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Exploring Potential Benefits of Repurposing Agricultural Subsidies in sub-Saharan Africa

Global Panel members

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Summary

Worldwide, governments spend more than US$817 billion annually to support the agriculture sector. This funding aims to promote the use of productivity-enhancing technologies, stabilise producers' incomes, and ensure that commodity supplies (especially of staple grains) are adequate to meet food security needs. There is considerable potential for such support to be repurposed to better promote the health of populations and to benefit the environment, and the incomes of farmers and the poor, as well as achieving agricultural goals. Modelling presented in this paper argues that reallocating agriculture sector support within the sector should become a key part of the ongoing dialogue on food system transformation. Given the food system's increasing impacts on health and the environment in many countries, maintaining the status quo on subsidies is not an option. In determining priorities for public expenditures, policymakers need to adopt a nuanced approach that addresses potential trade-offs among multiple objectives.

1. Introduction

This technical brief contributes to the growing debate around repurposing agriculture sector subsidies.[i] Its intended audience is policymakers in diverse sectors of government, including: agriculture and food systems; hunger, health and nutrition; climate change and the natural environment (e.g. water, land, biodiversity); and poverty and gender equality. The results and conclusions are based on modelling at a regional scale, rather than at the global scale used in most other work. This enables new and important conclusions to be drawn. That said, care needs to be taken in interpreting and applying them to individual countries. The intention is to stimulate broad policy-level discussion and provide a foundation for more detailed analytical work at the regional and national levels.

There are growing calls for agriculture systems worldwide to adapt to reduce their environmental impacts and the generation of greenhouse gas emissions, in ways that promote not just economic growth and food supplies, but also improvements to diet quality. Several recent studies have highlighted the potential of agricultural subsidies to help achieve this.[1, 2] However, while recent work has concentrated primarily on agricultural support in high-income countries, the focus of this analysis is on low- and middle-income countries (LMICs) in sub-Saharan Africa (SSA). Drawing on modelling analysis, the paper considers important questions for policymakers on a) the effectiveness of subsidies, b) the extent to which subsidies can be repurposed to yield joint benefits for human and planetary challenges, and c) how policymakers should approach decision-making in this area.

Many African governments see agriculture as a vital engine for jobs and economic growth. This was highlighted in the 2003 Maputo Declaration, when African leaders committed to spending 10% of their national budgets on agriculture to promote agricultural growth of 6% per annum. Further attention to agriculture came on the heels of the 2008/09 food price crisis, followed by the African Union's Malabo Declaration on Accelerated Agricultural Growth. Enacted in 2014, this Declaration committed to increased government support for agriculture to achieve zero hunger and other goals by 2025. More recently, there has been a renewed focus on the sector due to growing pressures on food prices arising from the COVID-19 pandemic, climate change, and conflicts – most recently in Ukraine. The latter has disrupted supply chains, caused food shortages, and driven up prices of key commodities such as wheat, energy, and fertiliser. This has had a particularly strong impact on smallholder farmers and consumers in LMICs.[3]

The 2021 UN Food Systems Summit highlighted the urgent need to transform food systems to improve both human and environmental health, and to ensure agriculture and food systems could operate sustainably into the future. One-third of the world's undernourished people are found in Africa – numbering 282 million in 2020 – and the situation has been worsening. In terms of hunger, 46 million more were affected across the continent in 2020, compared with 2019.[4] These figures represent a crisis not only in health but also in children's physical and mental development, and in economic growth.

In response, African governments are actively seeking ways to reinvigorate agriculture as a way to reduce hunger, improve food security, and reduce reliance on food imports. However, while these are welcome developments, more is needed to fully address nutrition and health goals, which cannot be met by relying on farms to produce more calories. To provide healthy diets for all, it is also essential to promote diversity of production as well as consumer demand for, and greater availability of affordable, nutrient-rich foods. This is especially important for the poorest consumers, whose food choices may be particularly constrained by lack of money. It is therefore an appropriate time to reconsider the scale and scope of production-focused subsidies: could existing levels of sector subsidies be used differently to promote diversification of production and dietary diversity? What if subsidies were abolished or doubled – would that enhance diet quality or impair it? What if climate change and the environment are prioritised over human health as priority outcomes – or can all of these be successfully addressed simultaneously? These are the kinds of real-world questions faced by policymakers across the African continent.

Any changes to the ways in which governments support agriculture must also be done sensitively. Many households and economic sectors depend on agricultural activity, and shifts in goals or incentives must pay close attention to potentially unintended consequences. An integrated policy approach is needed, placing agriculture within a broader context of solutions for food system transformation and recognising the tension and synergies of addressing different food-system goals.[5] This requires policymakers to think strategically about how different policy instruments can be used in the context of complex systems.

The growing global interest in repurposing subsidies has been informed by various modelling approaches that seek to estimate the potential benefits and costs of changing what exists today.[6] This technical brief aims to inform the debate around rebalancing and repurposing today's public sector support for the agricultural sector by considering the implications of repurposing agricultural subsidies and fiscal resources so that they can better contribute to both human and environmental health. While those models yield important insights, this paper draws on new work that produces a more granular view of the potential role that agriculture subsidy reform can play in Africa specifically. Recognising that outcomes can be very different across geographic regions and the degrees of reliance on subsidies, this paper focuses on implications for LMICs, where food insecurity and undernutrition are of particular concern.

i See Box 1 for the definition of 'subsidies' and 'support' as used in this paper.

Box 1. Agricultural Subsidies and Support: how these terms are used in this paper

In this paper, the term 'agricultural support' follows the OECD's definition: "Agricultural support is defined as the annual monetary value of gross transfers to agriculture from consumers and taxpayers, arising from governments' policies that support agriculture, regardless of their objectives and their economic impacts."[7] This includes payments (budgetary transfers) to farmers, subsidies on inputs such as fertilisers, as well as public investments in agricultural innovation/ research and development, biosecurity services, and off-farm infrastructure supporting food value chains.[8]

The term 'subsidies' is used to describe a subset of agricultural 'support'. Subsidies are typically designed to help producers produce more, with greater efficiency and, ideally, profitability. In particular, this paper's new modelling focuses on subsidies related to budgetary transfers and private transfers to producers. Examples of subsidies in the scenarios include, for example, fertiliser or seed subsidies and producer price support. Import tariffs and export subsidies are not included in the definition of agricultural 'subsidies'.

The term 'repurposing subsidies' means changing existing subsidies so that they promote new outcomes, for example improving dietary health, or increasing the sustainability of natural resources. The repurposing might be manifest as a shift in the balance of support between different forms of support (e.g. payments to farmers versus food price subsidies), or by refocusing a particular form of support (e.g. favouring the provision of fertiliser for specific crops such as fruits and vegetables).

Where comparisons are made with other studies, it will be made clear if those studies use the terms 'support' and 'subsidies' differently.

2. Agriculture, subsidies and support

2.1. Subsidies and other support for the agriculture sector today

Across the world, national governments provide considerable support to the agriculture sector. Among 79 countries for which data are available for 2016–18, the average annual support (as transfers from the government or between consumers and producers through market price support) is estimated to be US$817 billion per year.[8] In sub-Saharan Africa, agriculture plays a central role in many national economies. About 60% of the population in SSA relies on farming as a major source of income, and the sector contributes 23% of total GDP.[9, 10] While subsidies here are relatively low by world standards, they nevertheless represent an important commitment to an industry that is expected to provide food security, support commodity exports, and provide jobs for millions of people.

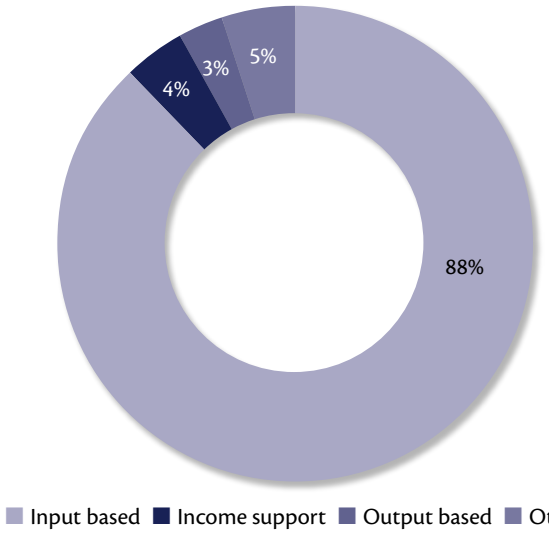
To support such goals, member states of the African Union committed in the Maputo Declaration in 2003 to increase their spending on agriculture and rural development to 10% of recurring national budgets.[11] That goal was based on the understanding that higher spending per capita at national levels is typically associated with better agricultural outcomes (proxied by technical efficiency).[12] By contrast, beyond a certain level of spending, the relationship becomes weaker, with a possible 'saturation' point.

Most African countries are today far from achieving the 2003 Maputo target. Few have met the 10% agriculture spending target, despite a renewed commitment in 2014 through the Malabo Declaration. Fiscal constraints, debt burdens, and competition for scarce resources within countries have all constrained progress. Today, Africa still spends less per capita on agriculture relative to other regions in the world.[12]

A study by the UN's Food and Agriculture Organization (FAO) in 2021 analysed available data on expenditure on food and agriculture in 13 SSA countries between 2004 and 2018, and estimated that 22% was provided directly to producers and 9% to consumers. In 2015, sub-Saharan Africa[ii] spent an estimated US$680 million on agricultural subsidies, in support of a sector that in 2016 contributed around US$291 billion to the continent's overall Gross Domestic Product (GDP).[13] Of this, support for input purchases (such as fertilisers) dominated (88%) while US$27 million (4%) was given as direct farm income, US$20 million (3%) as coupled support, and the remainder was declared as other payments to producers (see Figure 1).[12] In real terms, these are very low levels compared to OECD and some major non-OECD countries, which regularly spend more than US$200 billion per year on producer support, though they spend a much lower amount (around US$0.5 billion) on delivering public goods.[14] Also, there is contention regarding input subsidies and their beneficial effects to wealthier farmers, causing a widening gap between the rich and poor.[15, 16]

ii The countries included in this FAO report are: Mali, Burkina Faso, Senegal, Ghana, Benin, Ethiopia, Uganda, Rwanda, Burundi, Tanzania, Malawi, Mozambique, Kenya.

Figure 1. Distribution of farm payments



Nevertheless, the current expenditure of US$680 million in SSA offers a significant opportunity for refocusing and repurposing to promote better outcomes in terms of health and the environment and support for economic development. Moreover, if agricultural support were to be increased in line with the Malabo Declaration, there would be considerable scope to use additional funds for subsidies in order to achieve multiple objectives, including supporting nutrition goals across Africa through enhanced quality of local diets.

However, it is not just African subsidies that affect African agriculture. Subsidies in high-income countries (HICs) also have substantial effects on incentives and disincentives affecting African agriculture. For example, subsidies in high-income countries affect market prices for tradeable commodities and therefore influence the affordability of food and the incomes of African farmers. For this reason, one of the future scenarios for subsidies considered in Section 3 specifically considers the effect of changing subsidies in HICs on African agriculture.

2.2. A case for repurposing agricultural support, and subsidies in particular

Current global governmental support for agriculture (including subsidies) delivers low value for money as a way of helping farmers.[2] For every dollar of public support, the return to farmers has been estimated at just 35 cents, with the remaining expenditure used, for example, to support poor consumers (11%), public goods (17% – e.g., research and irrigation), and "green subsidies" (5%).[2] But some of the current support also incentivises global greenhouse gas (GHG) emissions,[2] with agriculture and land-use change globally responsible for 22% of the world's GHG emissions.[17] Subsidies typically support commodities such as staple grains or exportable cotton, which can have higher impacts on water use and land-use change, as well as supporting the intensity of production that can deplete soils. Without a shift in support policies, global GHG emissions could increase by 58%, and 56 million hectares would be converted to agricultural land between now and 2040.[2]

Some forms of agricultural support can also distort markets, especially when linked to the production of a specific commodity ('coupled subsidies').[18] If not appropriately designed, subsidies can also have adverse social consequences, and act against the health of populations through the foods they promote. This is in addition to driving environmental degradation, and negatively impacting climate change. When repurposing subsidies, it will be important to consider all effects and weigh possible trade-offs.[2, 19, 20, 21] Also, once in place, subsidies can be politically difficult to remove or change, which reinforces the importance of careful design and implementation from the outset.

Whether subsidies are needed at all is a legitimate policy question. For the purpose of comparison, on a global scale, modelling scenarios that consider the complete removal of agricultural subsidies[22] have found that it could be economically and environmentally beneficial. But the same study found that the removal of subsidies globally could reduce food output in net terms, thereby negatively impacting nutrition and health. This effect manifests in the modelling through a reduced supply of fruits and vegetables, nuts and seeds, and pulses.

Malawi provides an example of how repurposing subsidies can yield significant benefits in increasing farm incomes and ensuring more equitable benefits between male and female farmers (see Box 3, page 15). Also, other global simulation studies have demonstrated that positive outcomes are possible: e.g. when repurposing subsidies in favour of producing nutritious and sustainable foods such as fruits, vegetables, and nuts.[1, 23, 24] The global consumption of fruits and vegetables falls considerably short of that required for healthy diets. The mismatch is particularly acute in SSA and Africa more generally (see Box 2). Inadequate production of fruits and vegetables in SSA may help to explain one of the lowest consumption levels of fruits and vegetables worldwide.[24] However, lack of purchasing power, inadequate knowledge and poor access are also important contributing factors. The evidence shows that in poor regions with high historical and current levels of hunger and food insecurity, farmers will continue to focus on staple crops.[25]

> "Countries across Africa committed to transforming their food systems in the 2021 United Nations Food Systems Summit. Rethinking the level of agriculture subsidies, and where they are focused, presents a major opportunity to contribute to this vital agenda."
>
> **Rhoda Tumusiime,** Former Commissioner for Rural Economy and Agriculture, African Union Commission (AUC)

Box 2. Food consumption compared with dietary recommendations in Africa[26]

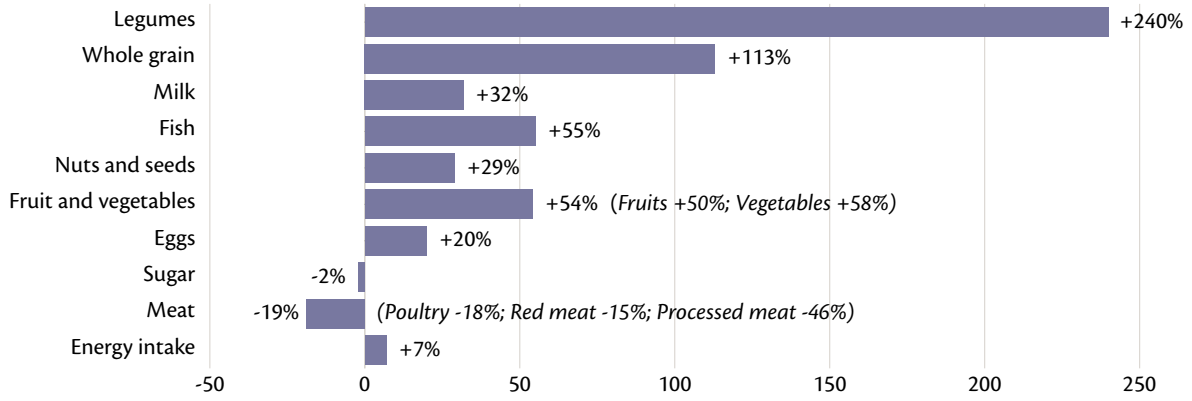
There is currently a substantial mismatch between what is consumed in regions and countries worldwide and what is recommended by local food-based dietary guidelines (FBDGs), with substantial implications in terms of dietary health and environmental health – and in the types of foods that are produced.

Figure 2 shows the percentage difference between recommendations from FBDGs and current intake by food group specifically for Africa[iii]. The comparison is based on recommended mean values. Positive values indicate that a dietary switch to conform with FBDGs would require a greater intake in the food category, and negative ones indicate lower intake a need to decrease intake.

The study on which this figure is based showed that adoption of national FBDGs could result in reductions in premature mortality of 15% on average (95% uncertainty interval 13% to 16%), but with mixed changes in environmental resource demand, including a reduction in greenhouse gas emissions of 13% on average (regional range −34% to 35%). However, when universally adopted globally, most of the national guidelines (83 of them, accounting for 98%) were not compatible with at least one of the global health and environmental targets. So, while many FBDGs could be improved regarding their intended health and environmental outcomes, better adherence to the existing FBDGs could yield substantial benefits.

In the case of sub-Saharan Africa, achieving these population- and environmental-health outcomes implies the need to substantially increase the consumption of, and therefore supply, availability, and affordability of specific food groups. This means, for example, a 240% increase in legumes, 113% in whole grains, and 54% in fruits and vegetables. It may also require actions to influence consumer behaviour regarding the types and balance of foods chosen. The repurposing of subsidies is one possible tool to achieve this.

Figure 2. Percentage difference between recommended intake and current intake, by food group in Africa



Source: This table has been amended from: Springmann M, Spajic L, Clark M A, Poore J, Herforth A, Webb P et al. The healthiness and sustainability of national and global food based dietary guidelines: modelling study *BMJ* 2020; 370 :m2322 doi:10.1136/bmj.m2322

Increasing their availability and affordability has both health and environmental benefits. This has been shown to be the case by epidemiological and lifecycle assessments, especially when the balance between fruits and vegetables and animal-based products such as meats and dairy is changed to a more optimum level.[27, 28, 29] However, as is typical for low-income countries, people in SSA spend most of their small food budget on relatively cheaper staples (grains and tubers), leaving little scope to purchase more expensive fruit and vegetables. The issue of the lack of affordability of healthy diets in many parts of the world is the subject of growing and deserved attention.[24] The high cost of nutrient-rich foods is partly due to low levels of output and significant loss and waste of foods after production, hence the importance of finding ways to support both greater output of these foods and greater purchasing power among poor households.[30]

iii The data presented in Figure 2 relates to a subset of African countries which have implemented Food Based Dietary Guidelines. These are: Benin, Seychelles, Kenya, Namibia, Nigeria, Sierra Leone, South Africa. For a more detailed explanation of how Figure 2 was produced, see the source which is cited for the figure.

However, 'multi-win' policy outcomes may be possible. For example, model simulations suggest that investments in innovations designed to lower emissions and raise productivity by 30% could reduce global emissions from agriculture and land use by more than 40%, returning 105 million hectares of agricultural land to natural habitats.[2] Incomes of farm workers would also increase, while farm employment would fall as part of structural economic transformation between now and 2040. At the same time, extreme global poverty would fall by 1%, while the cost of a healthy diet would drop by 18%.

It is important that the repurposing of agriculture subsidies be considered not in isolation but alongside other measures to transform food systems. For example, there is little point in incentivising the production of fruits and vegetables if consumers do not choose them in their food baskets or if they perish on their way to retail outlets. It would be vital to ensure that the increased availability of nutrient-rich foods be accompanied by measures to ensure the protection of products, the food safety of perishables, and income growth, as well as social protection measures to support consumer demand. Addressing food insecurity will also be important, as this would otherwise constrain people's ability to diversify their food choices.

There is a strong case to consider repurposing existing subsidies to ensure that agriculture better supports access to sustainable, healthy diets for all and promotes nature-positive impacts on the environment. However, repurposing needs to be done in a nuanced way to avoid pitfalls and unintended consequences. It also needs to be viewed in the context of more comprehensive measures to transform food systems. Section 3 discusses the results of commissioned modelling work which explores the net benefits to diets, health and the environment of a range of policy actions relating to subsidies.

2.3. The Malabo Declaration – the policy context

The 2014 Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods underlines the importance within the African Union of agriculture-led growth to address diverse policy agendas beyond farming. These include food and nutrition security targets and ending hunger in Africa by 2025. It also aims to halve poverty by 2025 by creating job opportunities for at least 30% of youth in the agricultural value chain. Facilitating entry and participation for women and youth is a particular priority.

In terms of the natural environment, the Declaration emphasises the need to promote 'sustainable and reliable' production, efficient and effective water management systems, and the halving of post-harvest losses (the latter could substantially improve the environmental footprint of food for the consumer). It also commits to reducing vulnerabilities of the livelihoods of populations through building the resilience of systems, particularly climate and weather-related risks. Arguably, the need to address environmental concerns has grown since 2014, particularly given droughts affecting the Horn of Africa and Sahelian regions.

Signatories are committed to increasing public support for agriculture (including subsidies as a subset) to 10% of government disbursements. They aim to accelerate agricultural growth by at least doubling the 2014 productivity levels by 2025, mainly through promoting efficiency and effectiveness. The Declaration also emphasises the need to ensure access to quality and affordable inputs (for crops, livestock, and fisheries, for example), as well as affordable energy, knowledge, information, and skills for farmers. However, the reality is that the majority of signatory states continue to deploy far less than 10% of public expenditure on support for agriculture. On average, the sub-Saharan African countries studied in this report spent around 6% of national budgets on food and agriculture. Malawi, Burkina Faso and Mali have been the only countries consistently meeting the 10% target.[31] Recent events such as the COVID-19 pandemic and the crisis in Ukraine have hindered countries from redressing this situation and getting back on track.

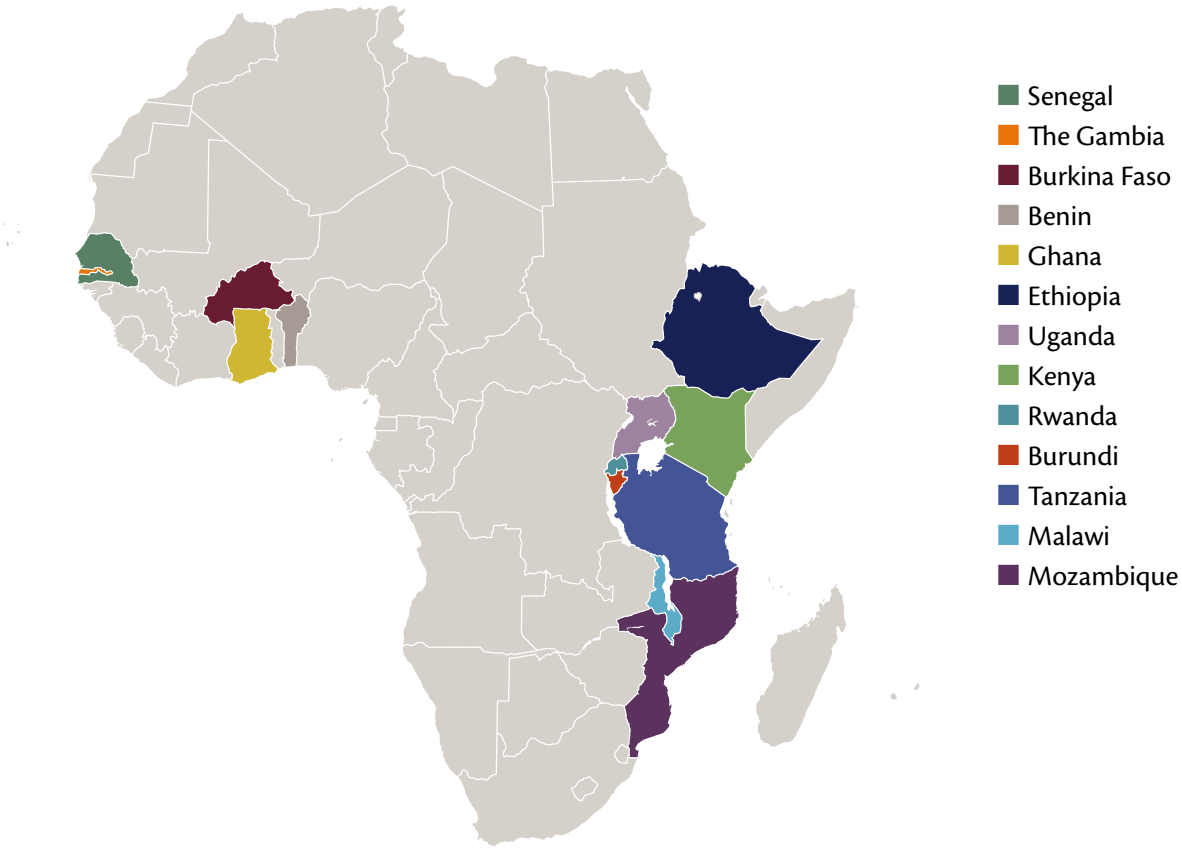
The Malabo Declaration (and the Maputo Declaration, which preceded it) shows that within Africa, agricultural support is not intended to further agriculture for its own sake but rather as a means of addressing diverse policy agendas. Therefore, the repurposing of subsidies to address concerns around nutritional health, the environment, and economic growth, is entirely consistent with these Declarations. It also raises a question for policymakers concerning the effectiveness of present agricultural support and subsidies, and whether agricultural subsidies might be repurposed to better deliver multiple benefits. Also, as and when support for agriculture is increased in line with the Declarations, the possibility of assigning some of those new funds to subsidies will arise.

3. New modelling

3.1. Scenarios considered in this paper

The results reported here used an integrated economic-environment-health modelling framework to assess several variants of agricultural subsidies in SSA (see Figure 3 for the countries modelled as 'SSA'). Four scenarios were considered. (Further details of the modelling and scenarios are provided in Annex A).

Figure 3. Countries in sub-Saharan Africa modelled as 'SSA' in the scenarios work (based on the availability of appropriate data).



> "A priority for future subsidies should be support for research and development in vegetable and fruits, and the development of supply chains using water-saving technologies. Both are vital to manage the trade-off between nutrition and environmental goals in the production of fruits and vegetables."
>
> **Shenggen Fan,** Chair Professor at the China Agricultural University, and former Director General, International Food Policy Research Institute (IFPRI)

Two scenarios were constructed in which subsidies in SSA were increased in accordance with the Malabo Declaration, which committed signatory governments to increasing agricultural spending (up to 10% of national spending) while the subsidy regime in all other parts of the world remained unchanged. It was assumed that the 10% ceiling for national agricultural spending is achieved, implying producer support of approximately US$6 billion across SSA. Within this scenario, two approaches (scenarios) were considered:

i. Subsidies are paid unconditionally to producers (**'MALABO-UNCONDITIONAL'**), and
ii. Subsidies are targeted to producers to grow food with beneficial health and environmental characteristics such as fruits, vegetables, legumes, and nuts (i.e. horticultural products) (**'MALABO-VEG&FRUIT'**).

Fruits, vegetables, legumes, and nuts were chosen as eligible for receiving subsidies as those foods are clearly linked to health benefits while having low environmental footprints such as GHG emissions, acidification, eutrophication and land use – especially when compared to animal-based foods.[32] In terms of nutritious foods, the disease endpoints included coronary heart disease, stroke, cancer, type-2 diabetes, and respiratory disease. In the remainder of this study, agricultural GHG emissions were the focus for the core environmental criteria, because GHG emissions, compared to other environmental impacts, are less modifiable by farm-level management and more by changes in the mix of production.[27]

For comparison and to study the current impacts of subsidies, the effects of eliminating subsidies in SSA were also modelled as a counterfactual (**'REMOVE-IN-AFRICA'**).

Possible changes in agricultural subsidies in countries outside of sub-Saharan Africa (high-income countries in particular) will also affect the continent. This is due to the influence on world market prices, which are often seen as particularly impacting LMICs and the poorest citizens. Therefore, the impacts of non-SSA countries eliminating their subsidies on SSA countries were considered in a fourth scenario (**'REMOVE-OUTSIDE-AFRICA'**).

4. Results

In the model simulations, the scenarios of agricultural subsidy reform in SSA differed in their agricultural, economic, health (affected by changes in diets), and environmental impacts (Table 1, Figures 4-6). Removing agricultural subsidies across all of SSA (‘**REMOVE-IN-AFRICA**’) showed modest results, with production, consumption, and economic indicators decreasing slightly and little change in health and environmental impacts.

Opposing effects were observed when OECD and major non-OECD countries abolished their agricultural support payments (**REMOVE-OUTSIDE-AFRICA**). Prices generally increased by reducing the availability of subsidised food on world markets. This reduced domestic consumption and increased the production of agricultural products in SSA. In turn, farm income and export revenues increased. The health impacts were nuanced as calories available for consumption decreased, and with it the consumption of nutritionally important foods, but also the proportion of overweight and obesity in the population.

The two variants of the Maputo scenarios led to more substantial impacts on production and consumption. Farm income and export revenues increased, but there was also environmental pressure. The variant with targeted subsidies (**MALABO-VEG&FRUIT**) delivered better health outcomes (compared with **MALABO-UNCONDITIONAL**) in terms of deaths avoided. While these numbers are small, they are indicative of much broader health implications – globally, the impacts of sub-optimal diets are now responsible for 20% of all disability-adjusted life years (DALYs).[33] Also, in the case of children, inadequate diets may cause lifelong effects on physical health and mental development (e.g. through stunting), and thereby affect wellbeing as well as future earnings and prosperity. On the other hand, the scenario with unconditional subsidies (**MALABO-UNCONDITIONAL**) delivered better environmental outcomes compared with **MALABO-VEG&FRUIT**. The relatively larger environmental footprints when subsidies target horticultural production result from the relatively larger water and land use of horticultural products compared to staples. But as horticulture is substituting some methane-intensive cattle ranching in this scenario, it will also lead to less GHG emissions. The significance of the increased use of water will, however, depend on local circumstances, such as whether a country is already water-scarce and whether the increased use would be sustainable; whether it would lead to increased pollution; and whether it would affect the ecological system.

Although there is a large increase in horticultural exports in the **MALABO-VEG&FRUIT** scenario, the estimated total agri-food export values are lower than in the **MALABO-UNCONDITIONAL** scenario. This is because in order to increase horticultural output, the production and exports of other high-value crops such as cocoa and coffee may have to decrease due to competition for land and water.

Table 1: Production changes by scenario, in thousand metric tonnes

	REMOVE-IN-AFRICA	REMOVE-OUTSIDE-AFRICA	MALABO-UNCONDITIONAL	MALABO-VEG & FRUIT
Wheat	-23	149	181	-160
Other grain	-88	-118	796	-942
Horticulture	-453	-125	3,607	18,269
Oilseed	-74	155	317	-260
Sugar	-90	-44	394	-522
Other crops	-61	367	342	-257
Cattle	-2	6	27	-36
Pigs and poultry	-4	9	25	-46
Milk	2	18	106	-215
Plant fibres	-8	27	36	-29
Wool	-1	0	0	-1
Total	**-801**	**444**	**5,832**	**15,800**

Figure 4. Changes in economic outcomes by scenario, in million US$. The indicators include income in the agricultural sector (sector income) and revenues from agricultural exports (export revenue).

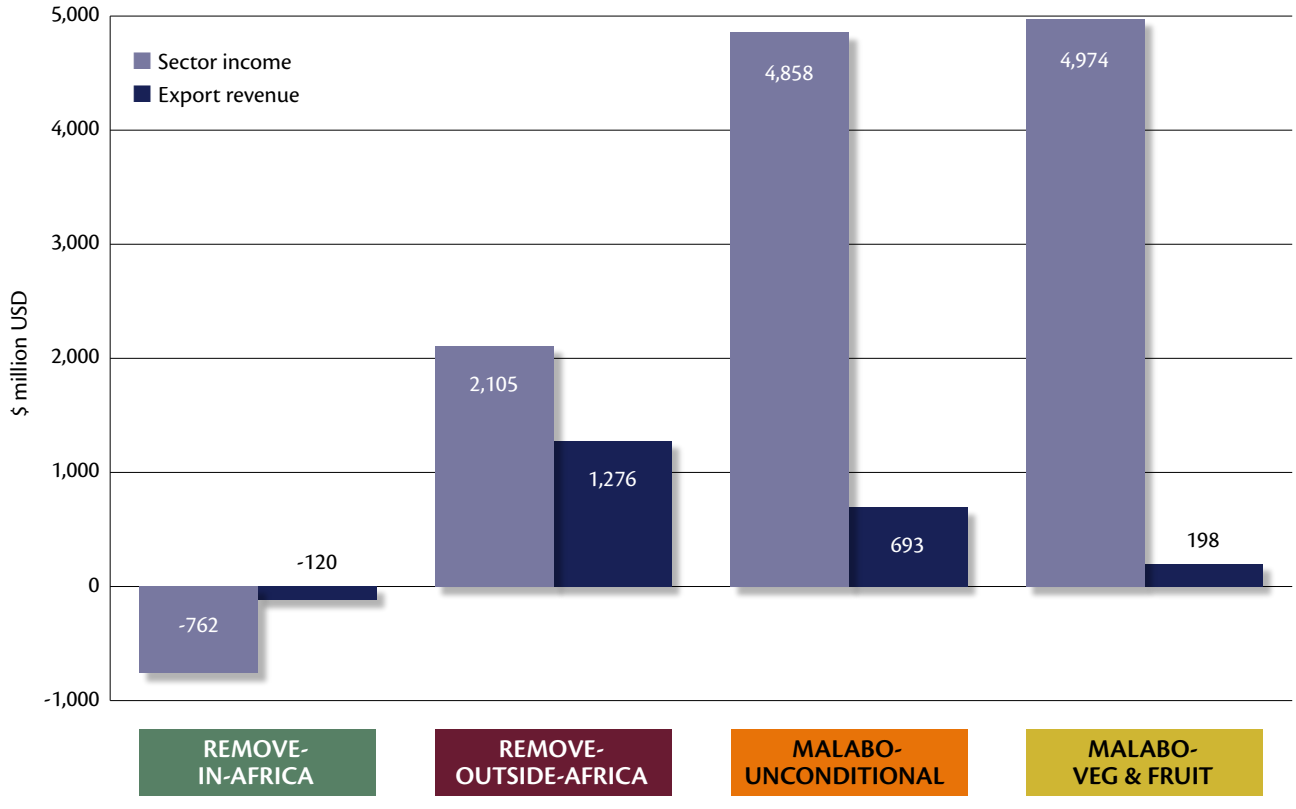
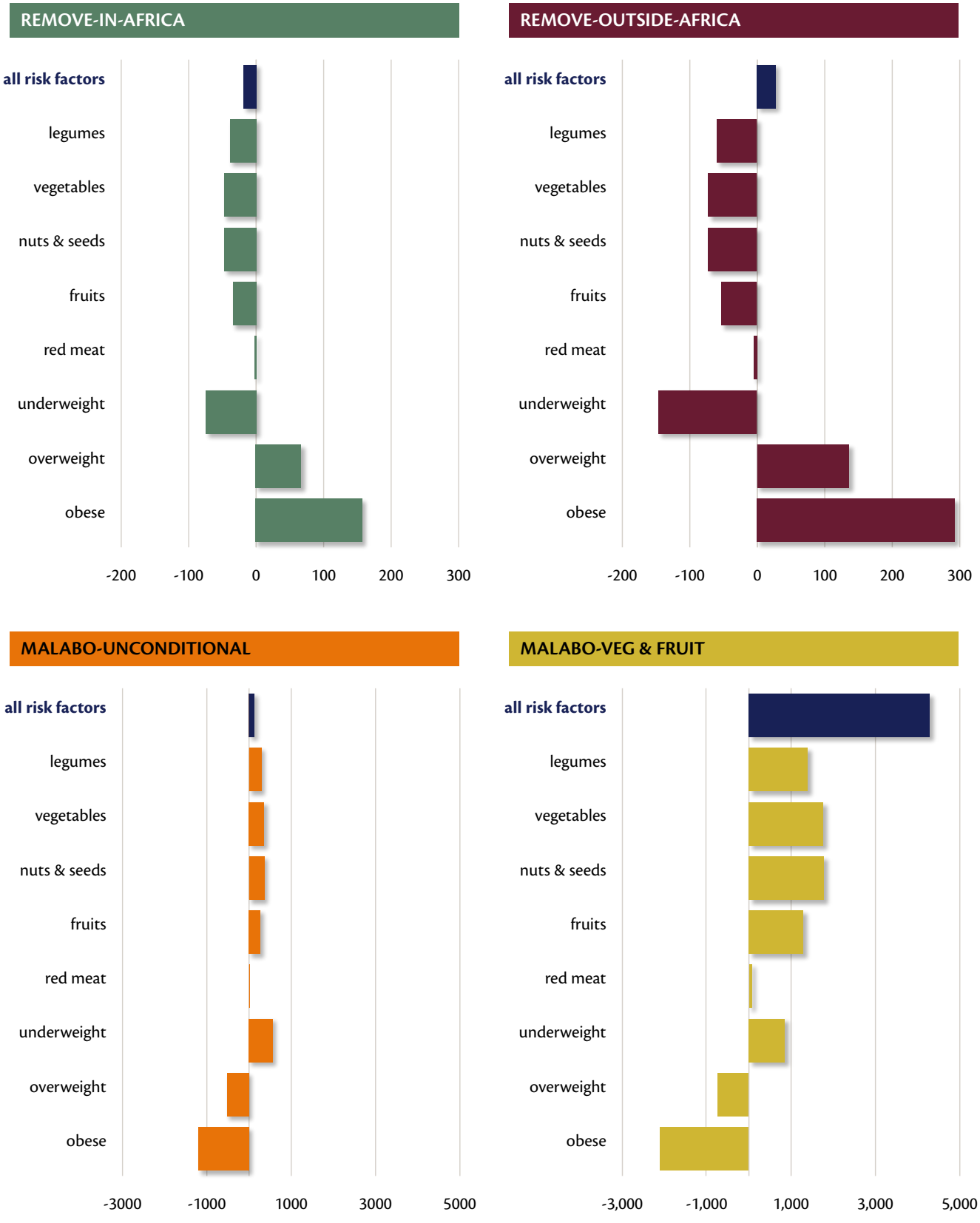


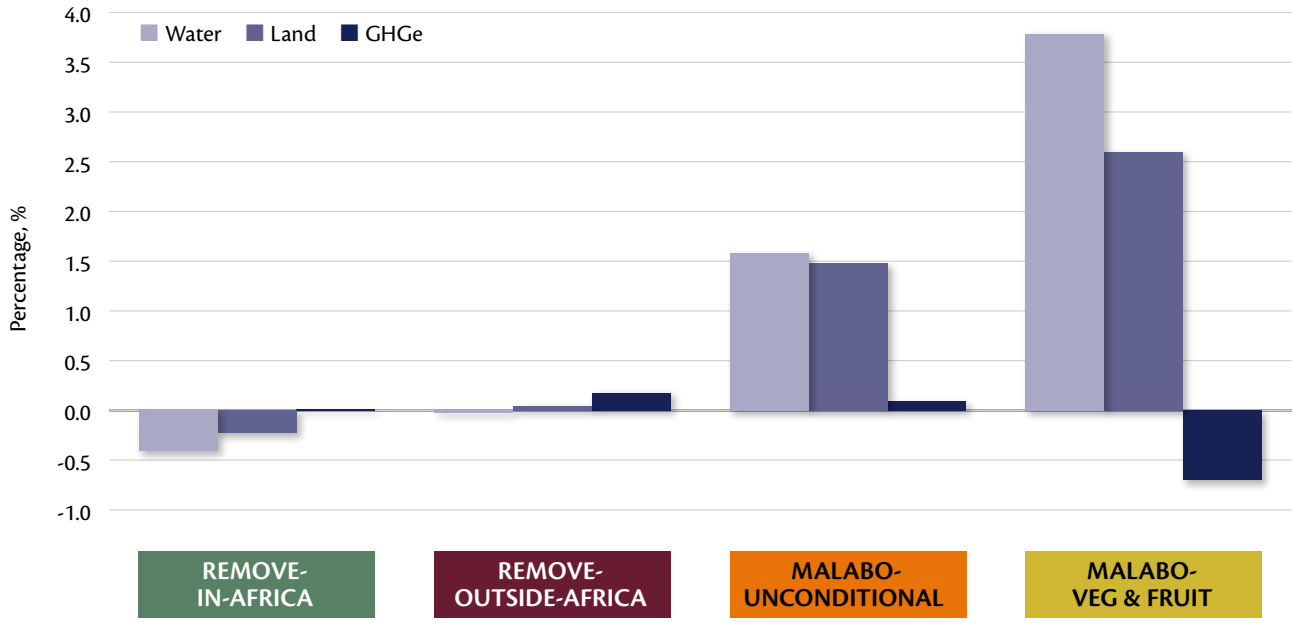
Figure 5. Numbers of deaths avoided by scenario and risk factor*

Note, x-scales vary – please refer to the numbers below each chart.



° Risk factors include low consumption of fruits, vegetables, legumes, and nuts and seeds, and high consumption of red meat, and being overweight, overweight, or obese. In the legend, 'all risk factors' means the combined impacts of changes in all risk factors.

Figure 6. Changes in environmental indicators by scenario, in %. The indicators include agricultural greenhouse gas emissions (GHGe – including methane and nitrous oxide), as well as freshwater use (water), and cropland use (land).



These results suggest several conclusions. First, although the current level of producer support has some economic benefits for farms, the impacts are rather small. Second, if other countries were to remove their subsidies, the impacts would be larger compared to current subsidy payments: production increases due to higher world market prices and imports into SSA decrease accordingly, while the diet-related health effects are small.

Third, increasing agricultural spending to approximately US$6 billion leads to much larger income gains and slightly negative environmental outcomes. Fourth, coupling the US$6 billion to the production of nutritious and relatively sustainable horticultural products could achieve improvements in dietary health and mortality whilst still creating considerable income gains.

Box 3. Can subsidies promote better gender equality? A case study from Malawi

Agriculture is a significant source of employment for women in Africa, with nearly 60% of the female workforce in the sub-Saharan region being employed by the sector.[34] While women are well-represented in the agriculture sector, female farmers, on average, have a lower rate of productivity than male farmers.[35] Agricultural productivity is defined by measures of output per unit of a single input – with gender gaps in productivity being considerable, reaching nearly 30% in Malawi. This is primarily due to inequitable access to agricultural inputs, including labour, high-yield crops, pesticides, and fertiliser. The allocation of pesticides and fertiliser, which are more accessible to male farmers, means that women tend to rely on organic fertilisers, which contributes to lower agricultural productivity.

Achieving food self-sufficiency at the national level is a high priority for the government of Malawi. In 2005, Malawi introduced the Farm Input Subsidy Program (FISP), which distributes vouchers to poor agricultural households. The goal of FISP is to enhance food self-sufficiency by increasing smallholder farmers' access to and use of improved agricultural inputs, thereby boosting the incomes of resource-poor farmers.

One of the outcomes of this programme has been to narrow the gap in agricultural productivity between male and female farmers. Studies of the programme have shown that receipt of subsidised seed and fertiliser coupons had no discernible effect on male farmers but positively influenced modern maize adoption by female households. While gender inequalities have not been eliminated, the FISP programme has helped to address them.

The message from Malawi is that subsidy programmes, when accessible to those who need them, can positively influence the production of food and address gender inequalities in the agricultural sector.

5. Conclusions

The results of new modelling presented in this paper demonstrate a case for Africa's policymakers to consider repurposing existing subsidies, and even to increase the overall level of subsidies provided. The latter should be a key consideration in the coming years as countries deliver on their commitments in the Maputo and Malabo Declarations (2003 and 2014, respectively) to increase the proportion of national expenditure spent on agriculture to 10%. Increasing the level of subsidies provided is an option for policymakers in their national commitments to the continent-wide declarations, while directing those subsidies towards the production of nutrient-rich foods would support national pathway commitments made at the UN Food Systems Summit in 2021.

The case for change is strong. Subsidies in SSA are driving greenhouse gas emissions and encourage agricultural practices that degrade natural environments already under increasing stress. Today's subsidies also fail to deliver healthy diets for countless millions in Africa. This situation is unsustainable.[2]

All of the results presented in this paper are aggregated at the regional level, and will require careful interpretation for individual countries. In particular, further case studies would help to expose the differences, not least as natural resources (e.g. relating to water, land and biodiversity) can vary widely between African countries. However, the broad conclusion is that repurposing subsidies has the potential to play an important role as part of broader efforts to improve diets and dietary diversity, promote positive environmental outcomes, and economic growth (including through jobs in the food system). It could contribute to rebalancing the mix of foods produced in sub-Saharan Africa, recognising that overall, the foods currently produced do not adequately map onto the nutritional needs of Africa's populations. And repurposing could also better promote food security, although measures to promote food security at a national level may be very different to those appropriate to smaller scales, for example at the level of individual farms and farmers.

The critical importance of delivering on all of these agendas has been heightened by the fallout from the current constellation of crises affecting all countries – including climate change and biodiversity loss, COVID-19, and the conflict in Ukraine. However, repurposing subsidies could also generate more widely-shared benefits, not only for farmers but also for local consumers; in particular, diversification of local production could promote access to diets that are more diverse and healthier. For example, it could be used to promote greater equality between male and female farmers: in some countries, female farmers have inequitable access to agricultural inputs, including labour, high-yield crops, pesticides, and fertiliser.

However, while there is a case to consider increasing subsidies, there may be diminishing returns beyond a certain point, past which expenditure increases have limited or even negative effects on agricultural efficiency. Also, repurposing subsidies needs to be done sensitively as this may involve trade-offs across different policy agendas (e.g., health, environment, economic outcomes). For example, there may be trade-offs between subsidy reforms that specifically benefit the environment and those targeted at economic prosperity.[2] Also, it will be important to tackle likely trade-offs between nutrition priorities and environmental targets when promoting higher production of fruits and vegetables. In this respect, a future investment priority should be research and development in vegetables and fruits and the development of supply chains using water saving technologies such as solar-powered irrigation.

A nuanced approach informed by the best science, evidence and data is essential to engender confidence and success in policy changes. This could be especially important when policy changes are made against a background of powerful vested interests resistant to change. Also, the modelling presented here is at a very aggregated level and choices will need to be conditioned by local circumstances and priorities. For example, the results showed that substantially scaling up subsides in SSA (tenfold to US$ 6 billion) would create large income gains. But it is important to consider how increased subsidies are targeted in terms of health versus the environment. For example, coupling the additional subsidies specifically in favour of producing nutrient-rich and relatively sustainable horticultural products could yield better health benefits but be worse for the environment compared with untargeted subsidies. The way in which policies are implemented will also be important. Even well-designed policies can have unintended consequences through the way that they are implemented, particularly at the grass roots level.[36]

Repurposing subsidies will not be a panacea. Any shift in policy towards repurposing and enhancing subsidy regimes in Africa will need to be carefully integrated with actions in other parts of food systems to achieve a coherent approach. For example, the impact of repurposing subsidies to encourage the production of nutrient-rich foods could be hampered by the absence of consumer demand. Measures to influence consumer demand, such as rebalancing relative food prices in favour of nutrient-rich foods rather than sugar-sweetened processed products, regulating the advertising of unhealthy foods to children, or public education, should work in concert with repurposed subsidies. More generally, it may also be necessary to promote accompanying measures to facilitate broad-based agricultural development, such as investments in infrastructure, rural finance, and value chain efficiencies available to women and men.

Because national food systems typically operate within networks of regional and transcontinental trade and supply chains, it makes sense to repurpose subsidies alongside other countries rather than in isolation. The biggest gains are likely to accrue through a coordinated effort of multiple countries to reset their policies based on competitive advantage and national priorities.[2]

Finally, changes to subsidies in countries beyond Africa could have important impacts on African farmers and consumers. For example, removing subsidies in HICs would likely result in increased production in those countries due to higher world market prices, leading to a decrease in imports into SSA. It will be important for African countries to monitor how countries in other regions of the world repurpose their own subsidies.

Annex A. Details of the Modelling Approach

A combined economic-environment-health modelling framework was used. The economic effects are derived from MAGNET, a computable general equilibrium model with agricultural detail.[37] The model also includes industrial and service sectors besides agriculture. The diet-related health effects are computed with a comparative risk assessment model.[38] The health model included eight diet and weight-related risk factors, including changes in the consumption of fruits, vegetables, legumes, nuts and seeds, and red meat, as well as being underweight, overweight, and obese. The disease endpoints included coronary heart disease, stroke, cancer, type-2 diabetes, and respiratory disease. Relative risk estimates relate changes in risk factors to changes in disease mortality from meta-analyses of prospective cohort studies, to minimise bias from individual studies. A more detailed description of the methods can be found in Springmann & Freund (2022).[1]

The base year of the database for the economic model is 2011.[39] Projections were used from USDA for key drivers such as gross domestic product and population to project the model's economic parameters to 2023.[40] The database was further updated to include producer support data in SSA and the most recent information on producer support estimates as provided by the OECD-PSE database.

The model aggregation includes, besides SSA, all regions for which information on domestic support payments is available in the GTAP database, which corresponds to the information made available by the OECD for specific regions/countries. The remaining countries are grouped into appropriate aggregates (Supplementary Table A.1). The sectoral aggregation includes 34 different products (Supplementary Table A.2), with agricultural products represented as explicitly as possible given the data provided by GTAP. The 26 agricultural sectors include primary agriculture, such as animal husbandry, wheat production, and raw milk, processing sectors, such as meat production and dairy, and sectors for bio energy (biodiesel and bioethanol). The remaining manufacturing and service sectors were aggregated into one aggregate each, in line with the agricultural focus of the analysis.

Several options for reform were considered. Those include increasing subsidies in accordance with the Maputo and Malabo declarations in which governments committed to increasing spending for agriculture (up to 10% of national spending). In the latter, it was assumed that the 10% ceiling for national spending on agriculture is achieved, which, as a consequence, would imply producer support of approximately US$6 billion. Within this scenario, two approaches were considered: (i) subsidies are paid unconditionally (**MALABO-UNCONDITIONAL**), and (ii) subsidies are targeted to grow food with beneficial health and environmental characteristics such as fruits, vegetables, legumes, and nuts (**MALABO-VEG&FRUIT**). For comparison and to study the current impacts of subsidies, the impacts of eliminating subsidies in SSA were also modelled as a counterfactual (**REMOVE-IN-AFRICA**). Lastly, the impacts of other countries eliminating their subsidies were considered (**REMOVE-OUTSIDE-AFRICA**).

Supplementary Table A.1. Regional aggregation

Region	Countries
EU-28	Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Spain, Slovakia, Slovenia, Sweden, United Kingdom
Switzerland	Switzerland
Norway	Norway
Rest of EFTA	Iceland, Liechtenstein
Ukraine	Ukraine
Turkey	Turkey
Russia	Russia
Kazakhstan	Kazakhstan
Israel	Israel
USA	USA
Canada	Canada
Australia	Australia
New Zealand	New Zealand
Mexico	Mexico
Brazil	Brazil
Chile	Chile
Japan	Japan
Korea	Korea
China	China
Indonesia	Indonesia
South Africa	South Africa
sub-Saharan Africa	Benin, Burkina Faso, Burundi, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Rwanda, Senegal, Tanzania, Uganda
Rest of Central Asia	Armenia, Azerbaijan, Georgia, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan
Middle East and North Africa (MENA)	United Arab Emirates, Bahrain, Egypt, Iran, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Algeria, Libya, Western Sahara, Afghanistan, Bhutan, Maldives
Rest of Asia	Bangladesh, Brunei Darassalam, India, Cambodia, Lao, Sri Lanka, Malaysia, Nepal, Pakistan, Philippines, Singapore, Thailand, Viet Nam, Democratic People's Republic of Korea, Macao, Myanmar, Timor-Leste
Rest of Latin America and the Caribbean	Argentina, Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Nicaragua, Panama, Peru, Puerto Rico, Paraguay, El Salvador, Trinidad and Tobago, Uruguay, Venezuela, Falkland Islands, French Guiana, Guyana, Suriname, Belize, Anguilla, Antigua and Barbados, Aruba, Bahamas, Barbados, British Virgin Islands, Cayman Islands, Cuba, Dominica, Grenada, Haiti, Montserrat, Netherlands Antilles, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and Grenadines, Turks and Caicos Islands, US Virgin Islands
Rest of Africa	Botswana, Cote d'Ivoire, Cameroon, Guinea, Madagascar, Mauritius, Namibia, Nigeria, Togo, Zambia, Zimbabwe, Cape Verde, Gambia, Guinea-Bissau, Liberia, Mali, Mauretania, Niger, Saint Helena, Sierra Leone, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, Sao Tome and Principe, Angola, the Democratic Republic of the Congo, Burundi, Comoros, Djibouti, Eritrea, Mayotte, Seychelles, Somalia, Sudan, Lesotho, Swaziland
Rest of World	Other Countries

Supplementary Table A.2. Sectoral aggregation

MAGNET aggregate	GTAP sectors	Description
wht	wht	Wheat
gro	gro	Other Cereals and Grains
v_f	v_f	Vegetables and Fruits
osd	osd	Oil Seeds
c_b	c_b	Sugar Cane and Sugar Beet
pcr	pdr, pcr	Rice
pfb	pfb	Plant based Fibers
oilcake	–	Oilcake
ddgs	–	DDGS
feed	–	Processed Animal Feed
ocr	ocr	Other Crops
ctl	ctl	Cattle, Sheep, Goats, Horses
oap	oap	Pig and Poultry
wol	wol	Wool
rmk	rmk	Raw Milk
cmt	cmt	Meat: Cattle, Sheep, Goats, Horses
omt	omt	Meat: Pig and Poultry and Eggs
vol	vol	Vegetable Oils and Fats
mil	mil	Dairy Products
sgr	sgr	Sugar
ofd	ofd	Food Products
b_t	b_t	Beverages and Tobaccos
fsh	fsh	Forestry
frs	frs	Fishing
biod	–	Biodiesel
biog	–	Biogas
coa	coa	Coal
oil	oil	Crude Oil
gas	gas	Gas
p_c	p_c	Petroleum, Coal Products
ely	ely	Electricity
crp	crp	Chemical Industry
MNFC	ele, fmp, i_s, lea, lum, mvh, nfm, nmm, ome, omf, omn, otn, ppp, tex, wap,	Manufacturing
SEVCS	atp, cmn, cns, dwe, gdt, isr, obs, ofi, osg, otp, ros, trd, wtp, wtr	Services

Note: Sectors with "–" are not part of the GTAP data base and are MAGNET specific sectors. For a detailed sector description consult https://www.gtap.agecon.purdue.edu/databases/contribute/detailedsector.asp

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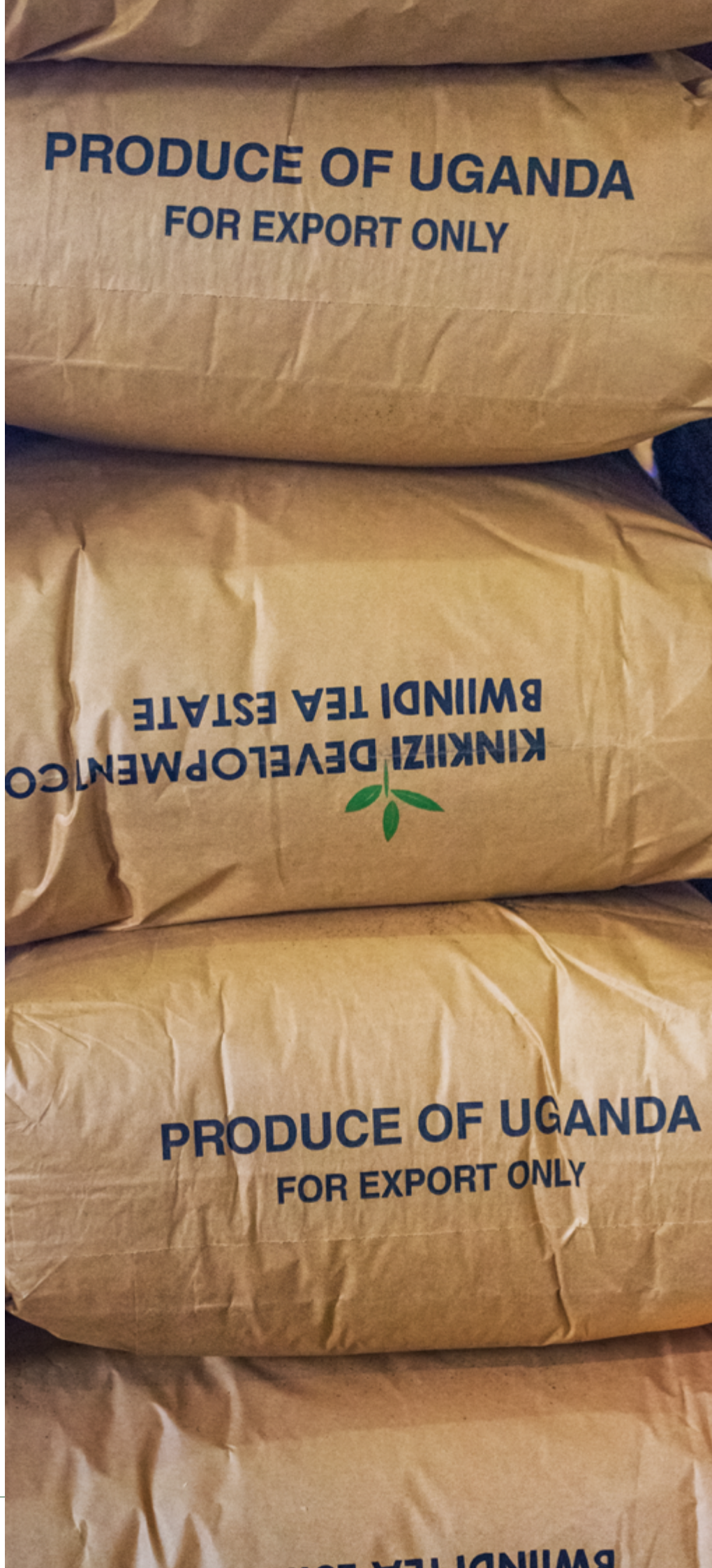

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