Sustainable Management of the Environment and Natural Resources

Implications for Food Security, Livelihoods and Economic Development in Malawi

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The Poverty-Environment Initiative (PEI) of the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UN Environment) is a global United Nations effort that supports country-led efforts to mainstream poverty-environment linkages into national development planning. PEI provides financial and technical assistance to government partners to set up institutional and capacity-strengthening programmes and carry out activities to address the particular poverty-environment context. The has worked in Malawi through the Ministry of Finance, Economic Planning and Development and the UNDP Malawi Country Office since 2009.

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Contents

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Executive summary

Malawi is endowed with abundant natural resources, contributing significantly to the country's economy and to the livelihoods and well-being of its people. This paper provides macro- and microeconomic evidence, based on empirical research, of the huge benefits of investing in sustainable environment and natural resource (ENR) management and sustainable agriculture in terms of economic gains, poverty reduction, food security and gender equality. The paper also demonstrates the economic, social and welfare costs of not investing in socially inclusive and economically desirable sustainable practices. It reviews the gaps between existing policies, public investments and implementation and the implications for achieving national, regional and global development goals.

The paper highlights three key messages with corresponding policy implications.

Key Message 1: ENR sectors account for about half of Malawi's gross domestic product (GDP). Cost-effective investments in sustainable ENR use have the potential to significantly increase the country's GDP—and hence personal income—reduce poverty and contribute to food security. Research findings support the need for targeted investments in ENR sectors, particularly agriculture, which is the sector from which most of Malawi's population derive their livelihoods.

- **Policy Implication 1.1.** The Government of Malawi should accelerate investments in sustainable ENR management at the district level with a particular focus on the agriculture sector, which has the greatest potential for economic growth due to its high multiplier effect.

- **Policy Implication 1.2.** Promote diversification of household incomes through investment in ENR sectors, particularly agriculture and related off-farm enterprises. This recommendation stems from findings that households with multiple income sources were found to cope better with short-term food-insecurity shocks and exhibit greater resilience in recovering when conditions improve.

Key Message 2: Agricultural growth is essential for the economy and poverty reduction, but productivity is below potential yields due to unsustainable ENR use, lack of investment and social exclusion.

- **Policy Implication 2.1.** Agriculture policies and strategies should aim

to address gender gaps. Closing the gender gap in agricultural productivity would increase crop productivity by about 7.3 per cent and generate an average of about $100 million per year.

- **Policy implication 2.2.** A comprehensive land policy is needed that promotes equitable access and efficient and sustainable land use.

- **Policy Implication 2.3.** Capacity building, skills development and training in, and technology transfer to, farmers and especially youth in the use of modern agricultural inputs are needed. In line with these needs, the current resource envelope for the agricultural sector should be reviewed with the aim of unlocking the sector's full potential to contribute to sustainable poverty reduction and economic growth. While the sector already enjoys prioritization of public expenditures, intra-sectoral resource allocation patterns should be reviewed to prioritize investments in agricultural research and development—particularly in agricultural extension services and training. Such investments could help reduce the drudgery that research shows continues to deter youth from engaging In the agriculture sector, and could be a potential solution for addressing youth unemployment.

- **Policy implication 2.4.** The government should transform the structure of the agricultural sector by (i) emphasizing processing, which increases agricultural value added; and (ii) raising the sector's budget allocation above its current 17 per cent allotment, particularly for the crop subsector, which is where most of the country's vulnerable groups—including women—derive their livelihoods. By appropriately prioritizing budget allocations across subsectors and programmes, the government could maximize net benefits to returns on investment in the sector. For example, the Farm Input Subsidy Programme continues to consume a very large share of budget, yet analysis shows it is not an efficient way of spending government resources for increased food security.

Key Message 3: ENR policies and laws are not properly implemented, leading to continued unsustainable ENR use. Thus, poverty reduction and productivity targets are not met because social and economic benefits are reduced by unsustainable ENR use. This situation has undermined government efforts to break the cycle of food insecurity and reduce poverty in a sustained manner.

- **Policy Implication 3.1.** The government needs to create a predictable, consistent and coherent policy environment to reduce business costs and encourage investment in the agricultural sector. Inconsistency on the part of the government—particularly with regard to strategic grain reserves and in the banning of trade on strategic staples such as maize—discourages investment in important crops that could provide the additional income required by farmers for crop diversification and off-farm investment.

1

Introduction

Malawi is endowed with abundant natural resources that contribute significantly to the country's economy and livelihoods and to people's well-being. Natural resource sectors are, in fact, the cornerstone of the country's gross domestic product (GDP) with agriculture contributing 30.0 per cent, nature-based tourism 7.2 per cent, forestry 6.1 per cent and fisheries 4,0 per cent (Yaron et al., 2011).

Over 80 per cent of Malawi's population of 16 million are smallholder farmers; an estimated one-half of the population lives in extreme poverty on less than $1.90 per day, and 60–80 per cent of the population experiences food insecurity in at least one month of the year (World Bank, 2016). Vulnerable groups tend to depend more on natural resources and agriculture for their livelihoods and well-being. Thus, unsustainable environmental and natural resource (ENR) use poses a real risk for those who have come out of poverty to again fall below the poverty line, as it compromises access to reliable sources of clean water and energy and contributes to air- and water-related diseases such as tuberculosis, malaria and cholera.

Over the years, Malawi's natural resources have been badly degraded for several reasons. These include unsustainable farming practices combined with a trend of bringing more land under cultivation due to population pressure and with little use of nutrient-replacing fertilizers; also, a high dependence on charcoal to meet domestic energy needs has led to high rates of deforestation. Degradation of soils and land further undermines agricultural production, the cornerstone of Malawi's economy.

The **poverty-environment nexus** refers to the mutually inclusive linkages among environment, natural resources, and human and economic development. The many linkages mean not only that the sustainable ENR use can contribute to achieving development objectives, but also that unsustainable use of these resources can make it impossible, for ENR-dependent developing countries to grow their economies and for most of the poor to develop beyond subsistence.

Thus, the way that Malawi's ENR are managed determines the ability of the country to meet its fundamental national development objectives: to significantly increase domestic food production and break the cycle of food insecurity and thereby limit dependence on food and humanitarian aid (PEI Malawi, 2016). It is also central to Malawi's progress in meeting the new Sustainable Development Goals—particularly those that focus on poverty reduction, food security, inclusiveness, environment and economic growth. Finally, it is critical to the way the country can articulate and implement one of its strategic priorities—agriculture, water development and climate change management—in the current Malawi Development and Growth Strategy (MDGS) for 2017–2022.

Report objective and rationale

The Government of Malawi needs detailed evidence of the importance of ENR sustainability for poverty reduction efforts and economic growth to inform its commitment to and strategy for achieving national, regional and global development goals. This report thus aims to present detailed, empirical findings that clearly demonstrate the linkages between sustainable ENR use, poverty reduction and economic growth. The findings presented here are primarily drawn from studies conducted by the Poverty-Environment Initiative (PEI) Malawi, a joint undertaking of the United Nations Development Programme and the United Nations Environment Programme (Box 1.1).

The report also provides recommendations for needed policy reforms to adopt a more integrated approach to economic growth, poverty reduction and ENR sustainability. By bringing these findings to the attention of policymakers and practitioners, the report aims to inform the forthcoming revision of the country's national development plan, national Agenda 2030 priorities, and other relevant policy reforms to adopt a more integrated approach to achieve ENR sustainability, economic growth and poverty reduction.

Understanding the relationship between the environment and poverty

In most agrarian economies, including Malawi's, the significance of the ENR sectors makes understanding the relationship between the environment and poverty crucial in addressing food security and poverty. This focus on the poverty-environment nexus is predicated on the recognition of the two-way relationship between ENR use and poverty reduction. As the poor and other vulnerable groups use ENR to produce outputs including food and industrial raw materials, there should be a clearly defined sustainable path for doing so; otherwise, unsustainable use will worsen poverty. This will then underscore a vicious cycle wherein food insecurity fuels more multidimensional poverty in the long run. The synergies between ENR and poverty reduction strategies have to be very well

understood, and sustainable use achieved and ensured, for the country's national objectives of economic growth and poverty reduction to be realized.

This intrinsic relationship between ENR use and poverty has become a subject of great concern. Although not many studies have been undertaken to date to untangle this complex issue, some empirical findings—particularly in the developing world, including Africa and Malawi—now exist. Though more work is needed, this body of knowledge provides some compelling evidence that cannot be ignored in the fight against food insecurity and chronic poverty and in the search for policy action that could help maximize the synergies between the ENR sustainability and poverty reduction.

For example, Jalal (1993) observed that achieving the development goals of agricultural-based economies would be impossible if corresponding attention is not given to sustainable ENR management and in providing remedial and preventive measures to avoid ENR degradation. This concern is strengthened by insights from some empirical studies showing that poverty inhibits people's investment in land conservation and induces parochial survival strategies detrimental to the natural resource base (Holden and Shiferaw, 2002). Specifically, poverty causes households to have high discount rates, thus inhibiting them from optimally investing and conserving their natural resource base (Holden, Shiferaw and Pender, 2001; PEP, 2005). More recently, findings have been generated to provide basic data on the magnitude of damage to the economy as a result of unsustainable ENR management.

Box 1.1 PEI Malawi

PEI Malawi was launched in 2008 and implemented until 2018 to support the government in improving the sustainability of ENR management in a manner that helps reduce poverty and achieves other relevant development goals such as food security. PEI's overarching strategy is to use empirical evidence to garner and catalyse policy change and the redirection of public finances to improve the efficiency and sustainability of ENR management in the country and thus reduce poverty in a multidimensional sense among the most vulnerable.

Over the years, PEI Malawi has commissioned studies to generate empirical evidence and data that show the linkages between poverty and the environment. Such evidence was then used to engage relevant decision-makers and other stakeholders in dialogue to catalyse policy formulation and reforms that will improve the sustainability of ENR use and increase the social and economic benefits they generate—which is essential to reducing poverty and achieving other development priorities such as food security.

In 2019, Poverty-Environment Action for the SDGs Malawi, a new joint initiative bringing together UN Environment, UNDP, UN Women and FAO, was launched that will build on PEI achievements. The project will focus on poverty-environment mainstreaming in the agricultural sector with a view to strengthening climate resilience and empowering women farmers by influencing agricultural investments and broader national and sector policy and budget processes.

The impact of unsustainable ENR use on economic productivity

Some of the recent, more detailed analyses have provided quantitative evidence of the impact of the unsustainable use of ENR on economic productivity and the overall effect on livelihoods and poverty levels in most countries in Africa. It is estimated that about 280 million tons of cereal crops lost each year in Africa on about 105 million hectares of cropland could be prevented if soil erosion were well managed and control measures mainstreamed into the development plans of most countries (Dallimer et al., 2016). Recent findings have put the cost of inaction—measured in terms of the value of cereal crop lost due to soil erosion-induced nutrient depletion over the next 15 years (2016–2030)—as equivalent to about 12.3 per cent of the GDP of 42 African countries (Dallimer et al., 2016). Taking action through investment in soil land management over the next 15 years would only cost an estimated 1.15 per cent of the GDP of these countries.

The benefits of acting to mitigate the negative effects of soil erosion in Africa are estimated to be about seven times the cost of inaction. Africa could generate about $71.8 billion in gross revenue per year if all countries took actions against soil erosion. The net present value of taking action only against soil erosion-induced nutrient depletion on arable land used solely for cereal production over the next 15 years is about $62.4 billion. The finding from this study shows, as expected, a positive and statistically significant relationship between the rate of the poverty gap and soil nutrient depletion from cereal cropland in Africa (Dallimer et al., 2016).

2

Connecting economic growth, food security, environmental sustainability and poverty reduction in Malawi

This section explores Malawi-specific evidence on the relationship between ENR sustainability, economic growth, food security and poverty reduction at the macro level, for household incomes and well-being as well as socioeconomic factors that affect the poverty-environment nexus.

Spurring economic growth, agricultural value added and poverty reduction through sustainable ENR management: evidence from macroeconomic studies

A number of studies that quantify the relationship between sustainable ENR management and macroeconomics in Malawi have been conducted. The studies reveal clear evidence of strong relationships between sustainable ENR management, poverty reduction, food security and well-being.

Sustainable natural resource use and GDP

Natural resources in Malawi significantly contribute to Malawi's economy (Table 2.1). The agricultural sector alone accounts for 30 per cent of GDP and 90 per cent of the country's export earnings (Government of Malawi, 2014), while employing 80 per cent of the population. Forest revenues account for 6.1 per cent of GDP,[1] amounting to MWK 1.2 billion ($7.3 million) between 2006 and 2012, while offering employment for

[1] The data cited in this paragraph are from PEI Malawi and Ministry of Finance, Economic Planning and Development (2011).

Table 2.1 Percentage contributions of natural resource sectors to Malawi GDP

Sector	Contribution to GDP (%)
Agriculture	30.0
Nature-based tourism	7.2
Forest	6.1
Fisheries	4.0

Source: Yaron et al., 2011.

some 160,000 people. Fishing contributes 4.0 per cent of GDP, and nearly 1.6 million people in lakeshore communities derive their livelihood from the industry. Fish, as a source of income, has a landed value of MWK 19 billion ($116 million) while accounting for 40 per cent of the protein consumed in the country. Moreover, nature-based tourism contributes 7.2 per cent of Malawi's total GDP.

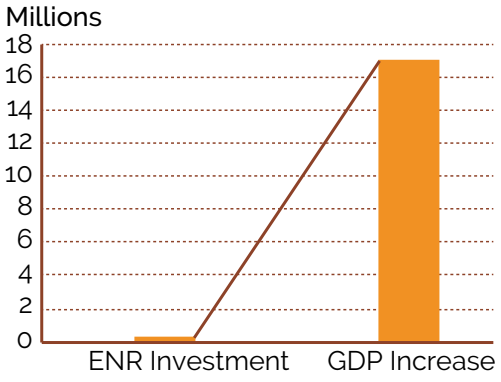
Given the importance of natural resources to the economy, unsustainable natural resource use is a threat to the economy. In fact, unsustainable natural resource use has been found to cost the country the equivalent of 5.3 per cent of GDP each year—more than the total funding allocated to education and health in 2009 (Yaron et al., 2011). Looking at forests in particular, a 1 per cent (317 square kilometre) loss in forest cover is likely to reduce GDP per capita by 0.6 per cent ($1.50) (PEI Malawi, 2016). In real terms, this translates to a loss in income of nearly $24 million a year. A reduction in the national GDP has a direct impact on the government's ability to invest in longer-term development objectives; in the short term, it also reduces the government's capacity to purchase food to smooth consumption for, notably, the most vulnerable groups during periods of severe draught, which leads to hunger and malnutrition.

On the other hand, findings also show that a 1 per cent increase ($300,000) in expenditure in ENR sectors leads to a 0.43 per cent increase in per capita GDP and a 2 per cent improvement in national food production (280,000 metric tons) (PEI Malawi, 2016). In monetary terms, this means that, for every $300,000 increase in ENR expenditure, there is an increase in GDP per capita of $1.10, and an increase in overall GDP of $17 million, based on an estimated population of 16 million in 2016 (Figure 2.1). For example, direct government investment of as little as $300,000 in afforestation, the control of soil erosion and soil restoration, would increase Malawi's GDP by about $85 million and enhance food production by about 2 per cent over five years, all things being equal. This is a conservative estimate which does not take into account the multiplier effects that would come with the increase in GDP and national income.

Implications of soil loss on economic performance and agricultural productivity

Soil loss in Malawi has been increasing, with serious consequences for food production

Figure 2.1 Return on ENR investment



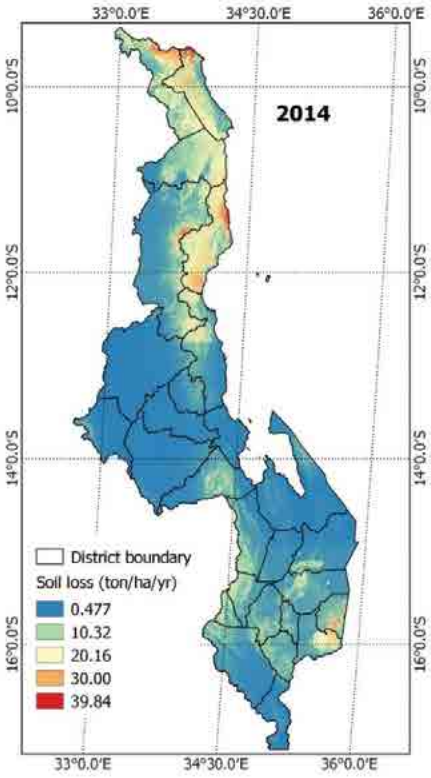
Source: PEI Malawi, 2016.

and economic growth. On average, Malawi loses about 29 tons of soil per hectare per year (Vargas and Omuto, 2016) (Figure 2.2); earlier estimates indicated an average soil loss of approximately 20 tons per hectare per year. This translates into yield losses of between 4 per cent and 25 per cent each year (Yaron et al., 2011). A conservative estimate of the annual on-site loss of agricultural productivity as a result of soil degradation is a reduction in GDP by 1.6 per cent (equivalent to MWK 7.5 billion or $54 million in 2007) (Yaron et al., 2011). Moreover, soil erosion reduces agricultural productivity by at least 6 per cent. Were lost yields recovered, an additional 1.88 million people would have been lifted out of poverty between 2005 and 2015 (Yaron et al., 2011).

These findings are in line with estimates of productivity losses on tropical soils being in the range of 0.5–1.5 per cent of gross national product (GNP) for most economies; World Bank country evaluation analyses show that, overall, the costs can be substantial—up to nearly 2.7 per cent of GDP. Jouanjean, Tucker and te Velde (2014) cite Yesuf et al. (2005) in showing that the estimated annual costs stemming from land degradation range between 2.00 per cent and 6.75 per cent of agricultural GDP.

This unprecedented level of soil loss has been attributed to loss in biomass due to extensive deforestation and unsustainable agricultural practices adopted by smallholder farmers, particularly during land preparation and cultivation. A great amount of organic fertilizer would be needed to redress the imbalance, which would constitute a substantial drain on national resources. In terms of forgone food production, the amount would well

Figure 2.2 Soil loss rates in Malawi in 2014



Region	District	Mean	STDEV	Minimum	Maximum
North	Chitpa	15.22	7.8	0.4	39.08
North	Karonga	15.81	8.59	0.69	39.74
North	Nkhate Bay	19.83	7.35	2.28	38.01
North	Rumphi	11.24	6.4	0.78	30.84
North	Mzimba	6.42	5.75	0.43	33.94
Central	Kasungu	0.89	1.19	0.13	14.55
Central	Nkhotakota	6.43	6.11	0.56	30.6
Central	Ntchisi	2.76	1.82	0.34	8.93
Central	Dowa	0.9	0.46	0.24	3.43
Central	Salima	1.11	0.59	0.31	7.23
Central	Lilongwe	1.05	0.74	0.24	8.17
Central	Mchingi	1.07	1.23	0.22	9.81
Central	Dedza	4.17	3.4	0.39	19.88
Central	Ntcheu	4.53	3.5	0.38	19.48
South	Mangochi	1.44	1.35	0.11	9.97
South	Machinga	2.44	2.76	0.2	16.55
South	Zomba	4.92	3.29	0.98	20.49
South	Chiradzulu	5.37	2.85	1.22	18.41
South	Blantyre	5.49	2.9	1.07	16.16
South	Thyolo	6.19	2.13	0.91	15.37
South	Mulsnje	9.64	7.76	1.57	33.4
South	Phalombe	10.22	8.15	2.54	35.17
South	Chikwawa	3.35	2.81	0.54	21.33
South	Nsanje	1.46	1.03	0.26	7.97
South	Balaka	2.1	1.05	0.38	12.64
South	Mwanza	9.03	4.51	1.27	23.32
South	Neno	7.44	4.26	1.44	21.07

Source: Vargas and Omuto, 2016.

exceed the cost required to prevent this unprecedented loss in soil nutrients.

Investment in the ENR sectors is crucial if the desired benefits for the national economy and poverty reduction are to be maximized. It will be necessary to clearly investigate investment options in different ENR management components to determine the marginal benefits of each investment portfolio and the option that will have the highest multiplier in terms of food security and poverty reduction.

Agricultural value added

Government investments in ENR-related sectors are the main drivers of agriculture value added. For instance, findings show that, in the short run, a 1 per cent (approximately $2 million) increase in public expenditure in the agriculture sector will result in a 0.46 per cent (approximately $500,000) increase in agriculture value added. Over a longer period of time, when all the adjustments have taken place as a result of the change in investment and the economy again attains equilibrium, this same investment ($2 million) in agriculture expenditure will lead to a 3.57 per cent ($24 million) increase in agriculture value added, as a result of the backward and forward linkages that would occur in the overall economy.

In other words, using $1 per day as a cut-off point for extreme poverty levels, this level of expenditure ($2 million) can, over time, lift about 65,000 people out of poverty in a given year—thus leveraging their ability to purchase food and obtain other welfare services such as health and access to clean water and a reliable energy supply. Obviously, the number of people lifted out of poverty would be much higher when factoring in the multiplier effects that can be realized as increased household income stimulates further consumption and investments in other sectors of the economy—which in turn feeds back into the circular flow of income, thus leveraging further consumption and investment in the economy.

Conclusion

This macroeconomic analysis clearly indicates that the ability of the Government of Malawi to generate much-needed domestic resources for both capital and current expenditures depends on sustainable management and judicious use of the country's ENR, which alone provide important benefits but also underpin the agricultural sector. Thus, the extent to which the government can meet its financial obligations and honour international commitments and agreements depend on the resilience of the ENR sectors to support the production of goods, services and social benefits in the most efficient manner. The overall performance of the economy indeed depends directly—and/or indirectly—on the outputs of ENR sectors. Implicitly, even the provision of adequate basic amenities such as water, education and access to health services, which are critical to the general welfare of the growing population, is dependent on the efficient use and management of the country's ENR. Moreover, increases in public investments in the agricultural sector are important for the attainment of a sustained agricultural productivity growth agenda and would be a useful policy tool in combating acute food shortages and breaking the cycle of food insecurity that the country frequently experiences.

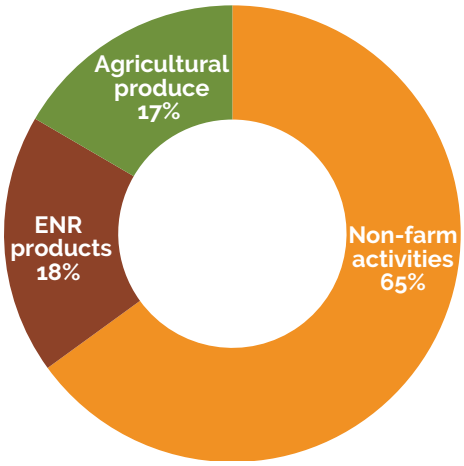
Importance of ENR and access to land for household incomes and food security: evidence from microeconomic studies

At the microeconomic and household levels, results similar to those obtained from macroeconomic analysis reveal positive and direct relationships between sustainable use of ENR and welfare measures, particularly access to food and nutrition, as well as income across all households.

Household incomes and ENR

Although off-farm economic activities such as business are the largest contributor to household income (65 per cent), 18 per cent of household incomes in Malawi come from ENR products such as charcoal, fuelwood, honey and mushrooms; and another 17 per cent from agricultural produce (PEI Malawi, 2016) (Figure 2.3). Interestingly, ENR incomes for households in peri-urban areas are twice that of rural households: MWK 62,195 versus MWK 30,962 (PEI Malawi, 2016). Therefore, peri-urban households benefit from value addition as a result of processing or semi-processing and from value added in terms of space and time. For example, by transporting honey to a peri-urban location, the value increases such that the additional revenue is greater than the cost of transportation. Similarly, the cost of charcoal nearly doubles as it moves from rural areas to the peri-urban areas located just outside the main cities of Lilongwe and Blantyre. This demonstrates the economic importance of ENR products to household livelihoods across Malawi and their value in cushioning households' food and other basic needs during lean harvests, droughts and crop failures.

Figure 2.3 Household income structure



Source: PEI Malawi, 2016.

These findings are in line with the results of similar studies in different countries, which have found that approximately 22 per cent of household income could be attributed to ENR in developing countries (World Bank, 2007). Moreover, findings show that families with multiple farm enterprises that include crops other than maize, bee keeping and petty trading during off-farm seasons have more stable incomes and were found to be more food secure than those farmers who mainly produce maize (PEI Malawi, 2016).

The importance of access to fertile land for food security and environmental sustainability

In Malawi, the potential maize yield is 10.0 metric tons/hectare; however, the national reported average is much lower: 2.2 metric tons/hectare. While some households have been found to achieve yields of 8.3 metric tons/hectare, most smallholder farmer households achieve a lower maize average productivity of only 1.45 metric tons/hectare (PEI Malawi, 2016). There is a positive and significant

relationship between land holdings and household food security, such that an additional increase of 1 hectare of land (representing an increase of 33 per cent in mean household land holding among smallholder farmers) is likely to result in an additional 118 kilograms of grain—equivalent to two months' consumption for an average household of five people (PEI Malawi, 2016). This represents an 18.5 per cent increase in household food security, computed on the basis of a mean maize yield of 1.45 tons/hectare (PEI Malawi, 2016). In general, women have been found to have less land—and, in most cases, less fertile land—than men, contributing to gender productivity gaps (FAO, 2011), as discussed later in this section.

If households have access to fertile land and soils, they are less likely to engage in unsustainable ENR use, such as cutting down trees for charcoal and unsustainable fishing, for quick income. One reason for this is that better incomes from land and enhanced agricultural productivity reduce soil mining and land degradation and allow for the use of external farm inputs and the purchase of environmentally friendly cooking stoves, which reduces the need for firewood.

When households are able to increase their food production, it allows them to spend less on food purchases. These savings can be invested in soil-conserving activities that limit environmental degradation and halt declines in soil nutrient levels—which in turn will improve agricultural productivity.

Household participation in sustainability interventions

One emerging trend that is very encouraging is that, at the household level, participation in sustainable ENR management programmes is estimated at 67 per cent (PEI Malawi, 2016). At the grassroots level, there are various efforts to implement more sustainable practices, such as community woodlots, water catchment area conservation, forest nursery and tree planting, and conservation agriculture. On average, about 67 per cent of households participate in such interventions; of these, 55 per cent were male-headed households and 12 per cent were female-headed households. This indicates that many households understand that sustainable ENR management is key to incomes and improved livelihoods. The largest percentage of households participates in forest programmes (68 per cent), with natural water fisheries ranking second (66 per cent). The smallest percentage of households participates in wildlife ENR management (59 per cent).

Conclusion

The findings from microeconomic analysis indicate that focusing on multiple and diversified sources of household income—particularly from ENR—is highly relevant to meeting household food security and broader needs. There is thus a need to move away from a focus on a one-income approach that emphasizes maize production as a panacea for alleviating food insecurity and poverty in the country.

Impact of socioeconomic factors on poverty-environment linkages

Demographic factors such as the age, sex and level of education of the head of the household are important determinants of agricultural productivity and food security in Malawi. Low productivity levels are an issue from an environmental perspective, as these lead to more intensive land use—and, as discussed above, environmental

degradation, particularly soil loss—which in turn reduces productivity, perpetuating a vicious cycle of ENR degradation and reduced productivity.

Gender gaps in agricultural productivity

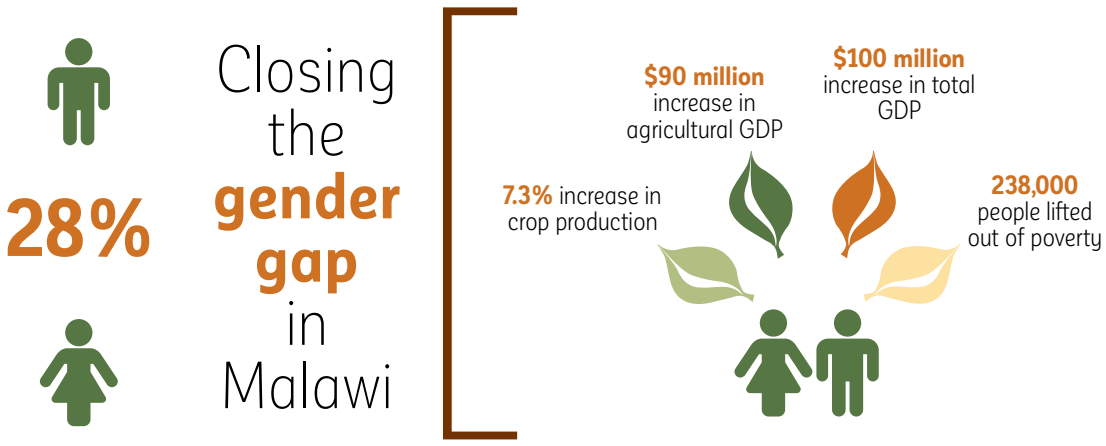
The gender gap in agricultural productivity in Malawi has been estimated at 28 per cent (Figure 2.4), due to differences in access to agricultural implements, labour and crop choices (UN Women, UNDP-UNEP PEI and World Bank, 2015). Other structural constraints that contribute to gender gaps in the agriculture sector include women's limited land ownership, tenure security and access to markets due to discriminatory, legal, social and customary norms as well as power relations and decision-making at the household level which affects women's access to agricultural extension and advisory services (World Bank, FAO and IFAD, 2015; UN Women, 2015).

Closing the gender gap in agricultural productivity by empowering women farmers to become as productive as men could lift 238,000 people out of poverty, increase crop production by 7.3 per cent and increase national GDP by $100 million on an annual basis (UN Women, UNDP-UNEP PEI and World Bank, 2015). Findings from other studies suggest that male-headed household are likely to be 18 per cent more food secure than their female-headed counterparts, as they tend to have better access than women to fertile land (PEI Malawi, 2016). Agricultural productivity would increase significantly if women had the same access to natural resources as men (FAO, 2016; Müller et al., 2016). These findings highlight the need for government, development partners and stakeholders to take appropriate measures to increase women's access to factors of production. This would help improve both household income and food security.

Experience and age effects on productivity

The age of the household head is another variable that has been shown to have a significant effect on agricultural productivity. With an average sample household age of 41 years, a recent PEI study found that a 10 per cent (equalling four-year) increase in the age of the household head—likely to represent farming experience—leads

Figure 2.4 Closing the gender gap in agricultural productivity in Malawi



Source: UN Women, UNDP-UNEP PEI and World Bank, 2015.

to an increase of 1.4–3.0 per cent (20–43 kilograms of maize) in household agricultural productivity (PEI Malawi, 2016). This implies that young farmers (aged 18–30) have yet to achieve optimal productivity levels. Moreover, given that the average household age of sampled farmers was 41, many young people are not actively engaged in agriculture; this may be due to a lack of the knowledge and skills needed for profitable farm enterprises.

Conclusion

To enhance the productivity of women and young farmers in an environmentally sustainable and climate-resilient manner requires expertise and knowledge and the adoption of new technologies and practices. This underscores the need for dedicated capacity building for women and young farmers in skills acquisition that can increase their labour productivity. Similarly, the capacity of agricultural extension officials to provide gender and climate-responsive services needs to be expanded, and the department of extension services well equipped with both material and human resources. Such services can increase farmer capacity for sustainable agriculture, particularly for women; and incentivize youth to remain in agriculture, thereby reducing youth unemployment rates. These actions are critical, as productivity gaps and the factors driving them make women and young farmers particularly vulnerable to environmental degradation and climate change.

3

Policy and regulatory framework of the environment and natural resource sectors in Malawi

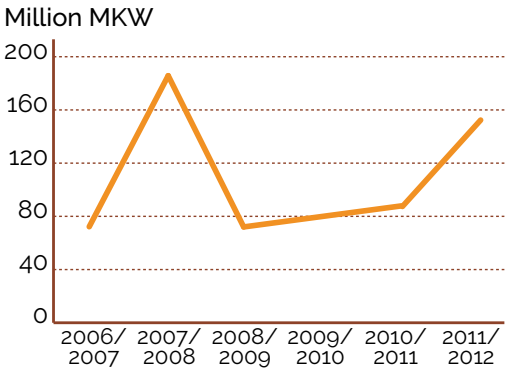
Several assessments and reviews of the policy and regulatory framework for ENR have been undertaken by PEI and others, either independently or as part economic and empirical assessments. The policy and regulatory framework is important as it, to a large extent, determines how private and public investments in ENR are made and their contribution to the economy, environmental sustainability, poverty reduction and food security strategies. To a great extent, the government's policy direction, including fiscal and monetary policies, influences the way different actors in society, including the private sector, use ENR.

Malawi's ENR sectors are governed by several public policies, and regulatory and institutional frameworks. However, some of these policies are outdated, and there is a lack of policy coherence and coordination between the ENR sectors on how to address issues related to unsustainable ENR management and utilization (PEI Malawi, 2016). In addition, policy implementation is weak. A critical look at Malawi's policy frameworks governing the ENR sectors vis-à-vis public investments and realities on the ground reveals a few contradictions and gaps.

Discrepancies between public policy and public investments

A Public Environmental Expenditure Review on ENR (PEI Malawi, 2014) showed that Malawi's total expenditure on ENR across government ministries and local councils between 2006 and 2012 was MWK 44,063 million (about $278 million) (Figure 3.1). The average annual national expenditure on ENR was equal to

Figure 3.1 ENR expenditure trend, fiscal years 2006–2012



Source: PEI Malawi, 2014.

3.15 per cent of the national budget, or 0.96 per cent of the country's GDP. Seventy per cent of the expenditure was made by sector ministries other than the Ministry of Environment.

An average annual expenditure on ENR equivalent to 0.96 per cent of GDP remains too low, considering national policy objectives and the fact that unsustainable use of ENR has been estimated to cost the country 5.3 per cent of GDP annually and prevent poverty reduction. Moreover, little expenditure, only 1 per cent, is taking place at the district and local government levels (PEI Malawi, 2014) where most rural Malawians dwell. Under-investment in ENR, particularly at the district level, prevents the Government of Malawi from achieving national development goals, and is likely to reduce future revenues from the ENR sectors that currently contribute significantly to the GDP and livelihoods of Malawians.

Malawi's average expenditure on agriculture is equal to about 17 per cent of the country's GDP.[1] This is more than the 10 per cent expenditure recommendation issued by the Comprehensive Africa Agriculture Development Programme (CAADP) but lower than international standards, after accounting for Malawi's income levels (World Bank, 2013). At face value, it does appear that the country's agricultural expenditure is sufficient to leverage economic development and poverty reduction. However, in an agrarian economy like Malawi's there should be an inverse relationship between income per capita and agricultural expenditure share in the economy. Unfortunately, Malawi does not meet this requirement and does not conform to this general pattern. GDP per capita is very low, but so too is the share of agricultural expenditure in relation to the rest of the economy. This trend indicates a structural misalignment between agricultural expenditure and budget execution. The low level of investment in the sector underlies the high degree of crop losses due to limited rural road access, and inadequate storage and other processing and infrastructure facilities.

Private sector involvement

While almost all its policies express the Government of Malawi's commitment to private sector development in various ENR sectors, actual engagement with the private

[1] Malawi is among the African countries that comply with the Maputo Protocol commitment of devoting at least 10 per cent of national public spending to agriculture. Notwithstanding the fact that forestry expenditures could not be obtained and included in the calculation as they should, agricultural expenditures (recurrent and investment) consistently accounted for 18–21 per cent of total national expenditures during 2007/08–2011/12, averaging 19 per cent. Malawi therefore largely exceeded the Maputo national budget commitment objective.

sector continues to be limited. There is also still limited private sector participation in forestry investments, agricultural commodity marketing, and in the water and energy sectors, among others, due to general constraints on private sector development in Malawi. These constraints include limited access to financial capital, low labour productivity and delays in obtaining business licenses (Government of Malawi, 2014, 2015).

Limited private sector participation in the ENR sectors is exacerbated by the fact that most policy statements by the Government of Malawi concerning its commitment to private sector development in the ENR sectors are not backed by practical strategies on how this is to be realized. While the government is committed to private sector development in implementation of food security interventions such as the Fertilizer Input Subsidy Programme (FISP), as outlined in the Malawi Agricultural Sector Wide Approach (Ministry of Agriculture and Food Security, 2011), concerns remain about the programme limiting private sector fertilizer sales to households. Studies by Chirwa and Dorward (2013) found that, for a matched sample of households that bought commercial fertilizer in the 2002–2003 and 2003–2004 seasons, a 1 per cent increase in subsidized fertilizers led to a 0.39 per cent reduction in commercial sales. The current FISP policy practice therefore has implications for sustained private sector growth as an instrument of sustainable ENR management.

In effect, while the need for an enabling environment for private sector participation is well recognized in almost all policy frameworks, there is a general lack of political will and institutional capacity to make things happen easier, cheaper and faster to attract increased private sector investment in the productive sectors of the economy, including ENR.

Marketing and trade policies

The divergence between what is contained in official policy statements and Government of Malawi practical policy actions is also very visible in marketing and trade policies. For example, to achieve the Government of Malawi's policy of self-sufficiency in maize which symbolizes the country's objective of food self-sufficiency, Malawi uses a combination of fiscal policies including government expenditures, taxes and tariffs. The policy of food self-sufficiency—a policy that is very difficult to accomplish because it negates the economic theory of comparative advantage, which is the basis for trade and growth—appears to have been shaping Malawi's agricultural trade policy. However, research evidence (PEI Malawi, 2016) suggests that this policy is not likely to solve the food insecurity problem in the foreseeable future. There is a need to encourage both domestic and international trade within the agricultural sector through value addition and diversification.

The government's unpredictable behaviour when it comes to interventions sends mixed signals concerning price controls and market interventions. This perpetuates volatility in market prices, which forces traders to operate only if they are able to charge a high-risk premium for aggregating, storing and releasing stock later in the marketing season. This approach defeats the objective of the market liberalization agenda, and tends to derail the government's objective of improving the robustness of the maize market and productivity through the forward and backward linkages that could stimulate production and contribute to

poverty reduction and food security (Arndt, Pauw and Thurlow, 2013).

The poverty and ENR implications of such cycles of policy inconsistency is that farmers, because of continuing low levels of farm incomes, are likely to engage in unsustainable ENR management activities in agricultural production practices, since they cannot access productivity-enhancing technologies such as fertilizers or invest in other more sustainable practices.

Continuation of unsustainable practices despite policy directions

Malawi has an integrated fisheries and aquaculture policy framework that recognizes the need to maximize the level of sustainable fish yields from across all waterbodies. The country nonetheless faces declining fish stocks due to overfishing in shallow waters; this indicates that the policy is not being properly implemented (Yaron et al., 2011). Consequently, it will be difficult to restore maximum sustainable yields from waterbodies such as Lake Malombe and the southwest arm of Lake Malawi, where the sustainable catch limits were exceeded several years ago. Such discrepancies apply to other ENR sectors such as forestry, wildlife and water as well; hence, the poor indicators of national ENR stocks.

All too often, implementation diverges from official policy. While limited institutional, fiscal and technical capacities are often cited as the major reasons for national failure to implement policies and laws, there are also occasions when unsustainable practices occur in the face of institutional arrangements and regulatory and legal structures. For instance, policymakers and law enforcers well know when large quantities of charcoal and fuelwood have been unsustainably harvested, but no adequate action is taken to control practices at the source, nor to confiscate overexploited ENR stocks when they pass through roadblocks. This demonstrates the failure and lack of effectiveness of the system in implementing existing policies and enforcing existing laws.

A recent critical review of the FISP shows that, despite some improvements in design and implementation made over the years, substantial gaps remain. On the positive side, FISP targeting of female farmers has improved to the extent that female-headed households are more likely to receive FISP coupons than male-headed households (Fisher and Kandiwa, 2013, as cited by Lunduka, Gilbert and Fisher, 2013). In terms of remaining gaps and challenges, however, Lunduka, Gilbert and Fisher (2013) find that the beneficiary targeting criteria are often ignored, with FISP coupons evenly divided among households rather than given to the targeted poor as stipulated in the FISP framework. In addition, there are challenges of untimely distribution of coupons due to lengthy input procurement processes; and there is elite capture of coupons, resulting in wealthier households benefiting alongside the targeted poor (LUANAR, 2014; Lunduka, Gilbert and Fisher, 2013). Other studies (e.g. PEI Malawi, 2016) indicate that there is no significant difference in productivity between farmers who did and did not benefit from the FISP.

These gaps provide a rationale to take a second look at the FISP in light of the controversies and debate surrounding the programme. Indeed, the government is redesigning the programme to make it more private sector controlled and to wean individuals who are dependent on it for their fertilizer needs, as it is not effective in addressing these needs.

Similarly, the Guaranteed Minimum Price policy and Buyer of Last Resort Grain Programme as a way of preventing food insecurity and hunger have also not been very successful. Besides sending the wrong signals to the private sector, the policy has created additional problems of benefiting a few individuals to the detriment of the poor and vulnerable groups to which that the programme was intended to cater. The Buyer of Last Resort Grain Programme's main goal was to develop a buffer stock in response to a shortage of cereals, as well as to influence prices by purchasing maize when market prices are below threshold (PEI Malawi, 2016). Although the government's Guaranteed Minimum Price policy currently involves only maize, its impact on this and other cereals that could be substitutes for maize is largely unknown. The policy has cross-cutting issues and needs to be further investigated.

Conclusion

Both social and economic analyses of investment in ENR yield positive income streams that are much higher than the opportunity cost of capital (PEI Malawi, 2016). However, these positive results are contingent on effective implementation of ENR objectives, programmes and policies as contained in national development plans, the Malawian Development Strategy and relevant sector policies.

Because agriculture is the cornerstone of Malawi's economy, it is logical that appropriate polices and measures related to the sustainable ENR management on which the sector is dependent be well implemented. The implementation of such policies will reduce unsustainable ENR use which decreases land productivity and heightens food insecurity and poverty in the country.

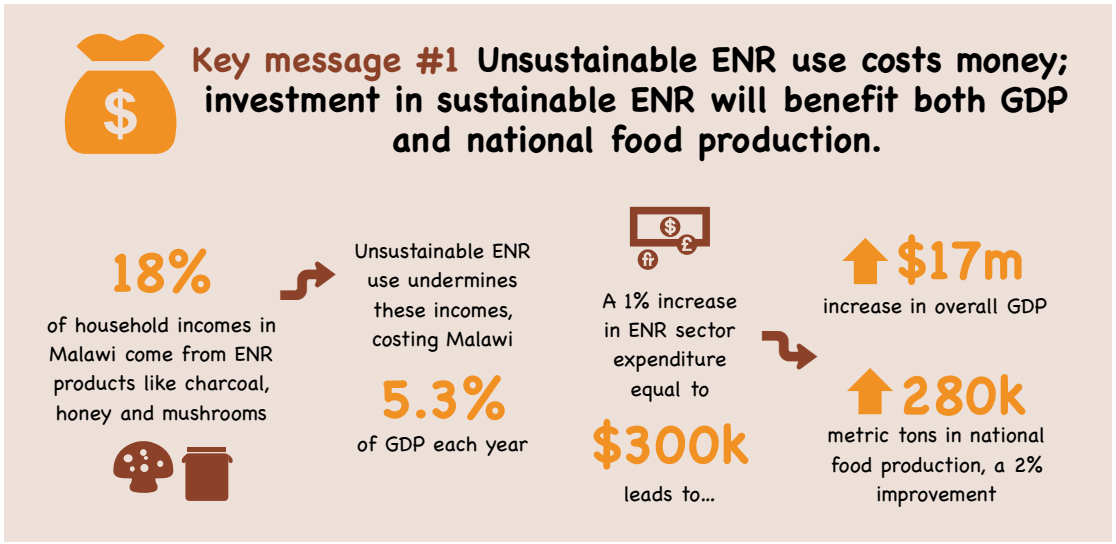
4

Key messages and policy implications

Agricultural production, poverty reduction, food security, and sustainable management and investment in Malawi's ENR are intertwined and constitute a nexus of relationships and interactions that will continue to shape the country's economy. This point is demonstrated by the findings of the various studies conducted in Malawi under PEI auspices, which very clearly show the significance of the relationship between ENR sustainability, food security and poverty reduction. Empirical findings from both macro- and microeconomic perspectives clearly indicate that increased investment in ENR sustainability would significantly contribute to income generation and poverty reduction. While these causal relationships are multidimensional, they offer a pathway that can also be used to address the multifaceted nature of poverty, food security and other welfare measures including access to health, water and education.

Key Message 1: ENR sectors account for about half of Malawi's gross domestic product (GDP). Cost-effective investments in sustainable ENR use have the potential to significantly increase the country's GDP—and hence personal income—reduce poverty and contribute to food security. Research findings support the need for targeted investments in ENR sectors, particularly agriculture, which is the sector from which most of Malawi's population derive their livelihoods.

- **Policy Implication 1.1.** The Government of Malawi should accelerate investments in sustainable ENR management at the district level with a particular focus on the agriculture sector, which has the greatest potential for economic growth due to its high multiplier effect.
- **Policy Implication 1.2.** Promote diversification of household incomes



through investment in ENR sectors, particularly agriculture and related off-farm enterprises. This recommendation stems from findings that households with multiple income sources were found to cope better with short-term food-insecurity shocks and exhibit greater resilience in recovering when conditions improve.

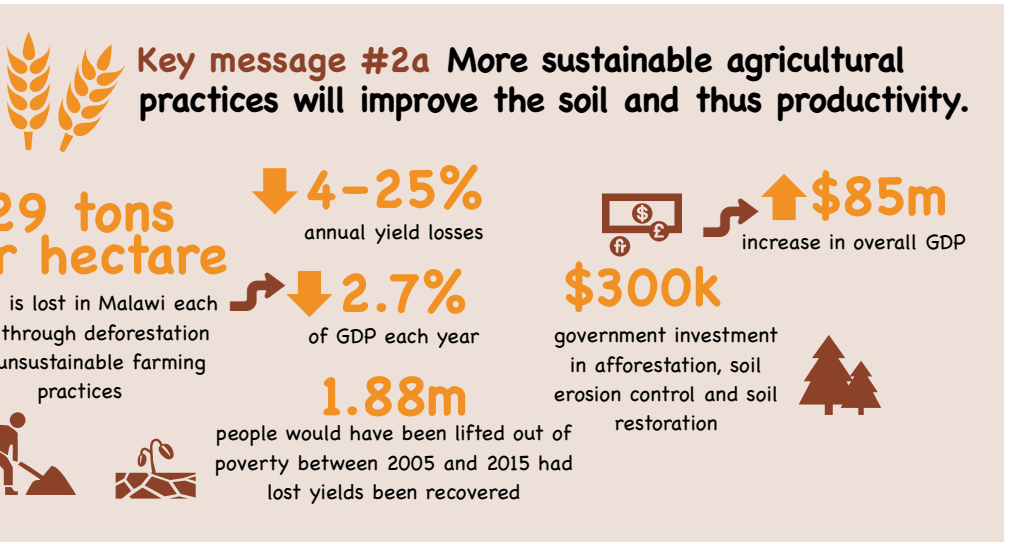
Key Message 2: Agricultural growth is essential for the economy and poverty reduction, but productivity is below potential yields due to unsustainable ENR use, lack of investment and social exclusion

- **Policy Implication 2.1.** Agriculture policies and strategies should aim to address gender gaps. Closing the gender gap in agricultural productivity would increase crop productivity by about 7.3 per cent and generate an average of about $100 million per year.

- **Policy implication 2.2.** A comprehensive land policy is needed that promotes equitable access and efficient and sustainable land use.

- **Policy Implication 2.3.** Capacity building, skills development and training in, and technology transfer to, farmers and especially youth in the use of modern agricultural inputs are needed. In line with these needs, the current resource envelope for the agricultural sector should be reviewed with the aim of unlocking the sector's full potential to contribute to sustainable poverty reduction and economic growth. While the sector already enjoys prioritization of public expenditures, intra-sectoral resource allocation patterns should be reviewed to prioritize investments in agricultural research and development—particularly in agricultural extension services and training. Such investments could help reduce the drudgery that research shows continues to deter youth from engaging In the agriculture sector, and could be a potential solution for addressing youth unemployment.

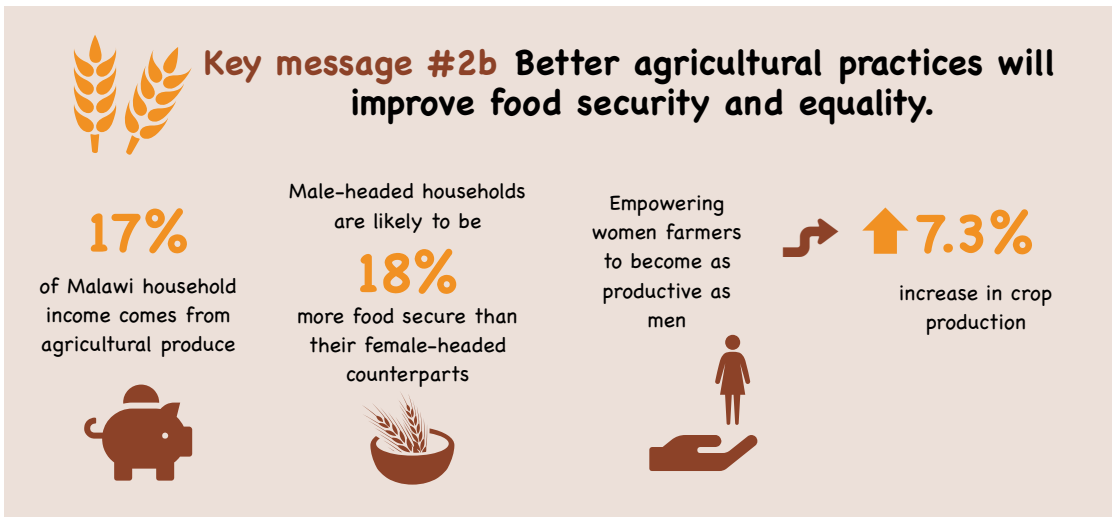
- **Policy implication 2.4.** The government should transform the structure of the agricultural sector by (i) emphasizing processing, which increases agricultural value added; and (ii) raising the sector's budget allocation above its current 17 per cent allotment, particularly for the crop subsector, which is where most of the country's vulnerable groups—including women—derive their



livelihoods. By appropriately prioritizing budget allocations across subsectors and programmes, the government could maximize net benefits to returns on investment in the sector. For example, the Farm Input Subsidy Programme continues to consume a very large share of budget, yet analysis shows it is not an efficient way of spending government resources for increased food security.

Key Message 3: ENR policies and laws are not properly implemented, leading to continued unsustainable ENR use. Thus, poverty reduction and productivity targets are not met because social and economic benefits are reduced by unsustainable ENR use. This situation has undermined government efforts to break the cycle of food insecurity and reduce poverty in a sustained manner.

- **Policy Implication 3.1.** The government needs to create a predictable, consistent and coherent policy environment to reduce business costs and encourage investment in the agricultural sector. Inconsistency on the part of the government—particularly with regard to strategic grain reserves and in the banning of trade on strategic staples such as maize—discourages investment in important crops that could provide the additional income required by farmers for crop diversification and off-farm investment.



5

Concluding remarks

The relationships between ENR sustainability, agricultural production, food security and poverty reduction in Malawi are very strong, mutually reinforcing and crucial for any meaningful progress in fighting poverty and achieving a number of the other Sustainable Development Goals. The factors at play need to be isolated and the true nature of their relationships understood in order to devise strategies and programmes to reduce the constraints they present while maximizing the opportunities they offer.

The empirical findings from PEI studies strongly suggest that providing adequate food and nutrition for every Malawian requires using ENR in a sustainable manner. It also requires closing the gender gap and creating jobs for all who are willing and able to work. To sustain productivity requires that the stock of natural resources such as land be used in a sustainable manner, and that negative environmental externalities such as pollution be reduced and climate resilience improved.

It is therefore recommended that efforts be made to reverse existing trends of soil loss and nutrient decline as well as the generally high rates of other forms of ENR degradation in Malawi. Such efforts would, among other actions, significantly improve agricultural productivity and thus help achieve food security and maintain the productive potential of ENR—particularly land—for future generations.

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