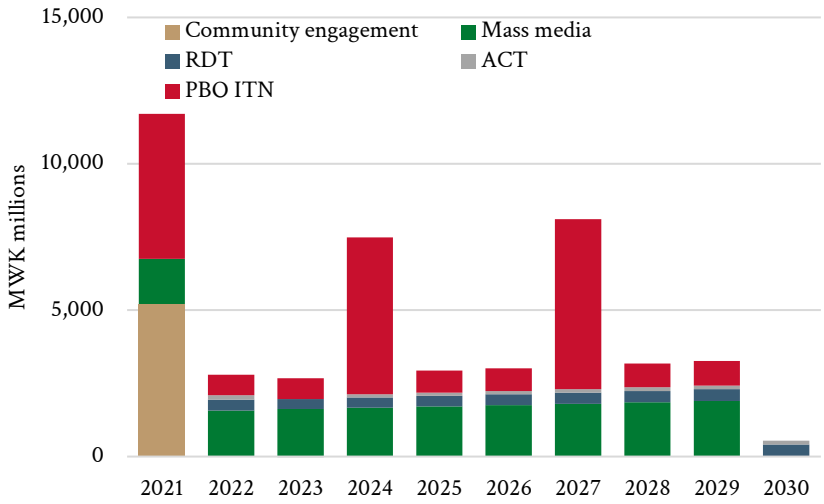
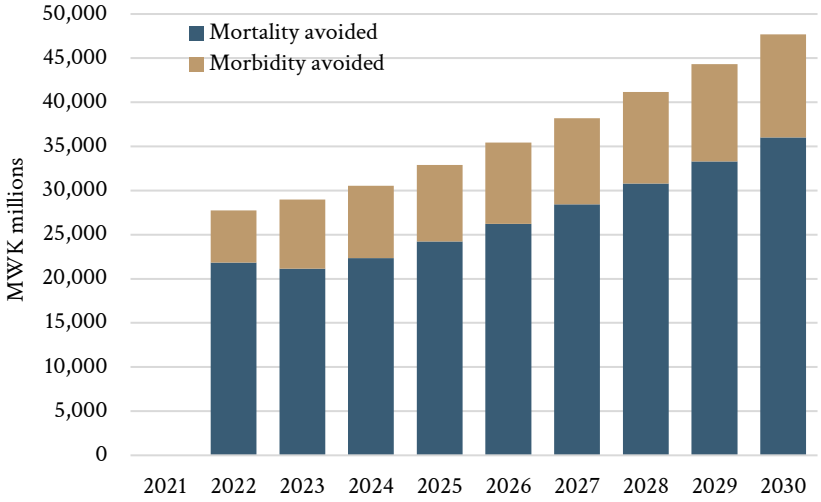


Figure 11.2 Benefits of Community-Informed Mass Media + PBO ITN



Overall, the analysis indicates that PBO ITNs and mass media for improving fever care seeking are likely the most efficient use of additional resources for the NMCP. The combination of the two interventions would bring Malawi

closer to its malaria targets. In contrast, IRS in the districts around Lake Malawi as well as increasing the frequency of mass ITN distribution campaigns are likely less effective uses of resources.

Table 11.1. Summary of BCAs on Interventions to Control Malaria

Intervention	BCR	Beneficiary Group	Extra Costs over 10 years	Extra Benefits over 10 years	Cost per Death Avoided
Mass media for improved care seeking for fever	7.4 Good	All Malawians	MWK 24,718 million	12,312 deaths and 4.9m cases avoided	MWK 2.0m
100 percent PBO ITN distribution	6.0 Good	10.7 million households	MWK 20,729 million	6,767 deaths and 6.1m cases avoided	MWK 3.1m
Mass media for improved care seeking for fever + 100 percent PBO ITN distribution	6.6 Good	All Malawians	MWK 46,000 million	18,129 deaths and 10.4m cases avoided	MWK 2.5m
Scale-up IRS in districts around Lake Malawi	1.7 Fair	2.1 million people in districts around Lake Malawi	MWK 5,827 million	507 deaths and 0.4m cases avoided	MWK 11.5m
Increasing frequency of mass ITN campaigns from once every 3 years to once every 2 (PBO or pyrethroid-only)	<1 Poor	All Malawians	40% extra costs	Only 20% increase in benefit over a 6-year period	

12. IMPROVING THE QUALITY OF PRIMARY SCHOOL EDUCATION

Christopher Cotton, Bahman Kashi, Jay MacKinnon, Jonathan Makuwira, Ardyn Nordstrom, Lindsay Wallace, Ivy Chauya and Brad Wong.

Context

Malawi has made great strides since primary education was made free to all students in 1994. This has encouraged many children to attend school. Enrolment rates for Primary School 1 students were at 97 percent in 2009 and 98 percent in 2015/16. The latest enrolment figures, however, show that only 88 percent of students (87 percent of boys and 89 percent of girls) were enrolled in primary education in 2017. Although these rates are still relatively high, this recent and rapid decrease is a cause for concern.

As part of recent development strategies, the government of Malawi identified education and skills development as one of its five priorities. Approximately 23.5 percent of the government's budget is dedicated to education (UNICEF, 2019). In the Malawi 2063 vision, improving education quality is highlighted as an enabler to achieve inclusive wealth creation and self-reliance.

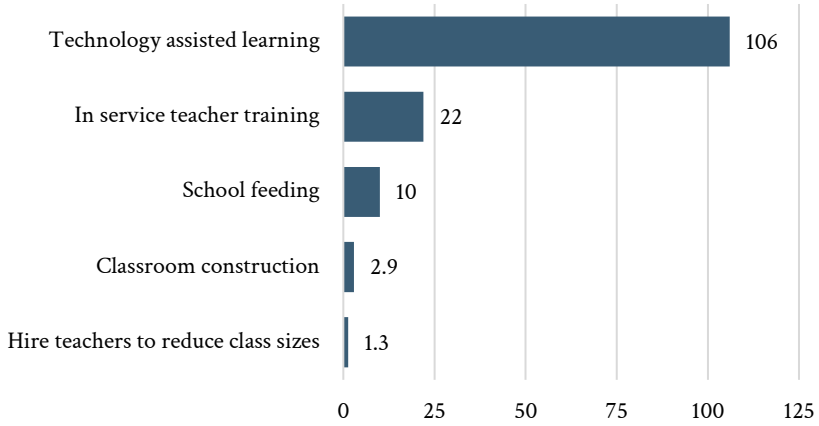
Although the education sector receives a high proportion of the government budget, youth in Malawi are failing to learn and progress: Less than a quarter of students in Grade 2 pass English assessments, and only 40 percent pass Mathematics assessments. Repetition rates are consistently higher than 20 percent across all grades of primary school. These poor outcomes are due to a number of factors: high pupil–teacher ratios, particularly in early years, lack of school feeding, lack of infrastructure resulting in one-third of students learning outside and subject to rain, heat, dust and other distractions, and variable teacher quality with surveys demonstrating that teachers often do not have the skills to teach beyond a Grade 6 level and spend a fifth of their

time off-task, as well as traditional gender norms and early marriage, which compel girls to drop out even before secondary school. The question is: How does Malawi most effectively improve the quality of education in primary schooling? Using cost-benefit analysis five solutions were evaluated in terms of social and economic value for each new kwacha invested.

Summary of Findings

Primary education quality was the highest-ranked priority by sector experts consulted for the Malawi Priorities study. The findings of this report suggest that education interventions can bring about substantial benefits to the people of Malawi. The five interventions considered in this analysis are school construction, reduced class size, in-service teacher training, school feeding, and technology-assisted learning (TAL).

Figure 12.1: Value for Money for Selected Interventions to Improve Quality of Education in Malawi



Among the interventions analysed, the educational return per kwacha spent on TAL is almost five times greater than the second-best intervention (teacher training) and more than 30 times that of reduced class sizes and school construction interventions but require internet connectivity for use. A study in Malawi showed that the intervention, delivered over 8 months, provided learning improvements equivalent to almost two years of normal

instruction. This is because this particular TAL intervention addresses three major constraints of the education system simultaneously: high pupil-teacher ratios, variable teacher quality and lack of infrastructure.

Additional Government or Donor Investment Required

This intervention involves some level of classroom construction but majority of funds on a per child per year basis are directed towards hardware. Scaling of the TAL intervention to 50,000 students per year would require investments for 100 classrooms every 20 years, 100 solar panels every 10 years, 6,000 iPads every 4 years, 6,000 headphones and covers every 2 years and roughly 7 additional staff members annually.

The profile of these costs is presented in Figure 12.2, shown only until 2030. The main investment is in the first year, at almost MWK 3,500 million. Periodic replacement of tablets represents the next most costly element.

An important caveat of the analysis is that it assumes that the government will undertake the necessary investments to maintain the status quo in terms of classroom construction and hiring of teachers going forward as the primary-school-age population grows. The results suggest that if additional funds are available, they should be directed towards a technology-assisted learning followed by in-service training.

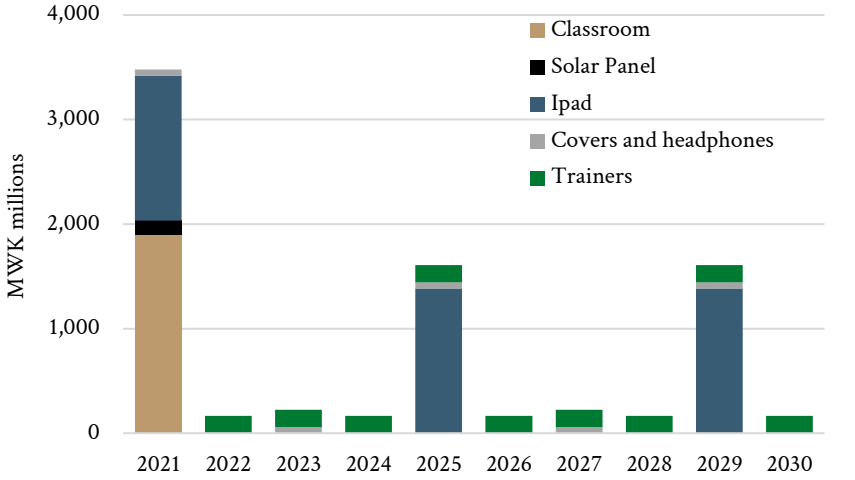
Strongest intervention: Technology Assisted Learning

The intervention with the highest BCR is a particular type of technology assisted learning (TAL), where students:

- engage individually with high-quality education software
- can proceed through the curriculum at their own pace, and
- are guaranteed an indoor learning environment when using the software.

The intervention requires a specially built classroom with a solar charging panel and locked storage space for tablets. Students use the software in this classroom for up to an hour each day, with an individualised account that allows for progression through the curriculum at the student's desired pace.

Figure 12.2: Profile of Investments



Benefits as Increased Lifetime Earnings

The increase in learning brought about by the intervention is estimated to deliver two years' worth of equivalent learning, boosting students' lifetime earnings by 22 percent. The present value of this gain is equal to approximately MWK 1,200,000 over a 30-year working career. All the benefits accrue directly to primary school learners.

Table 12.1. Summary of BCAs of Interventions for Improving Quality of Education Services Provision

Intervention	BCR Rating	Beneficiary Group	Investment cost	Benefits
Technology Assisted Learning	106 Excellent (100% economic benefits)	50,000 primary school students annually	MWK 3.5 billion in the first year; after which MWK 2.1 billion every four years	2 years of learning 22% increase in lifetime earnings, MWK 1,200,000 per student
In-service teacher training for 715 teachers	22 Excellent (100% economic benefits)	50,000 primary school students annually	MWK 960 million (per cohort spread over three years)	0.7 years of learning 8% increase in lifetime earnings MWK 417,000 per student
School feeding	10 Good (100% economic benefits)	50,000 primary school students annually	MWK 1.6 billion every year	0.6 years of learning 7% increase in lifetime earnings MWK 313,000 per student
Classroom construction	2.9 Fair	70,000 primary school students annually	MWK 19.2 billion up front	0.09 years of learning 1% increase in lifetime earnings MWK 54,000 per student
Hire teachers to reduce class sizes	1.3 Fair	70,000 primary school students annually	MWK 2.2 billion every year	0.09 years of learning 1.1% increase in lifetime earnings MWK 57,000 per student

13. REDUCING SECONDARY SCHOOL DROPOUT RATES

Lindsay Wallace, Christopher Cotton, Jay MacKinnon, Ardyn Nordstrom, Brad Wong and Ngeyi Kanyongolo.

Context

Despite Malawi's remarkably high enrolment rates of nearly 90 percent in primary school, secondary school education rates in Malawi remain chronically low, with net enrolment at 16 percent in 2017 (UNICEF, 2019). The issue of high school dropouts is also critically tied to child marriage, with approximately 65 percent of women with no formal education engaging in child marriage, and the overall prevalence of child marriage consistently remaining at more than 40 percent over the past decade. Despite a legal framework built to outlaw and eliminate child marriage, economic vulnerability and minimal law enforcement have resulted in the practice not only continuing but also increasing remarkably in the wake of the Covid-19 pandemic.

Malawi has a serious challenge with both reducing secondary school dropouts and eliminating child marriage. Key constraints facing the nation are the lack of secondary schools and lack of labour market opportunities for Malawian girls, which disincentivises investments in girls' education. Cultural norms and practices also play a part in normalising early marriage, teenage pregnancy, and early sexual activity. Interventions presently target different stages of a girl's life, as well as different aspects of the child-marriage–secondary-schooling dynamic, making it difficult to find a common comparator through which to assess effectiveness.

This cost-benefit analysis attempts to provide a common ground from which to evaluate the value for money each of these interventions provides. As a part of this analysis, six types of interventions were compared to determine which intervention provides the strongest value for money. The six interventions considered were Increased Schooling Capacity (BCR 3.4), Community

Dialogues (BCR 114), Education Promotion (BCR 2.5), Conditional Cash Transfer (BCR 9.2), the Marriage Survivor programme (BCR 8.5), and the Girls' Empowerment and SRH programme (BCR 9.8). Among the considered interventions, Community Dialogues generated the highest BCR with a demographic benefit included. Without the inclusion of a demographic benefit, however, Increased Schooling Capacity was found to be the strongest performing intervention.

Child Marriage Intervention: Community Dialogues

Addressing cultural norms through community dialogues was one prominent method highlighted by sector experts as important in the Malawian context. There have been several such programmes already conducted such as the Chief's Wives' Initiative in which stations were supported with lunch allowances and fuel to engage chiefs' wives in eight districts on child protection issues and related laws. Given the lack of data pertaining to Malawi-based Community Dialogue programmes, the paper considers a Population Council programme that was implemented in three countries: Burkina Faso, Ethiopia, and Tanzania (Erulkar et al. 2017). The intervention included community sensitisation about the harmful effects of child marriage and attempts to address social norms surrounding the practice. A facilitator's guide developed to standardise messaging on the importance of girls' education and the negative impacts of child marriage were distributed, and community and religious leaders were trained at the beginning of the project to facilitate discussions and deliver messages during monthly village meetings or weekly religious services. In addition, project staff disseminated messages on market days.

Benefits of Intervention

Based on the Tanzanian rate of impact at 26 percent reduction in early child marriages, if run for 100,000 girls in Malawi, the programme would avert 10,920 child marriages, 3,781 births, 14 maternal deaths, 77 child deaths, 12 cases of obstetric fistula, and almost 2,800 days of lost productivity from IPV per year. The welfare gains of these benefits are MWK 1,084 million, which is 1.4 times higher than the cost. However, the demographic benefit is substantial at MWK 85,883 million. The benefit-cost ratio for this intervention is

1.4 without demographic benefits and 114 with the demographic benefit. Programmes that lead to fertility declines, such as those that reduce or eliminate child marriages, are likely to lead to improved economic conditions for the entire population through a variety of channels. These channels include: (1) increased fixed resources per person due to a lower population, (2) an increase in income per worker holding productivity constant but spread across fewer people, (3) an increase in savings due to an increased proportion of the population of working age involved in economic activity, (4) an increase in the experience of the overall workforce because a larger proportion of workers are now older and have a work history, (5) reduction in time spent child-rearing that is reallocated to productive activities, and (6) increased investment in children as there are now fewer children (child-quality effect).

Costs of Intervention

The costs of providing the programme to cover 100,000 girls in Malawi were estimated to be MWK 755 million or about MWK 7,500 per beneficiary. The costs incurred were for the initial training of the community and religious leaders, for food and refreshments provided at monthly village meetings, and for weekly religious services. The cost of time for participants is not included as an extra cost because they provide food and refreshments served as an incentive for participation, essentially covering opportunity costs of involvement, and many of the community meetings are not additional (e.g., religious meetings would happen even without the intervention).

Girl's Secondary School Enrolment Intervention

The intervention aims at increasing secondary-schooling capacity in Malawi through the construction of additional schools, and the hiring of additional teachers. The analysis in this report is based on a programme that constructs classrooms for an additional 100,000 girls per year; with an expected lifespan of these classrooms of 20 years, this programme could reach a total of 2 million girls. The annualised cost is estimated at MWK 44,169 million at an 8 percent discount rate. Total costs of this programme also include additional teacher salaries and auxiliary fees, and the foregone income from not working while at school.

Expected benefits consist mainly of an increase in school attendance and educational attainment, which translates into higher lifetime earnings. This analysis is based on the historical experience of building schools in Malawi and the impacts of additional learning on wages. The annualised benefits of the intervention over a 20-year period, covering 100,000 girls a year, were estimated to be MWK 119,145 million, made up almost entirely of increased lifetime earnings due to the additional 0.9 years of schooling. Due to the additional schooling, the intervention is also expected to avoid 4,000 child marriages, 1,370 births, 5 maternal deaths, 28 child deaths, 4 cases of obstetric fistula, and 1,012 days of lost productivity from IPV per year. The annualised demographic benefit is estimated at MWK 29.3 billion per year.

The benefit-cost ratio for this intervention comes out to 2.7. Adding the demographic benefit brings the BCR of this intervention to 3.4.

Figure 13.1: Cost per Additional Year of Schooling Attained (MWK)

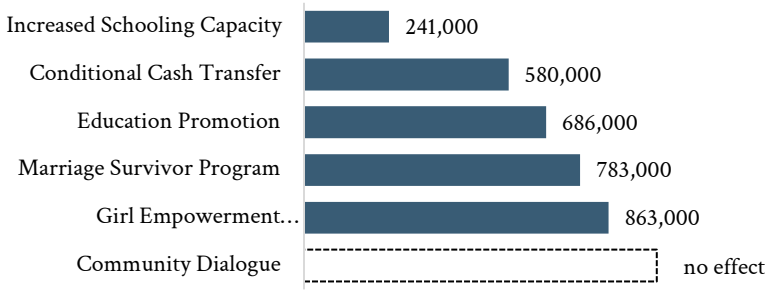


Figure 13.2: Cost per Child Marriage Avoided (MWK)

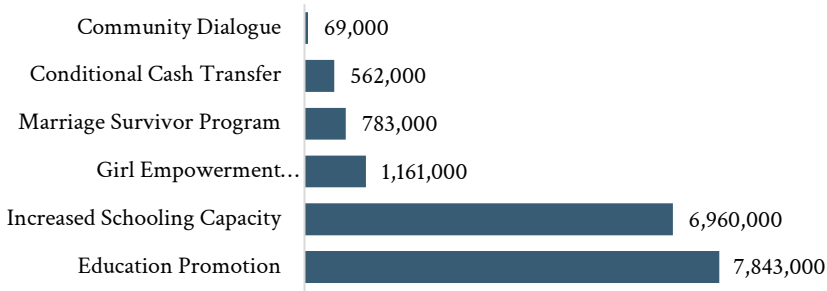


Table 13.1. BCA Interventions Reducing Secondary School Dropout Rates

	Increased Schooling Capacity	Community Dialogue	Education Promotion	Conditional Cash Transfer	Marriage Survivor Program	Girl Empowerment and SRH campaign
Country evidence drawn from	Malawi	Tanzania	Tanzania	Malawi	Malawi	Bangladesh
Government cost /girl targetted (MWK)	66,387	7,549	13,933	102,741	539,837	56,028
Opportunity Cost of Schooling /girl targetted (MWK)	150,445	0	12,970	100,320	243,181	48,636
Effect on Early Marriage (%)	-12%	-26%	-1%	-34%	-100%	-23%
Increase in Schooling (years /girl)	0.90	-	0.05	0.37	0.90	0.18
Cost /additional year of schooling attained (MWK)	240,923	Infinite	686,302	580,176	783,018	862,551
Cost /child marriage avoided (MWK)	6.96M	69,133	7.84M	561,537	783,018	1.16M
Cost /birth avoided (MWK)	20.10M	199,675	22.65M	2.78M	3.19M	3.35M
Total Annualized Cost (MWK)	44,169M	755M	3,294M	20,306M	7,830M	11,213M
Total Annualized Benefits (MWK), non-demographic	119,145M	1,084M	4,901M	20,945M	10,726M	17,665M
Total Annualized Demographic Benefits (MWK)	29,327M	85,883M	3,304M	165,981M	55,842M	75,974M
BCR without demographic benefit	2.7	1.4	1.5	1.0	1.4	1.6
BCR with demographic benefit	3.4	114	2.5	9.2	8.5	8.4
Rating	Fair	Excellent	Fair	Good	Good	Good

Note. M = million

14. EXPANDING AND IMPROVING EARLY CHILDHOOD EDUCATION

Bjorn Larsen, Brad Wong, Saleema Razvi, Jonathan Makuwira, Ivy Chauya and Harold Fote.

Context

Much evidence points to the importance of early childhood development on overall life outcomes. Development and progress in cognitive, psychological, motor and language skills in early childhood significantly contribute to adult outcomes of educational achievement, health, work productivity and earnings. Two key challenges face Malawian children in their earliest years of life: under-nutrition and lack of pre-school training and stimulation for young children. While an earlier report from the Malawi Priorities project identifies the smartest interventions to eliminate childhood undernutrition in early infancy, the technical report on Early Childhood development focuses on interventions that combine enhanced nutrition practices with child stimulation activities and education for children aged 3 to 5 years.

In this respect Malawi's community-based childcare centres (CBCCs) – parent and community run preschools – have shown remarkable success. In addition to providing important early childhood education, CBCCs free up caregiver time for economic activities. There are 12,424 centres operational, with nearly 35,000 non-salaried volunteer caretakers and helpers and a net preschool enrolment rate of 47 percent. While this is a strong figure, it leaves ample room for improvement. Present challenges to expansion include the following:

- certain communities lack CBCCs due to start-up frictions, such as awareness, coordination and training.
- Lack of trained caregivers lowers the provision of quality education, with most caregivers having little or no training in teaching young children.

- Facilities used as CBCCs vary greatly, ranging from permanent structures including homes, churches, community centres to open air spaces, shelters and thatch structures; this challenge is further compounded by a lack safe and nearby sources of water, indoor play materials and permanent structures for learning.
- CBCC's voluntary and community-funded nature also makes them vulnerable to shocks, disasters or absenteeism, meaning that they are not always open or properly functioning throughout the year, thus lowering reliability.

The intervention proposed is to expand the CBCCs to new and underserved communities, targeting an 80 percent enrolment of 3-year-old children over a ten-year period. This would mean an additional 206,500 children would attend pre-school in 2030.

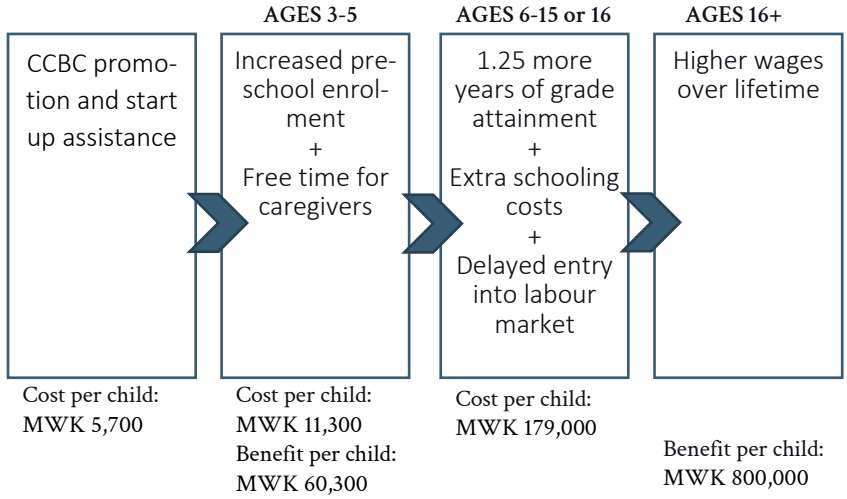
The cost of expansion includes cost of preschool promotion and establishment (MWK 5,722 per child); cost of preschool caretakers and helpers (MWK 4,017 per child per year); cost of incremental education provision from increased grade attainment resulting from preschool enrolment (MWK 63,000 per child); and cost of delayed labour force participation from higher grade attainment, also known as the opportunity cost of education (MWK 142,600). The total cost of the CBCC intervention is MWK 196,706 per child.

The main benefit of preschool enrolment is increased grade attainment, which implies increased lifetime income. As a result of preschool education, there is an increase in 1.25 years of grade attainment, which translates into an increase of lifetime income of 13.9 percent, with a present value of MWK 801,569. There is also the benefit of parents' savings of child-care expenses during this period of childhood development. The time savings is valued at MWK 63,437 for three years of preschool. The benefit cost ratio is 4.5.

The short-term benefits of the program would accrue primarily to caregivers, mostly mothers, who benefit by freeing up time for more economically productive activities. This productive time is valued at MWK 63,400 per child per year. In the long run, pre-school children benefit by progressing further through the education system, earning more income over their life amounting to approximately 800,000 MWK per child. On average, each child would

obtain 1.25 years more grade attainment. Indirect costs further on, include the cost of additional education provision from increased grade attainment (MWK 37,000) and cost of delayed labour force participation (MWK 142,000).

Figure 14.1: Schematic of intervention costs and benefits over time



This intervention provides better value-for-money than an alternative intervention of improving existing CBCCs. Specifically, a programme that provides infrastructure, supplies, meals, salaries for caretakers and helpers, as well as hires additional helpers would cost MWK 130,000 per child per year. In the long run, additional schooling and opportunity costs increase this figure to MWK 255,000 per child. The incremental benefit of preschool improvement over existing preschools is 0.75 years of increased grade attainment. With this in mind, the increase in lifetime income per child amounts to MWK 481,000 plus MWK 50,000 in food savings for households. The BCR of this intervention is 2.1. It should be noted that both interventions examined in this report have lower BCRs than alternative education interventions for primary and secondary schooling analysed in other Malawi Priorities papers. For example, technology assisted learning has a BCR of 106 and teacher training has a BCR of 22.

Table 14.1. Summary of BCAs on Interventions for Expanding and Improving Early Childhood Development

Intervention	BCR	Beneficiary Group	Extra Costs	Extra Benefits
Expanding the number of CBCCs	4.5 Fair (100% economic benefits)	Communities without CBCCs 200,000 more children in 2030	Short run MWK 17,000 Long run MWK 179,000	1.25 years of grade attainment 13.9% increase in lifetime earnings MWK 800,000 per child
Improving existing CBCCs	2.1 Fair (100% economic benefits)	All children currently in CBCCs 300,000 students in 2030	Short run MWK 130,000 Long run MWK 125,000	0.75 years of grade attainment 11.% increase in lifetime earnings MWK 530,000 per child incl. MWK 50,000 meal savings

PART IV.
SUSTAINABLE ECONOMIC DEVELOPMENT

15. INDUSTRIALISATION AND YOUTH EMPLOYMENT

Lindsay Wallace, Bahman Kashi, Sarah Carello, Brett Crowley, Ben Kaluwa, Brad Wong, Grace Kumchulesi and Hope Chavula.

Context

This analysis grew from two distinct research questions: "Where should Malawi focus its resources to achieve industrialisation?" and "Which policies can effectively address youth unemployment and underemployment?" In considering the challenges and opportunities for both areas, the authors recognised several overlaps and common spaces for growth, and as such, the analysis was merged. Malawi's young workforce participants are reliant on Malawi's ability to improve industrialisation, without which any amount of skilled labour would remain unused.

Since 1980, Malawi's growth has fallen behind the Sub-Saharan Africa average, with weak and volatile growth highly dependent on rainfed agriculture and unreliable agricultural outputs. Maize and tobacco have been at the centre of Malawi's politics and economy; however, to achieve economic growth, there is a need for product diversification and investment in measures that promote productivity. At the same time, Malawi's youth have constrained opportunities for decent and fulltime employment. A quarter of youth in Malawi are underemployed, and almost all youth are employed in the two lowest skill tiers of employment, including youth who have finished their secondary and tertiary educations. More than 40 percent of youth who are deemed highly skilled only work in jobs that require low skill levels, typically self-employed, informal, micro-enterprises that have limited value addition. Conventional skill development programmes, which are regularly conducted in response to youth unemployment, fail to adequately respond to these challenges.

Intervention 1: Poultry Farming Outgrower Scheme

Malawi's agro-processing value chains are characterised by weak links and inefficient marketing channels, largely driven by infrastructure gaps and information asymmetries between stakeholders. There is often a mismatch between supply and demand for agricultural products, and it can be challenging for agro-processors to achieve profitable margins. The animal feed to poultry sector value chain is one such example of a value chain that could benefit from greater integration. The intervention modelled in this study is a poultry farm outgrower scheme that aims to strengthen connections between small-scale poultry farmers, commercial poultry firms, and soybean processors. Small-scale poultry farmers can use soybean oilcake to generate more and higher quality eggs for commercial poultry firms. At the same time, this would increase demand for soybean oilcake, using existing capacity that is currently idle.

Costs and Benefits

Costs include start-up capital costs, recurring capital and operations and maintenance costs, and the social cost of carbon emissions. The cost of the intervention is MWK 222 million rising to MWK 4,337 million for start-ups and ongoing costs for outgrower farmers.

The primary benefits of this intervention are the increase in egg sales, cost savings through increased efficiency of egg production, and increased income to labour entering the soybean processing sector. The intervention would generate MWK 159 million initially, rising to MWK 6,050 million by 2040. Some 80 percent of the benefits accrue to the poultry sector in terms of higher egg sales and cheaper production costs, with the rest going to the soybean sector.

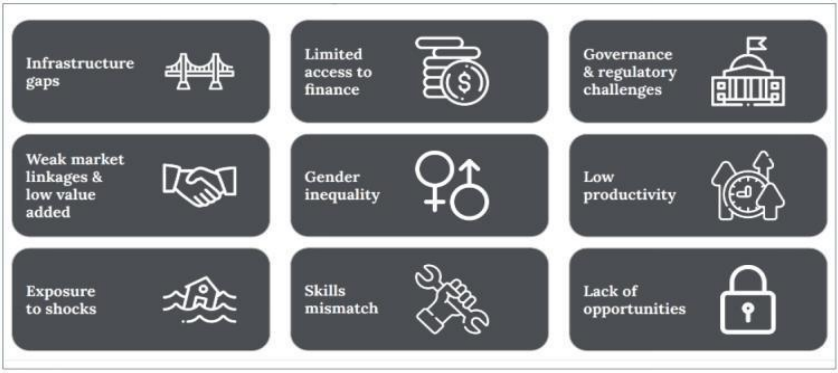
The intervention would generate MWK 1.4 for every MWK 1 invested and 10,800 years of employment between 2021 and 2040. The benefits of agro-processing value chain integration can be expanded through exports. The results of the poultry egg outgrower scheme modelled in this study are based on projected domestic demand for poultry eggs. The Government of Malawi

could work with entities such as the Malawi Investment and Trade Commission (MITC) to identify opportunities to expand exports of poultry eggs to regional neighbours, to expand and diversify the benefits of value chain integration.

Intervention 2: Credit Guarantee Scheme

Formal lenders cannot easily distinguish between good and bad borrowers. As such, formal loans are set at higher rates to mitigate risk of default, forcing many SMEs out of the formal finance market. These credit-constrained SMEs may be unable to invest in production-enhancing inputs, including hired labour. To help address these issues, the intervention modelled is a credit guarantee scheme to provide SMEs with greater access to formal finance. However, it is important to note that the government should not engage in loan generation in the space of banks. Banks have the infrastructure, incentives and capability to assess lending risk. Instead, the role for the government should be to assume some of the risk of lending that the banks would not risk.

Figure 15.1. Key Barriers to Employment Growth



Costs and Benefits

The primary benefits of this intervention are the increased return on capital to SMEs who gain access to credit through the intervention as well as the SME surplus that accumulates from a reduction in the cost of borrowing. By

2026, the intervention would require MWK 10,712 million in costs of financing, defaults and administration but generate MWK 11,039 million in returns and surplus for MSMEs. The intervention generates MWK 1.05 for every MWK 1 invested and 11,776 years of employment between 2021 and 2026.

Overall, Policy Implications

The root cause of the youth underemployment and unemployment challenge in Malawi is a lack of jobs, which is caused by limited structural transformation of the economy. While many youth employment programmes cite a lack of skills as a constraining issue, skills development alone will not address the challenge of youth employment in Malawi.

Demand-driven education and skills development programmes are still needed. Due to the mismatch of demand and supply in the labour market in Malawi, it is likely that economic growth will need to be accompanied by investment in education and infrastructure to connect youth to employers. These programmes should be designed and funded based on the skills demanded by the job market.

Industrialisation is defined more broadly than simply the growth of manufacturing services; rather, it is a process of economic transformation that results in employment creation. To that end, a number of tradable services industries share many of the same characteristics as manufacturing, particularly the capacity to create better jobs. They benefit from productivity growth, scale and agglomeration economies.

Any intervention that might be designed should undertake a thorough assessment of considerations related to land tenure. Land tenure is an exceedingly complex and an often-contentious matter that should be a central consideration of any intervention that is designed to advance industrialisation and youth employment in Malawi. Poorly designed interventions can cause more harm than good by excluding marginalised citizens from accessing benefits or, worse yet, further marginalise people by dispossessing them of their livelihoods.

International experience has shown there is no 'silver bullet' for industrialisation and job growth in any economy. Mass employment requires a portfolio of targeted interventions: While the interventions modelled in this study are expected to yield net benefits for Malawi's economy, they fall well short of the 1 million jobs that the government of Malawi hopes to create during its term. This level of job creation will require a larger portfolio of interventions, of which the two modelled can serve as examples. Other research papers in the Malawi Priorities series provide complementary interventions that support Malawi's wealth and job creation aspirations including land titling, agricultural commodity exchange reform, energy sector reform, improving education quality and artisanal and small-scale mining support.

Figure 15.2. Costs and Benefits of Poultry Outgrower Scheme

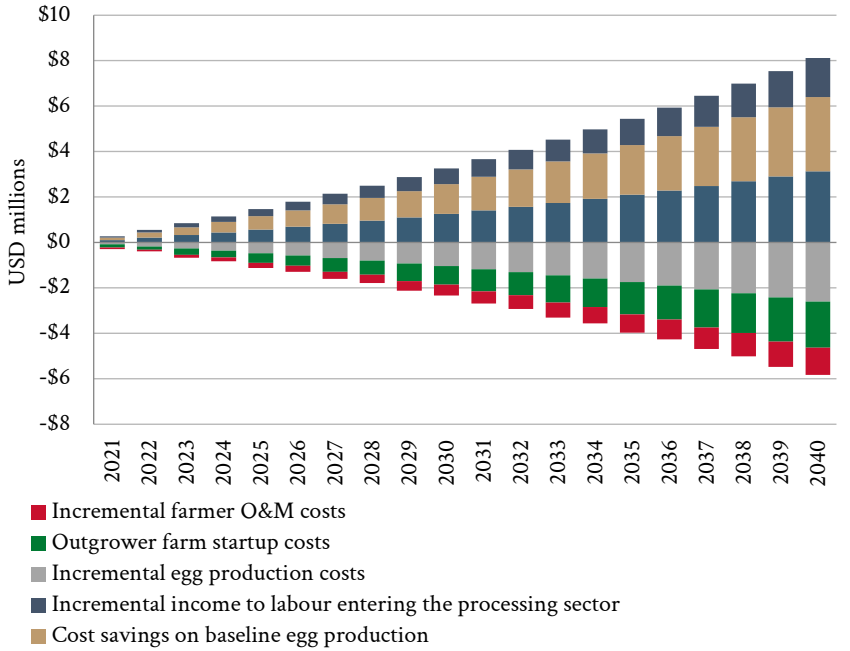


Figure 15.3. Costs and Benefits of the MSME CGS Intervention Scheme for Each Stakeholder

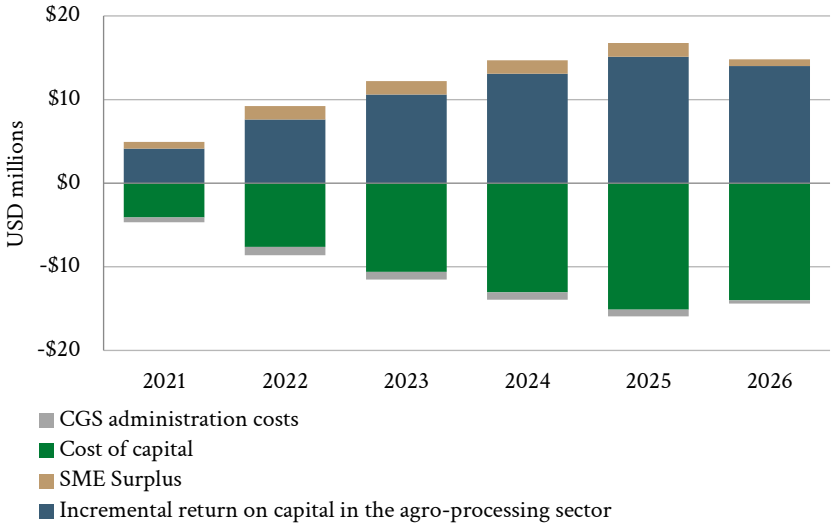


Table 15.1. Summary of BCA Interventions for Industrialisation and Youth Employment

Intervention	BCR	Costs	Benefits
Credit Guarantee Scheme	1.05 Fair	Costs over 6 years Capital costs (MWK 48,085 million) Programme administration costs (MWK 3,348 million)	Benefits over 6 years Increased revenue and surplus earned by MSMEs (MWK 54,100 million)
Poultry Out-grower Scheme	1.3 Fair	Costs over 20 years Incremental egg production costs (MWK 17,790 million) Outgrower farm start-up costs (MWK 14,369 million) Incremental farmer O&M costs (MWK 8,188 million)	Benefits over 20 years Value added by poultry out-growers (MWK 21,429 million) Cost savings on baseline egg production (MWK 22,355 million) Increased income to labour in soybean sector (MWK 11,778 million)

16. IMPROVING WATER SERVICE RELIABILITY IN BLANTYRE

Nancy Dubosse, Brad Wong, Charles Jumbe and Salim A. Mapila.

Context

Despite the recent completion of the Likhubula water supply project, Blantyre is plagued by water shortages. The new infrastructure increased the Blantyre Water Board's (BWB's) capacity to 122 million litres of water daily. However, this is still less than the estimated average demand of 140 million litres per day. In addition, large physical water losses mean that 40 percent of the water supply is lost before it reaches the consumer, exacerbating the shortfall. As a result, water is not available 24 hours per day, and most residents (85 percent) use a secondary source of water when their main source of water is unavailable. On average, public taps, boreholes, and protected springs were only available for 12 hours per day, due to limited opening hours and irregular supply, while drinking water from a private tap is available for 21 hours per day.

Unreliable water imposes costs on water users. Consumers must store water in their homes or are forced to travel to other water sources to meet their needs. Across Malawi, around 16 percent of urban dwellers obtain their water from boreholes that are typically outside of the main water board's supply system, a phenomenon confirmed by the Blantyre Water Board. All these coping strategies require extra costs or extra time or both. The largest burden of insufficient supply falls upon Blantyre residents living in informal settlements who are mostly serviced from the city's water kiosks. Despite the fact residents in informal settlements make up around 60 percent of inhabitants in Blantyre, kiosks only provide 4 percent of supplied water. In addition to these challenges, the BWB further struggles with revenue collection, inefficiencies in administration, indebtedness, and unaffordability of water.

Intervention 1: Development of a New Water Source from Shire River

Irregular water supply emerges as the BWB's biggest problem. With the supply of water evidently falling short of demand, the BWB has plans to invest in a new water source from the Shire River. The plans include a water treatment plant, pumping stations, water tanks and pipelines to produce 230 million litres per day in 2023. This intervention is expected to directly address the interruptions in service owing to inadequate supply and is one of the future projects identified by the Blantyre Water Board. However, the intervention is currently only 47 percent financed with a loan from India's Exim Bank (BWB, 2021).

For an upfront investment of MWK 122,925 million and recurrent costs of MWK 17,865 million rising to MWK 33,708 million, the new supply of 230 million litres per day would likely be sufficient to meet demand in Blantyre until 2036, even after accounting for 40 percent physical losses. The primary beneficiaries of the intervention would be residential consumers – those living in both informal and permanent housing areas, who make up the largest portion of the present demand gap. Industrial, institutional and commercial customers would also have their water demands met. Benefits are primarily expressed in avoided coping costs that residential, institutional, and commercial customers would otherwise have to incur. The intervention would generate benefits worth MWK 44,770 million in 2023, the assumed first year of operations, rising to MWK 306,887 million by 2052. Being the commercial centre of Malawi, ensuring Blantyre has sufficient water is essential for both the city and the country's economic growth.

As such, the benefits of this intervention alone are equivalent to 0.6 percent of projected GDP. The return-on-investment from the intervention by itself is 2.8, meaning that for every kwacha spent on the project, Blantyre receives 2.8 kwacha in economic benefits, and rises to 3.2 if combined with the E-Madzi intervention, explained below.

Figure 16.1. Demand of Water per Day, and Supply of Water per Day with and without Intervention

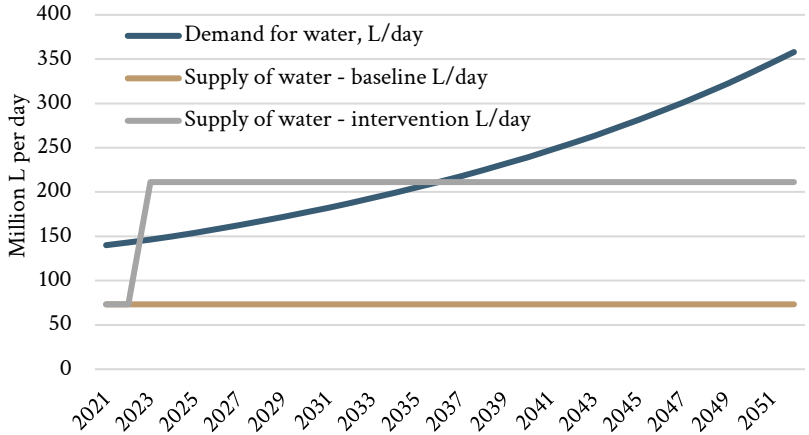


Figure 16.2. Cost of Additional Water, and Avoided Copping Costs from the Interventions

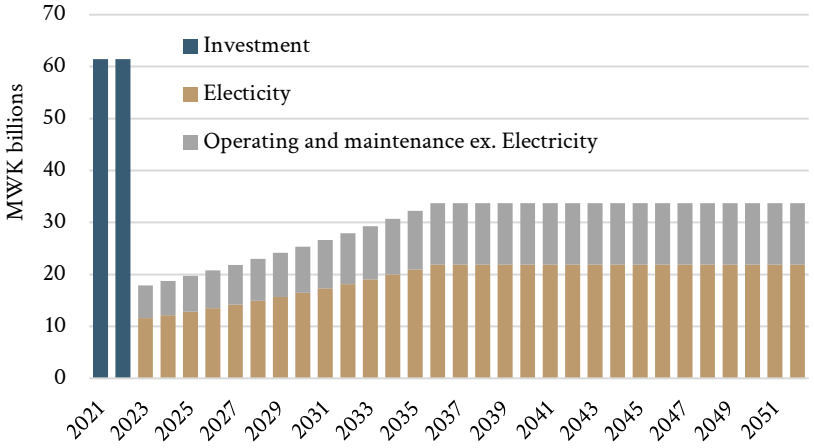
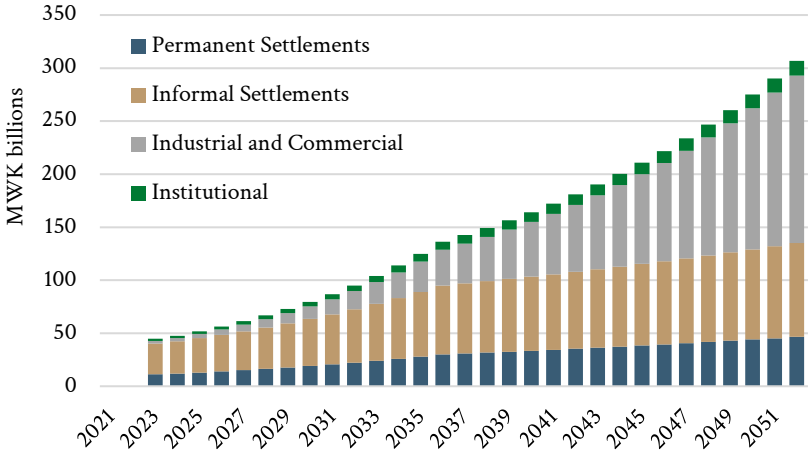


Figure 16.3. Avoided Copping Costs from the Interventions



Intervention 2: Rollout of e-Madzi Kiosks Across Blantyre

The second intervention is the installation of E-Madzi kiosks across Blantyre, based on a pilot rolled out in Lilongwe. These E-Madzi kiosks are automated water dispensers that replace in-person kiosks while ensuring increased access to water and lowering water costs by 65 percent. With residents in informal settlements unable to pay for connection fees and water authorities unwilling to extend the piped network into environmentally sensitive areas, the water kiosks are considered critical to providing and maintaining the water supply to low-income areas and are managed by the Water Users Association (WUA).

The intervention proposed is to replace traditional (manual) water kiosks with e-Madzi kiosks across all 730 functional kiosks in Blantyre. The E-Madzi kiosks respond directly to the problems of NRW, inconsistent access, and unaffordability. Residents can also access water at any time, as the traditional kiosks are only open for a portion of the day when they can be staffed. Finally, the technology helps to reduce water wastage due to spillage and non-revenue water because the release of water is automated with through a smart card. The costs of the intervention are MWK 3,357 million for the installation of the automated kiosks, programme management and purchase

of smart cards. Maintenance is estimated at MWK 163 million per year. Replacement of smart cards occurs every 5 years, while E-Madzis are replaced every 10 years.

The benefits of the intervention are a reduction in water costs by 65 percent and a reduction in waiting time by 5 minutes per trip. There is also a reduction in congestion that reduces the spread of infectious disease, notably COVID-19, although this benefit was not quantified in the analysis. The benefits are highly dependent on the amount of water that is supplied to the kiosks. If the new water supply intervention is not implemented and the kiosks continue receiving only 4 percent of water, the benefits are only 1.5 times the costs of the E-Madzis. However, if the E-Madzis are rolled out after the water supply project is installed, the benefits increase substantially and the return on investment for the combined intervention is 3.2

An intervention with both increased water supply and E-Madzi has a higher return on investment than either of the two alone

While alone these interventions generated positive returns on investment, in a scenario where both interventions are implemented simultaneously, the incremental BCR of both interventions increases to 3.2, meaning that every kwacha invested yields 3.2 kwacha in benefits, indicating that the two interventions are synergistic. This is based on a 30-year water supply project and E-madzis installed in 2022 and replaced in 2032 and 2042.

Table 16.1. BCA for Improving Water Service Reliability in Blantyre City

Intervention	BCR	Costs MWK, millions	Benefits MWK, millions
Water Source Development from the Shire River & E-Madzi Rollout to Blantyre (together)	3.2 Fair (100% economic benefits)	Sum of cost figures below	Reduced coping costs from unreliable water: MWK 44,770 million in 2023, rising to MWK 306,887 million by 2052 Reduced costs of kiosk water: MWK 8,000 million every year Time savings from reduced queuing: MWK 12,630 million initially rising with income growth
New Water Source Development from the Shire River (alone)	2.8 Fair (100% economic benefits)	Upfront cost: MWK 122,925 million in upfront investment Operating and electricity cost: MWK 17,865 million in 2023 rising to MWK 33,708 million in 2052	Reduced coping costs from unreliable water: MWK 44,770 million in 2023, rising to MWK 306,887 million by 2052
E-Madzi Rollout (alone)	1.5 Fair (100% economic benefits)	E-madzis: MWK 3,290 million replaced every 10 years Smart cards: MWK 67 million replaced every 5 years. Maintenance: MWK 163 million every year	Reduced costs of kiosk water: MWK 521 million every year. Time savings from reduced queuing: MWK 418 million initially rising with income growth

17. INCREASING COMPLIANCE WITH CONSTRUCTION PERMITS PROCESS TO ENSURE BENEFITS OF URBANISATION

Nancy Dubosse, Brad Wong, Charles Jumbe and Salim A. Mapila.

Context

Malawi's urbanisation is in its infancy, occurring at a modest rate of 3 percent nationally; however, 75 percent of the urban population is concentrated in four cities: Lilongwe, Blantyre, Mzuzu and Zomba, and the living conditions are unsettling. The proportion of urban residents living in informal settlements is around 65 percent; the majority (52.8 percent) are living in rented structures. A significant number of these houses are built with traditional materials and are particularly vulnerable to damage and climatic events like floods. The 2019 floods resulted in damage to 288,371 houses nationally. The 2019 Post Disaster Needs Assessment found that 89 percent of the affected houses were constructed out of traditional materials that did not comply with building standards.

While land use plans and construction norms are in place, housing that meets the requirements of the regulatory framework is too expensive for the average urban resident. The annual urban salary, as projected by the Copenhagen Consensus Center, is around MWK 960,000 in 2021. At an average price of MK 10 million and average rentals of approximately MWK 75 000 (one month's salary), very few can afford to own or rent a decent house. Yet, many hazards can be avoided when houses are built compliant with construction regulations.

Owner-developers of low-income housing face several challenges in meeting the requirements of the construction permit process. The dearth of accredited experts, the cost of consulting them, and the time and resources required to coordinate with government officials effectively creates a 'barrier' to comply with building regulations. Consequently, the cost of compliance

renders the construction permit process so expensive that a significant percentage of houses are constructed with traditional materials, even in areas designated for housing construction.

Obtaining a construction permit in Malawi entails 13 procedures and begins with having the architectural plans approved. Albeit straightforward, this process demands significant monetary and time costs. Among these 13 components, the most expensive component by far is the approval of the architectural plan. Where it relates to time, approval of the architectural plan from the local council takes 60 days, whereas the total time to obtain a construction permit is 172 days. The plans approval process alone takes up approximately 78 percent (MWK 941,000) of the total cost of obtaining a construction permit (MWK 1.2 million).

Therefore, two interventions are proposed to reduce the costs of compliance with the construction permit process:

- The use of prototype plans to substantially reduce the cost of the architectural-plans approval stage, the first step being to obtain the construction permit.
- The integration of ICT in the construction permit process.

Intervention 1: The Use of Prototype Plans for Housing

The intervention proposed is to make use of prototypes (pre-approved architectural plans) to reduce the financial cost and time of the plan's approval process. The intervention suggests that local councils are expected to have 5 pre-approved, prototype plans, upon which owner-developers may customise. The benefits of prototype plans include saving time and avoiding the expenses of engaging architects and engineers directly to create an original architectural plan. The cost savings is substantial, as the 2020 Doing Business costed this phase of the construction permit process at MWK 941,000. The intervention saves MWK 14,287 million over the ten-year intervention period, reducing the costs associated with developing individual architectural plans by 84 percent.

There is also an additional time savings that accrues to owner-developers, who would otherwise have gone through the current plans-approval process.

The 2020 Doing Business Survey estimates that the plans approval phase takes, on average, 60 days in Malawi. The time savings thus ranges from 90,000 to 113,000 days annually over the intervention period.

Finally, there is the benefit of avoiding housing damage or loss due to flooding. Taking into consideration the expected annual growth of housing units, the current level of noncompliance among builders, and a minimal uptake rate of 10 percent of the prototype plans among those who would otherwise have built traditional houses, the number of houses damaged/lost by flood number approximately 670 in the first year, rising to over 800 in Year 10.

The costs of the intervention include the direct cost of developing prototype plans (MWK 131.7 million) and the cost of customising them (MWK 325.9 million in Year 2 increasing to MWK 409.6 million in Year 10). There is also the additional cost of construction. All things being equal, a dwelling that is disaster-resistant and meets building regulations is more expensive than a house built out of traditional materials. The upgrades are valued at MWK 161.6 million in Year 1, increasing to MWK 203.1 million in Year 10. Customisation and upgrade costs increase in proportion to housing demand. Overall, costs and benefits together result in 3.3 kwacha of benefit for every kwacha invested. The use of prototype plans encourages those who could not afford architectural fees to submit customised but pre-approved plans for approval and erect structures that are properly guided. Although the intervention is specified for housing construction, prototype plans could be used for other building types, such as schools and business centres.

Figure 17.1. Prototype Plan, Benefits

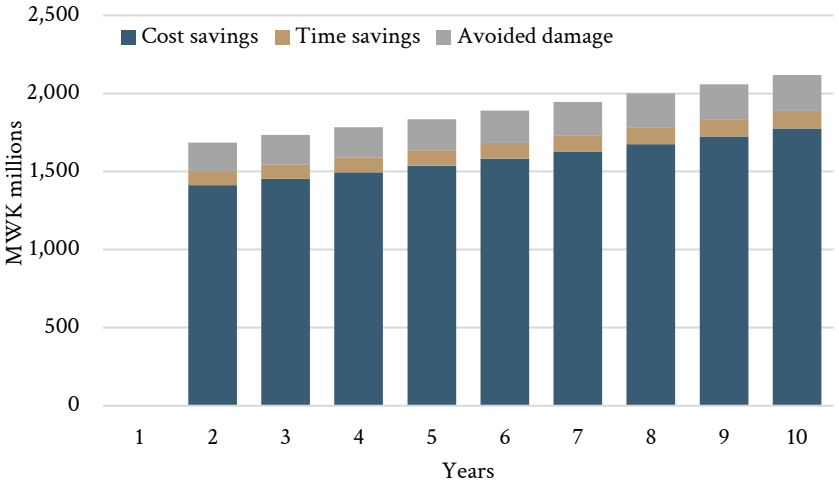
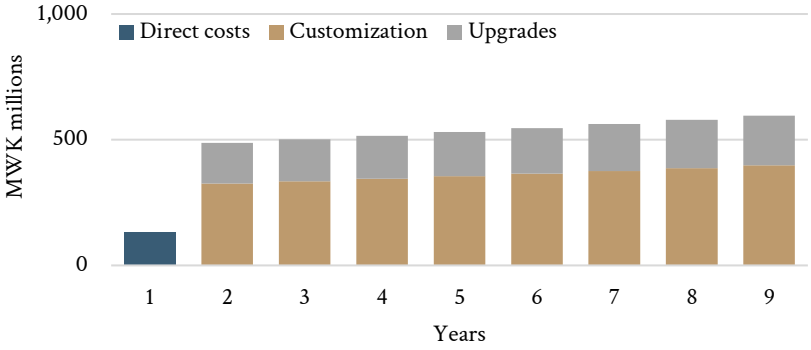


Figure 2: Prototype Plan, Costs



Intervention 2: E-permits

Doing Business 2020 data show that on average, it takes 172 days to complete the Construction Permit Process in Malawi, with no digital features. Tackling time costs and bureaucratic inefficiencies within the Construction Permit Process would contribute to a decrease in building costs, primarily expressed in time costs, and thus an increase in compliance. When more than five digital features are available, this time decreases by 32 percent, to

an average of 114 days. That is, the availability of digital features is associated with less time. The five most common functions of e-permitting systems are online applications for construction/demolition with the capability of uploading plans; online plan reviews; access to the system by multiple authorities; data exchange between government agencies, and online fee payments.

For the purposes of this analysis, principally because of the absence of a pilot in Malawi, the sole benefit measured is the reduction in time to complete the construction permit process. It is assumed that the uptake rate is 35 percent; this is the proportion of future owner-developers who will use the digitised services offered. Benefits accrue over a five-year period, after which replacement of capital equipment, software license renewals, etc. are required. Time savings (in days) begin at 491,000 in Year 4 of the intervention and terminate at 551,000 in Year 8.

The benefit is valued by using a proxy for willingness to expedite the construction permit approvals process, MWK 1,000 per day. Thus, the total willingness to pay is MWK 2,604 million over five years. The cost of rolling out the e-permits process is assumed to be MWK 553 million, the high end of costs from international experience in Africa and Latin America. The high-end value was chosen due to the low internet penetration and the higher-than-average number of days to obtain a construction permit. It is further assumed that the government of Malawi rolls out the intervention nationally, over three years and that the costs are evenly incurred during that time. E-permitting reduces transaction time and cost, generating 3.2 kwacha for each kwacha invested. It also renders the construction permit application system more transparent, fostering confidence in the process.

Table 17.1. BCA Interventions for Increasing Compliance with Construction Permits Process to Ensure Benefits of Urbanisation

Intervention	BCR	Costs	Benefits
Prototype plans	3.3 Fair (100% economic benefits)	MWK 3,506 million total costs including: MWK 131.7 million over 10 years (cost to local councils for development of prototype plans Customisation and housing upgrades are private costs.	MWK 14,287 million over 10 years (avoided cost of architectural plans) MWK 911 million over 10 years (Time Savings); MWK 1,857 million over 10 years (reduced risk of housing damage)
E-permits	3.2 Fair (100% economic benefits)	MWK 553 million (national roll out over a 3-year period)	MWK 1,775 million over five years, beginning in Year 4 (time saved from eliminated waiting time, and reduced human interactions)

18. UPGRADING ROAD INFRASTRUCTURE FOR TOURISM

Nancy Dubosse, Brad Wong, Max Maida and Austin Chingwengwe.

Context

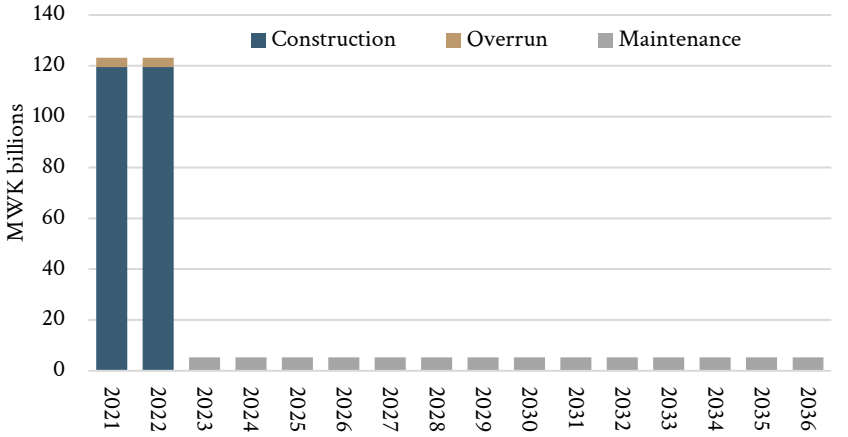
Tourism contributes 7.7 percent to Malawi's GDP, and sub-optimal capacity use of tourism facilities and services indicates that there is opportunity for growth. One of the keys to unlocking Malawi's potential in tourism and other sectors like mining and forestry is investment in passenger-transport infrastructure. Since Malawi is landlocked, transport costs in Malawi are among the highest in the region. Furthermore, road infrastructure is poor and below internationally accepted standards. Earlier analyses cite the poor conditions of roads as being impediments to attracting more international visitors. In fact, some of the key tourist attractions were deemed inaccessible due to road conditions.

To address this challenge, the Government of Malawi is aiming to mainstream tourism in the transport sector by ensuring provision of appropriate infrastructure to support the sector (National Tourism Policy, 2019). According to the National Transport Master Plan, Malawi has 15,451 km of road network, and only 30 percent is paved. The country faces high transport costs. A World Bank value-chain analysis found that transport costs are often the highest single cost category (26 percent of total expenditures), especially when including transfers and moving guests on excursions and game viewing. The costs include capital costs of vehicles for transfers, vehicles and boats for game viewing and excursions, maintenance costs and fuel. Poor quality roads increase maintenance bills and decrease the average operational lifespan of vehicles. The National Transport Master Plan also cites the costs of oil, time spent at border crossings and road quality as the main cost drivers.

This paper focuses on cost-benefit analysis of upgrading 1,407 kilometres of roads to and around strategic tourist sites, with a view to increasing tourist

receipts. The proposed upgrade represents approximately 9 percent of the total network (paved and unpaved) and would increase the percentage of paved roads by 9 percentage points, a 30 percent increase on current levels.

Figure 18.1. Costs of Upgrading 1,407 km of Road



The costs of the project include the direct costs of bituminisation and periodic maintenance and cost overruns stemming from typical roadworks delays. Up-front costs in the first two years are valued at MWK 123,135 million in upfront costs in the first two years plus ongoing annual road maintenance costs of MWK 5,258 million. A marginal cost overrun associated with delays is also factored in at MWK 3,639 million for the first two years.

The benefits of the proposed road works include an increase in tourism revenues, a reduction in travel times and vehicle operating costs (VOC) of existing users, and the consumer surplus of induced demand. The intervention will stimulate over 15,462 additional tourist arrivals in 2023, reaching 19,336 in 2036. Correspondingly, receipts begin at MWK 9,632 million in 2023 and reach MWK 12,045 million in 2036. It would lead to time savings of about 29.5 million hours per year across the 1,407 km road network equivalent to MWK 6,054 million in 2023 and growing to MWK 8,782 million by 2036. It would also reduce the vehicle operating costs of existing users, resulting in the savings of MWK 79,244 million annually. Another benefit is the consumer

surplus of induced demand, with road improvement expected to attract new (domestic) users valued at MWK 3,021 million in the first year, rising to MWK 3,787 million.

Figure 18.3. Benefits from Upgrading 1,407 km of Road Network

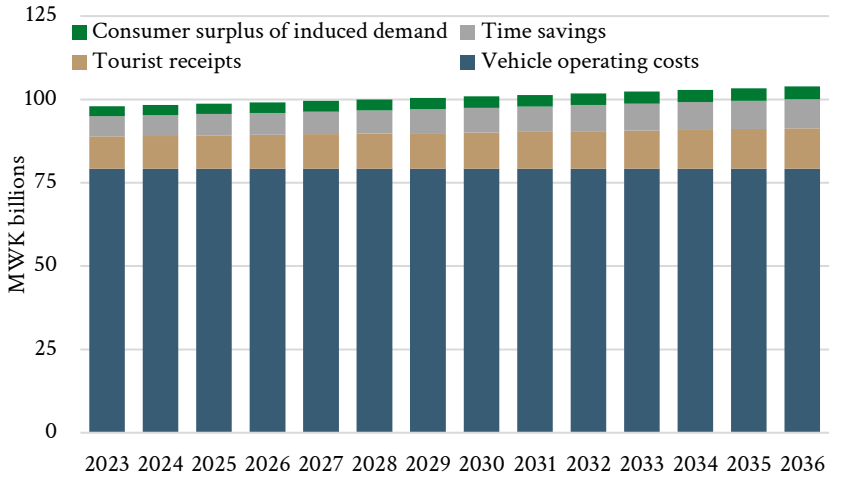
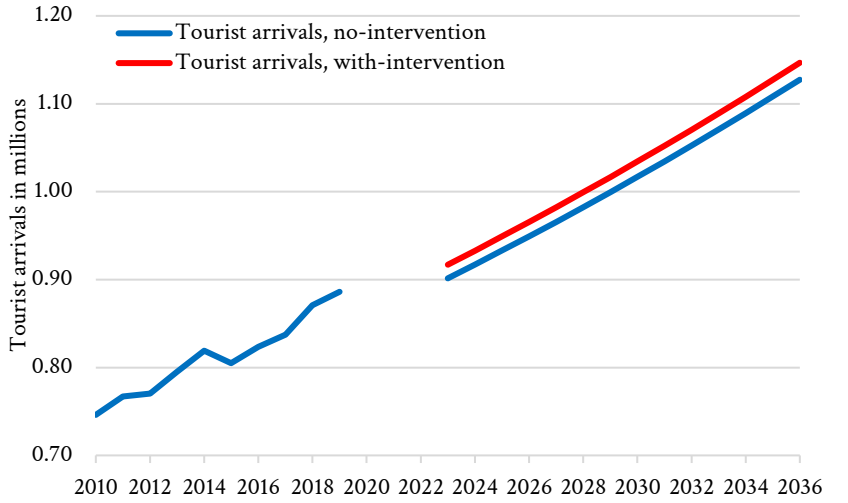


Figure 18.2. Effect Estimate of Road Improvements on Tourist Arrivals



In total, the benefits equal MWK 97,951 million in 2023 and rise to MWK 103,858 million in 2036. Some 80 percent of the benefits are attributed to reduced vehicle operating costs. The intervention has a central BCR of 2.8, providing benefits higher than costs that are relatively large in absolute terms, and equal to 0.9 percent of projected GDP until 2036. However, meeting the aim of doubling Malawi's tourism share of GDP will require a larger suite of investments than just paved roads.

In the absence of any extreme force of nature, an asphalted road has a lifespan of at least 15 years, with regular maintenance. Reconstruction of paved roads becomes necessary when periodic maintenance and rehabilitation activities are neglected. Sub-optimal allocations (historically 21.4 percent of total need) to the road maintenance fund have resulted in a gradual decline of the road network classified as 'good', necessitating the complete reconstruction of roads. We also demonstrate the importance of regular maintenance by conducting a supplementary cost-benefit analysis on meeting regular maintenance needs, conditional on the road already being built. The cost of regular maintenance, MWK 3.7 million per km, of the newly asphalted 1,407 km was compared to the benefits of avoided future reconstruction costs, MWK 170 million per km. The benefit-cost ratio is 5.2, meaning that for every kwacha spent on regular maintenance there are 5.2 kwacha saved in avoided reconstruction costs and deterioration of benefits.

Table 18.1. Summary of BCA Interventions to Upgrade the Road Infrastructure for Tourism

Intervention	BCR	Investment Costs	Benefits
Upgrade and pave 1,047 km of roads around select tourist sites	2.8 Fair (100% economic benefits)	MWK 123,135 million for construction over 2 years MWK 5,258 million per year for maintenance	Benefits in 2023: MWK 79,244 million – 24% reduction in vehicle operating costs MWK 6,054 million – 56% reduction in travel time MWK 9,632 million – 15,460 extra tourist arrivals MWK 3,021 million – benefits from increased road use Total benefits 2023 to 2036: MWK 97,951 million in 2023, rising to MWK 103,858 million in 2036
Fully financed road maintenance	5.2 Good (100% economic benefits)	MWK 4,133 million per year to fill the maintenance gap	MWK 64,528 million Avoided reconstruction cost of roads in 2029 and 2036 MWK 3,778 to MWK 28,042 million sustained benefits from road upgrading

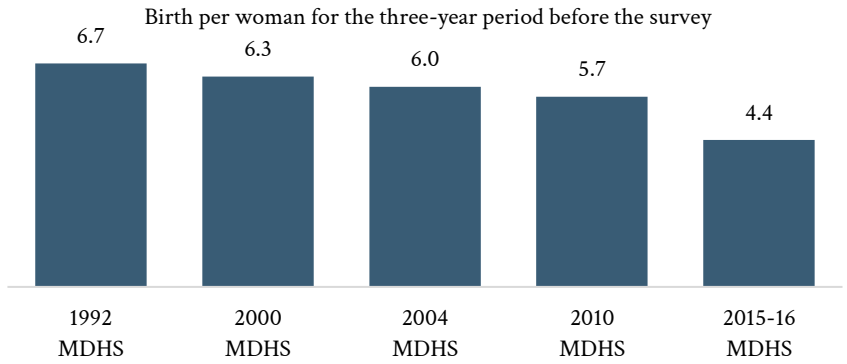
19. INCREASING CONTRACEPTIVE USE THROUGH POST-PARTUM COUNSELLING AND FREE, IMPROVED ACCESS TO CONTRACEPTION

Mark Radin, Mahesh Karra, Salim A. Mapila, Nyovani Madise and Brad Wong.

Context

Access to and use of contraception in Malawi has increased substantially over the past two decades. The modern contraceptive prevalence rate (mCPR) for married women has increased from 7 percent in 1992 to 58 percent in 2016. This increased access and use of contraception has coincided with a decrease in total fertility rates from 6.7 per woman in 1992 to 4.4 in 2016. Overall, Malawi has had the largest increase in the percentage of women aged 15-49 using modern contraception and the third largest reduction in total fertility rate from 2010 to 2019 in the world. However, the population of Malawi is expected to double from 2020 to 2050. Reducing population growth is imperative for Malawi to unlock the benefits of a demographic dividend.

Figure 19.1. Total Fertility Rate Malawi



Source: Demographic and Health Survey (2015–16)

The Government has been actively engaged in expanding access to family planning services in Malawi. Numerous policies have been developed including The Youth Friendly Health Services National Standards (2007), the Sexual and Reproductive Health and Rights Strategy for Young People (2009), Youth Friendly Health Services National Standards (2015), and the National Youth Friendly Services Strategy (2015–2020). In 2016 the Malawi Government developed a Family Planning Implementation plan that highlighted the need for increased postpartum counselling and suggested that it be prioritised particularly in 11 high-priority districts.

Summary of Findings

The success and proliferation of programmes has made it challenging to identify interventions with potential to further reduce fertility and improve access to contraceptives. In this report, analysts focused on post-partum counselling plus free access to contraceptives, due its prioritisation in districts with the highest fertility rates, and evidence that it could reduce the number of pregnancies by 40 percent in the three years after birth. The intervention entails

- Counselling in the period around birth
- Free contraceptives across various methods as desired by the beneficiary
- Free transport to clinics via the services of a dedicated driver
- Free treatment for side effects of contraceptive use

If rolled out for 10 years, the intervention is expected to reach 2.3 million women who have just given birth. This would avoid nearly 120,000 unwanted births and 35,000 mistimed births. These avoided or better spaced births generate several flow-on benefits:

- 6,800 avoided deaths of children under 5 years due to improved birth spacing
- 4,700 fewer low weight births
- 620 avoided maternal deaths, a consequence of fewer pregnancies
- demographic benefit associated with a reduction in population

In addition, there are benefits of free transport and contraceptives for those who would still have used modern methods even without the intervention. The largest and most important of these benefits is the demographic benefit. The demographic benefit is an economic benefit that accrues to the entirety of Malawian society and includes several components such as:

- A short run increase in GDP per capita because the same resources are split across fewer people
- More attention and investment in remaining children that leads to more schooling, better health, and higher future productivity
- More time for people, particularly women, to return to work, which increases economic output
- Increased savings that can be invested into immediately productive assets
- A positive feedback loop where increased schooling, health and wealth generates even more reductions in fertility leading to further economic gains

If the intervention reduces unwanted births in the target population by 20 percent per year, it will generate a demographic benefit increasing between 0.7 percent and 1.9 percent in GDP per capita per year in the long run. This has a present value of MWK 2,723 billion, representing 97,5 percent of the total benefits.

The costs of the intervention over ten years include

- the hiring and training costs of counsellors, with a present value of MWK 14,856 million
- transportation costs estimated at MWK 19,656 million
- the cost of contraceptives and treatment for related health issues, estimated at MWK 5,168 million
- programme administration at MWK 35,294 million

The main cost driver is that of administration: Administrators are responsible for arranging counselling appointments and transportation for each individual to the health clinics as well as attending all clinical appointments along with the client. Total discounted costs amount to MWK 75,130 million over the intervention period.

Figure 19.2. Costs for Selected Interventions for Increasing Contraceptive Use through Postpartum Counselling and Free, Improved Access to Contraception

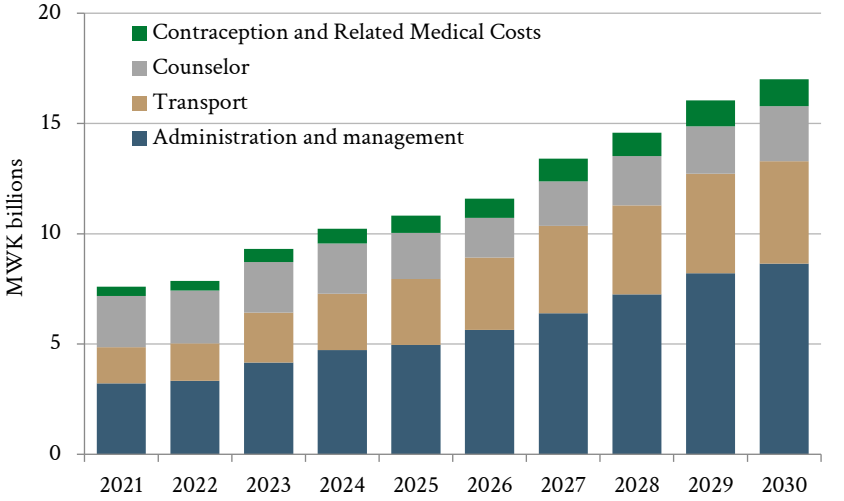


Table 19.1. BCA Intervention for Increasing Contraceptive Use through Postpartum Counselling and Free, Improved Access to Contraception

Intervention	BCR	Target population	Avoided births	Avoided deaths	Demographic benefit
Post-partum counselling and free access to contraceptives	37 Excellent	All married women who have given birth in health facilities	156,000 unwanted and mis-timed births 5,000 low-birth weight	6,800 children under 5 620 mothers MKW 16 million per avoided deaths	Increases between 0.7% and 1.9% in GDP per capita per year

PART V.
GOVERNANCE

20. IMPLEMENTING THE NATIONAL LAND POLICY

Saleema Razvi, Brad Wong, Devie Chilonga, Euphemia Bota and Maxwell Maida.

Context

Land reform in Malawi has been a decades-long process. Starting in 1993, efforts have culminated in a series of acts ushered into law in 2016 to ensure increased land security for Malawians. The laws allowed for, inter alia, formal registration of customary lands and a decentralised structure for managing land registration and transfers. Given the relatively recent enactment of these laws and creation of subsequent plans, much of the land remains untitled, with only a few decentralised offices created for administration. Discussions with the Department of Lands suggest that 3.2 million hectares of rural land and 1.5 million hectares of urban land requires titling. Land titling would have significant benefits, with 15 percent of households having a dispute over land and one out of five households fearing that their land would either be encroached upon or taken away from them.

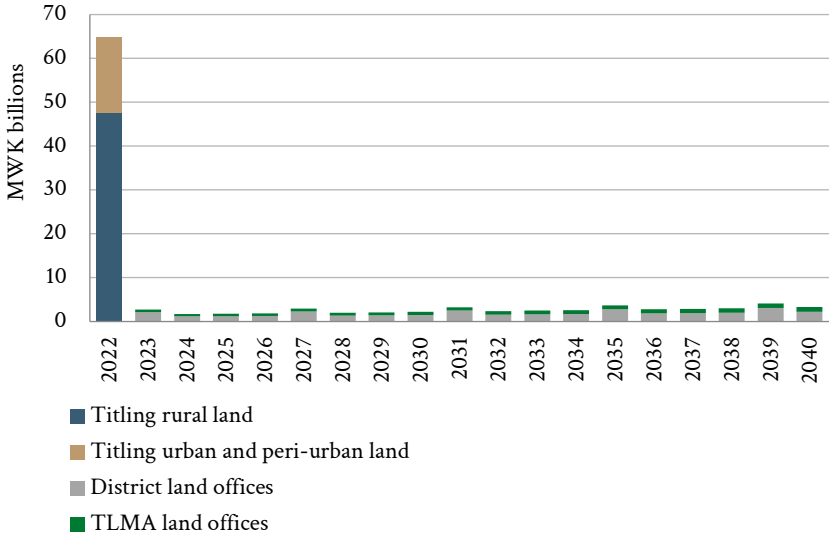
Land reform has an excellent return on investment with the potential for substantial wealth creation in Malawi

There are two primary costs to implement the land reforms: the first is the actual land titling process, the second relates to creating the infrastructure and services to manage land transactions going forward via decentralised offices. Specifically, to adjudicate, demarcate and register land parcels on the estimated 3.2 million hectares of rural land that requires titling would cost MWK 47,680 million, based on an assumed per hectare cost of MWK 14,900. This figure is based on land titling pilots currently underway in Malawi that use satellite imagery to identify plot boundaries. For the estimated 1.5 million hectares of untitled urban and peri-urban land, the total cost of titling is estimated at MWK 17,240 million, based on a per hectare titling cost of MWK 11,175.

Recurring and ongoing costs include the cost of capacitating and maintaining district land registry offices. Currently, Malawi has only three regional land registry offices, in Mzuzu, Lilongwe and Blantyre, which will be disbanded once District Offices are in place. Thirty-five district offices would require salaries for almost 500 staff members, rental costs for around 1,000 square metres of office space plus up-front expenditure for computers, office equipment and furniture estimated at MWK 1,000 million. Human resource costs were estimated using the official civil service pay grade (Department of Human Resource Development and Management, 2020), while office space was assumed to cost MWK 70,000 per person as documented in the National Resource Management paper. Equipment costs of around MWK 1,000 million are required in the first year and every fourth year thereafter. Office rental, including utilities, is relatively modest at MWK 35 million.

According to law, smaller offices are required at each TLMA to hold land records, of which there are roughly 226 across the country. We estimate the overall cost of these smaller offices starting at MWK 582 million in 2022 based on rental costs, human resources and equipment required, rising to MWK 1,098 million by 2040 to account for expected real growth in wages. The costs of educating a cadre of land management and surveying personnel does not need to be factored into the analysis because there is already a surfeit of personnel trained in these disciplines from various universities in Malawi who are waiting for employment.

Figure 20.1. Cost of Implementing Land Reform



As can be seen in Figure 20.1, the largest cost is associated with land titling, which reaches MWK 64,920 million with roughly 73 percent of the cost for titling rural land. Thereafter, the operating costs of running the district and Land Management Administration (LMA) offices is relatively modest, averaging MWK 2,700 million per year.

The benefits of land titling are also numerous, notably increased ability to access credit, increased investment certainty, reduced costs in land transactions, reduced land conflicts and greater peace. A review of the literature and discussions with the Department of Lands suggests a somewhat conservative boost to land values associated with titling equal to 25 percent (urban) and 10 percent (rural) of the existing land value. For the base case, a value of rural land at MWK 2,000,000 per hectare is assumed, and the value of urban/peri-urban land at MWK 15,000,000 per hectare based on land valuation reports. Applying a 25 percent increase in valuation for urban lands and a 10 percent increase for rural lands, the total benefits are a staggering MWK 6,425,313 million.

The results indicate that the expected BCR is very high, at 73 kwachas for every kwacha spent. This figure is based on several assumptions – costs drawn from pilot land titling programmes in Malawi and benefits drawn from land value reports also from Malawi. The report provides a strong impetus to ensure there are no further delays to the implementation of the land reform agenda in Malawi. For a country with an aspiration for wealth creation, land titling is one effective way to generate substantial economic benefits for most Malawians.

Table 20.1. BCA of Intervention to Implement the National Land Policy

Intervention	BCR Rating	Beneficiary Group	Costs	Benefits
Land Titling Reform	73 Excellent (100% economic benefits)	Population residing in 3.2 million ha of rural and 1.5 million ha of urban land	Upfront MWK 64,920 million for land titling, demarcation and adjudication Ongoing MWK 2,700 million per year district offices and TLMA offices	Increased economic benefits (land tenure security, access to credit, transaction cost reductions) valued at MWK 6,425,313 million

21. REFORMING THE POWER SECTOR FOR BUSINESS FRIENDLINESS

Juan Belt, Bahman Kashi, Ben Kaluwa, Sarah Carello, Thomas C. Munthali and Brad Wong.

Context

ESCOM was under a Millennium Challenge Corporation Compact for five years (2013–2018), during which substantial infrastructure improvements were made, including a reduction in technical losses. However, an independent evaluation of the MCC Compact found that the sustainability of the supported improvements could not be guaranteed. The evaluation noted that the financial position of ESCOM had declined in recent years, there had been significant operational challenges, and the board of directors of ESCOM may not have been sufficiently independent from political authorities. Other operational issues include stock-outs, procurement maintenance calendars not being maintained, and lack of knowledge of adaptation strategies to mitigate climatic changes, particularly those affecting the Shire River, as examples of management issues leading to technical losses. Finally, while tariffs have increased significantly, they are still below full cost-recovery levels, impeding ESCOM's ability to conduct routine maintenance.

Operational weaknesses can prevent power from reaching customers even when it is available. As a result, electricity services suffer from substantial blackouts. Malawian firms experience approximately 7.4 outages per month, with each outage lasting 3.6 hours. Around half of Malawian firms supplement with costly diesel generators, while the rest opt for low productivity activities that do not require stable electricity or suffer large revenue losses.

The intervention: A long-term technical mentoring programme to improve management

The intervention proposed is a long-term technical assistance programme to redress the deficiencies in corporate governance and management practices that would specifically target corporate and management practices related to (1) reducing transmission outages, (2) keeping transmission losses in check, and (3) improving the reliability of service provision. There is evidence of the merits of assistance to improve corporate governance and management of utilities companies throughout the world (see case study box on Guatemala). Technical assistants can facilitate the adoption of best-practice management principles associated with profitability, including cost-reflective tariffs, stock management, and employee performance assessments. The programme (and cost/benefit calculations) has a mechanism to ensure that if the management consultancy is not achieving expected benefits by the fifth year, it can be unwound.

Wealth creation as a benefit

The programme is expected to reduce technical losses by 5 percentage points of generated electricity. Transmission losses lead to outages, which in turn, increase the coping costs of firms and households. Given the current supply shortages and the targets for expanding coverage, it is assumed that all power saved through avoiding technical losses can be used by consumers already connected to the grid.

Dealing with unreliable power is costly for businesses. Firms' coping costs are estimated at MWK 1,557 ($2.09) per kWh of unsupplied electricity. This is in the form of expensive diesel generation or productivity losses. These productivity losses may be obvious – such as reduced sales when there are blackouts – or more insidious, such as firms opting for low productivity enterprises that do not require stable electricity. For households, dry-cell batteries, torches and candles are the main coping strategies in the face of power outages, and the cost of batteries and candles was used to estimate the coping cost for households – a more modest MWK 75 ($0.10) per kWh. The 'saved' power is the benefit, and it is quantified by taking the coping costs of businesses and consumers in the face of blackouts to estimate their willingness to pay for

the saved energy. The benefits of the intervention can be characterised as increased profits for businesses and more income for households and are substantial. In 2030, they are expected to be worth MWK 110 billion or 1 percent of projected GDP. From 2022 until 2040, the intervention is expected to generate a staggering MWK 1.9 trillion in economic benefits.

Case Study 21.1. Successful Electricity Reform in Guatemala

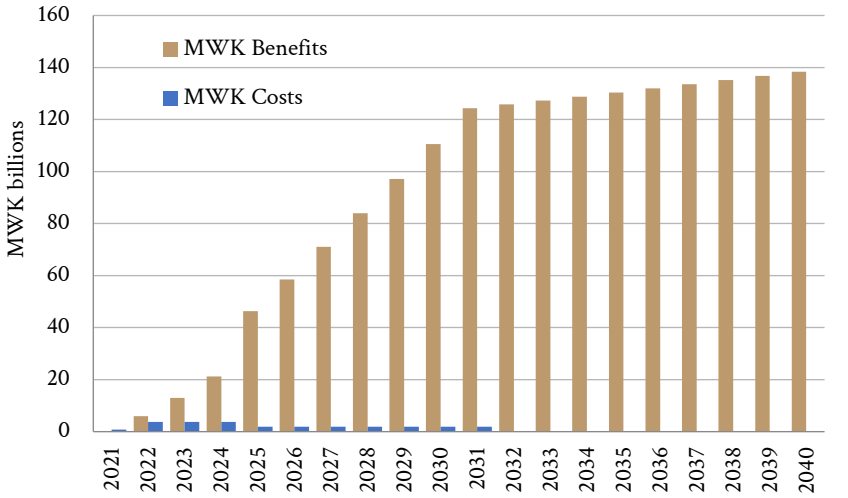
Alvarado and Belt (2018) provide a description of a successful programme that improved energy provision and enabled the setting of cost reflective tariffs in Guatemala after it was exiting from an extremely violent 40-year civil war. Reforms were enacted in a General Electricity Law in 1996, which was implemented with the help of an international team of experts. One of the key features was allowing the energy distributor a fee – Value Added for Distribution (VAD) – to cover distribution costs. This VAD is revised every five years and set by an independent body to reflect costs of an efficient firm. Independent Power Producers are selected using International Competitive Bidding (ICB), the Power Purchase Agreements (PPAs) are approved by the regulator, and the PPAs are readily available to the public on the website of the regulator. The tariffs to the final users consist of the generation costs, the transmission costs, and the VAD. Importantly, tariffs are changed every three months, mostly reflecting movement in the price of hydrocarbons, including downward revisions when the prices of hydrocarbons decline.

From 1996 to 2018, this led to numerous achievements including almost $9 billion in private investment in generation, distribution and transmission, and a generative capacity that is double peak demand. Electricity access is 92 percent, up front 63 percent in 1996. There is no load shedding in Guatemala. Importantly, Guatemalan households pay half the amount they did in 2010, showing that successful reforms can generate improvements and reduce costs. Guatemala exports excess energy to surrounding countries, thus generating substantial foreign exchange reserves.

Costs of the intervention

The costs of the intervention comprise two components: The first is a design phase and is expected to cost MWK 745 million (USD 1 million). The second component is the technical assistance programme, during Years 2 through 11, valued at MWK 3,725 (USD 5 million per year), and these costs would be estimated more precisely after the design phase. While an extended assistance arrangement may seem lavish with respect to opportunity costs, history is replete with evidence that good corporate practices, particularly with respect to human resources and financial discipline, are associated with better utility performance. The results indicate that the entire programme costs could be recovered sometime in the third year.

Figure 21.1. Costs and Benefits



Benefits exceed costs by a factor of 41

It is important to recognise that this intervention should not be viewed as a fix-all solution to Malawi's problems regarding electricity generation and distribution. Rather, this analysis focuses on finding one reliable, resolvable, and credible solution to a very specific aspect of the problem. It does not solve financial losses (unpaid bills), leakages (people using electricity without any

means to measure or pay for their use), corruption, or expensive and insufficient power production. Nevertheless, the benefits of this intervention far exceed the costs. For every MWK 1 invested in this programme Malawi will reap MWK 41 in benefits.

Table 21.1. BCA Results for Interventions for Reforming the Power Sector

Intervention	BCR	Costs	Benefits
Long-term technical accompaniment and mentoring programme for ESCOM	41 Excellent (100% economic benefits)	MWK 745 million political economy assessment in Year 1 MWK 3,725,000 million in management consultancy costs from Year 2 to Year 11 with an option to close the contract after 4 years if sufficient benefits not achieved	MWK 110 billion in 2030 in increased firm and household income MWK 1.9 trillion from 2022 to 2040

22. GOVERNMENT SERVICES TO SUPPORT MSMES

Bahman Kashi, Lindsay Wallace, Kemal Bagzibagli, Shannon Davis, Zachary Robb, Henry Chingaipe, Blessings Chinsinga and Brad Wong

Context

Malawi's micro-, small- and medium-sized enterprises (MSME) sector contributes 40 percent of total GDP. The sector employs nearly two million Malawians including part-time and seasonal employees and entrepreneurs. In addition, the sector generated approximately MWK 11,771 billion (USD 15.8 billion) in revenues and about MWK 5,066 billion (USD 6.8 billion) in profits in 2019. The value additions by the formal and informal businesses in 2019 were MWK 2,682 billion (USD 3.6 billion) and MWK 2,384 billion (USD 3.2 billion), respectively.

The Government of Malawi has recognised the importance of MSMEs to spur economic growth and designed its Micro, Small, and Medium-Sized Enterprise Policy 2019, which, along with the Malawi 2063, guides the creation of a more productive business environment for MSMEs. A recent FinScope MSME survey on the size, scope and characteristics of the MSME sector in Malawi suggests that of Malawi's 1,600,739 MSMEs in 2019, 89 percent were neither registered nor licensed. As emphasised in Malawi 2063, the Government of Malawi targets Malawi to be among the most preferred investment destinations in Africa by 2063. Decreasing the burden of compliance by removing unnecessary regulation and bureaucracy, increasing the sector's dynamism by the maximum use of digital facilities, broadening the tax base, and allocating the tax returns to the country's vital infrastructure and other needs are crucial to reach that goal. Bearing these goals in mind, the analysis considers interventions that focus on the provision of MSME support services, improving the business environment within Malawi and lowering the time costs associated with compliance.

Two interventions address the broad governance challenges and support Malawi's overall aim of generating wealth through private sector dynamism:

- Free micro-, small- and medium-sized enterprise (MSME) registration accompanied by a bank information seminar
- E-filing (inc. payment) and tax nudges facilitating compliance

Intervention 1: E-filing and tax nudges facilitating compliance

High tax compliance costs, the perceived risk of being caught for tax non-compliance, unsatisfactory use of tax revenues by the government, and general unwillingness to pay taxes are among the reasons why MSMEs are non-compliant. The intervention focuses on reducing compliance costs and facilitating payment procedures to improve businesses' efficiency and tax compliance. Specifically, it looks to improve the Malawi Revenue Authority's Msonkho Online system to replace paper tax filing with electronic filing. The intervention also contains implementing tax nudges to facilitate and enhance tax compliance. These nudges take the form of a simple message to remind non-filers of the importance of paying taxes and the consequences of not paying.

The intervention has two broad costs – the cost of upgrading and operating the ICT system for e-filing and the tax nudges. Upgrading the ICT system would cost MWK 1,139 million initially, and MWK 840 million per year thereafter. The tax nudges are a relatively small cost of MWK 57 million per year.

The intervention is expected to lead to two benefits: reduced tax compliance costs for firms and reduced administrative costs for MRA. Currently firms require 1 to 1.2 fulltime equivalent staff to comply with the tax laws. E-filing is expected to reduce this cost by 65 percent in the long run. For the 11 percent of firms that currently pay taxes, the savings are substantial: around MWK 5,271 million per year.

The intervention also increases the administrative efficiency of the MRA. Estimates obtained from the MRA suggest savings that start at MWK 789 million initially rising to MWK 4,010 in 2026, before settling at MWK 2,570 million in the long run, mostly in the form of improved staff efficiency. The return on investment from the intervention is 7, meaning that for every kwacha

spent, Malawian businesses and government save 7 kwachas in filing and administering taxes respectively.

Intervention 2: Free MSME Registration and Bank Seminar

The intervention provides MSMEs with free registration and banking seminars, with the expectation that this will lead owners to formalise their businesses and improve their financial practices, savings, access to credit, and benefits from insurance. Formalisation increases businesses' financial inclusion that would support them to improve their business practices, become more productive, grow, and benefit from economies of scale. In addition, the potential impact of financial inclusion on businesses' profitability increases their willingness to register, thus increasing the uptake rate of the intervention. While registering a business is not the same as formalisation, it does increase compliance with the law and provides the government with some information about the enterprise. Although business registration on its own does little to increase performance or even formalisation rates, when it is combined with complementary services such as increased access to advertising, credit, insurance, or government assistance programmes, there is a significant increase in both.

The expected impacts of the intervention are drawn from a pilot programme conducted in Malawi. In that study, participating MSMEs saw an increase in revenues of 20 percent. This large increase was attributed mostly to the connections made to formal financial services. Both the registration and banking seminar were retained for this analysis, since it was this combination that led to the greatest increase in revenues. Following the pilot, the analysis assumes 50 percent of offered firms take up the intervention. This would generate benefits starting at MWK 73,000 million rising to MWK 725,000 million by 2031. To realise these gains, firms are expected to incur an additional MWK 413,000 million in operating expenses by 2031. The costs of the seminar and registration are relatively low at MWK 2,000 million by 2031. For every 1 kwacha spent, the intervention returns 1.7 kwacha. While the return on investment is only fair, the net benefits are large, equivalent to 2 to 3 percent of Malawi's GDP in the long run.

Table 22.1. E-filing and Tax Nudges: Cash Flow Over Time

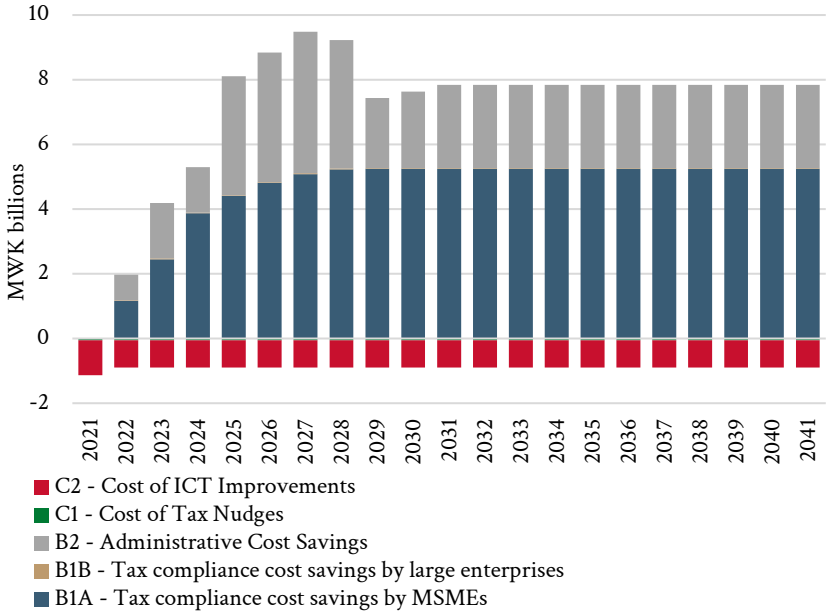


Table 22.1. BCAs for Selected Interventions for Government Services to Support MSMEs in Malawi

Intervention	BCR	Beneficiaries	Costs	Benefits
E-filing and tax nudges	6.9 Good (100% economic benefits)	Firms that file taxes MRA	ICT costs: MWK 1,082 million in the first year, MWK 840 million per year after Tax nudges: MWK 57 million per year	Tax compliance cost savings: MWK 5,271 million per year Administrative cost savings: MWK 2,570 million per year (long run)
Free MSME Registration and Bank Seminar	1.7 Fair (100% economic benefits)	50% of MSMEs in Malawi	Increased firm operating costs: MWK 413,000 million (long run) Banking seminar and registration costs: MWK 2,000 million over 10 years	Increased MSME revenue: MWK 725,000 million per year (long run)

ANNEXES

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*Regrettably, Ben Kalua passed away before publication of this book. May his soul rest in peace and his contributions live on."

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Malawi Priorities is a research-based project that seeks to provide the government with a systematic process to help prioritise the most effective policy solutions for maximising social, environmental, and economic benefits for every kwacha invested.

In this book, you will find precise and easy to comprehend summary findings from cost-benefit analyses applied to more than twenty research questions in Malawi's strategic development areas, in line with the country's development aspirations. The research questions were drawn from the NPC's research agenda, and extensive consultations with academics, think tanks, the private sector and government. The selection of interventions under each research area was informed by numerous consultations across Malawi's development policy and programme space as well as one academic and two sector experts who provided peer reviews on all analyses.

Cost-benefit analyses in Malawi Priorities consider the social, economic and environmental impacts that accrue to all of Malawian society. This represents a wider scope than financial cost-benefit analysis, which considers the perspective of only one party. All benefit-cost ratios (BCRs) reported within the Malawi Priorities project are comparable.

The cost-benefit analysis considered in the project is premised on an injection of new money available to decision makers, that can be spent on expanding existing programs (e.g. new beneficiaries, additional program features) or implementing new programs. Results should not be interpreted as reflections on past efforts or the benefits of reallocating existing funds.

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