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NOTES

Agricultural Producer Subsidies

Navigating Challenges and Policy Considerations

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Agricultural producer subsidies are prevalent, large, and deployed to achieve diverse and, at times, overlapping policy objectives. Among countries accounting for 90 percent of global GDP, food and agriculture subsidies amount to 0.3–0.7 percent of GDP over the past decade and a half. More than half of total government support to the food and agriculture sector goes to agricultural producer subsidies, and only a quarter is dedicated to support for public goods in the sector. Farmer subsidies were used by many governments in response to rising global food prices stoked by Russia's invasion of Ukraine. Often motivated by the need to mitigate information problems and risks for farmers, key objectives for subsidies could include improving food access and availability, reducing import dependence, stabilizing prices, boosting returns on farmers' investments, stimulating rural economic development, and sustaining competitiveness. These objectives can have conflicting implications for the design of subsidy programs. As they tend to affect meaningful swaths of the electorate, subsidies can also be an attractive political instrument.

Agricultural producer subsidies can be inefficient and harmful to the environment. By artificially lowering production costs or assuring higher output prices, direct support measures can result in resource misallocation. In instances where they fail to address market failures, such as imperfect information about the returns to fertilizers, subsidies can result in deadweight losses. Subsidies can contribute to fertilizer overuse, harming the environment and the agricultural sector in the long term. Furthermore, agricultural production subsidies are often fiscally costly and unfavorable compared to alternative uses of public funds—both within the agricultural sector and outside it—to achieve the same ends.

Various design and implementation challenges amplify the shortcomings of producer subsidy programs. Numerous inefficiencies arising from design and operational failures result in farmers attaining significantly lower yield responses with subsidized inputs compared to potential yields. Prominent among these are delays in delivering inputs to farmers and inadequacies in tailoring the size and composition of input packages to match specific requirements of crops, land size, and soil conditions. In addition, challenges related to mistargeting of beneficiaries, high administrative costs arising from low capacity, and leakages are quite common.

Targeting producer subsidies can help improve efficiency and equity and lower fiscal cost. Input subsidies are more suitable for targeting than output price support programs. However, even in the case of input subsidies, targeting may require compromising on some objectives. For example, moving from an untargeted to a targeted program may align with the food security objective, but it may conflict with the objective of promoting agricultural growth. Another area that gives rise to a trade-off between objectives is related to program beneficiaries. For example, small farmers are more

likely to face food insecurity than nonpoor commercial farmers whose returns on inputs may be higher. However, more targeting comes also at a higher administrative cost.

The implementation of agricultural subsidies should be consistent with the World Trade Organization (WTO) rules. These rules are laid out in the joint International Monetary Fund (IMF), Organisation for Economic Co-operation and Development (OECD), World Bank, and the WTO report on subsidies and trade (IMF and others 2022). Trade- or production-distorting effects need to be avoided. Where measures do distort production and trade, they should be limited and not exceed WTO limits. Measures should be implemented transparently, including timely notification of agricultural domestic support measures to the WTO. Countries should support multilateral cooperation in advancing negotiations on agricultural reforms at the WTO, including new rules on domestic support and public stockholding for food security purposes.

The design and sequencing of reforms to remove agricultural subsidies should be attentive to the need for systems that can ensure efficient marketing and distribution of agricultural inputs and outputs. Lessons can be drawn in this regard from past initiatives to eliminate producer subsidies—including those from the 1980s and 1990s, during which market systems and private sector agents, such as agricultural input retailers and distributors, did not always emerge to step into the void. Carefully designed structural reforms should therefore accompany gradual subsidy phaseout to enable private delivery systems to meet farmers' demands.

Introduction

This paper explores key dimensions of agricultural producer subsidies, given their prevalence and size. Spikes in agricultural input and output prices—as during the global food price crisis of 2008–09, in the pandemic years, and in the wake of the Russian invasion of Ukraine—have triggered dramatic changes in governments' spending on agricultural producer subsidies. In turn, such subsidies have had macroeconomic impacts, often creating a sizable fiscal burden. This warrants an examination of the policy objectives that motivate their use, their scope and size, their economic impact, and the factors that drive their relative success and failure. The note also seeks to provide an overview of the considerations in formulating policy toward subsidies and gives pointers to alternative expenditure policy measures that may contribute to the goals referenced as justification for subsidy programs.

The paper's outline is as follows: This section provides a broad context for the topic and describes what is meant by "agricultural producer subsidies." The following section provides an empirical overview of the size and scope of food and agriculture subsidies globally and by country group. The section "Intended Benefits and Actual Limitations of Producer Subsidies" discusses the most common policy objectives that motivate the use of such measures and sets these against an examination of efficiency, distributional, and environmental/climate consequences of these programs, including their international spillovers, before summarizing alternative measures that may more effectively serve the stated policy goals. A brief foray into political economy factors is also presented, as well as their implications for the staying power of subsidy programs. The section "The Conceptual Argument for Agricultural Subsidies and the Underlying Assumptions" introduces the economic logic of farm input and output subsidies and key features of their operation, providing a window into their fiscal and social costs. The opportunities and modalities of

targeting producer subsidies are explored in the section "Targeting Producer Subsidies: Opportunities and Constraints," and important constraints emanating from the way they are designed and implemented feature in the section "The Design and Implementation of Agricultural Producer Subsidies." The final section centers on policy considerations for agricultural producer subsidies.

Global commodity price shocks—a common trigger of agricultural subsidies—have an uneven effect on different categories of farmers. While *commercially oriented farmers* will face higher production costs from rising farm input prices, this increase in costs may be partially compensated by the increased crop output prices. For such producers, it is not only price increases but also volatility in prices that affect whether their farming will be profitable (Timmer 2015). *Subsistence-oriented farmers*, however, may be unable to afford all the commercial inputs they require to produce sufficient food to meet their consumption needs. They may resort to diverse coping mechanisms, including reducing food intake or selling productive assets, which compromise their future productivity. For those farmers who are *net food buyers* and use incomes from cash crops or nonfarming activity to buy food, the rise in food prices represents a significant risk, as they rely on the market to meet their food needs. Many farmers in low- and middle-income countries fall into the latter two categories.[1]

Direct support to farmers is commonly used by governments to shield producers from rising input costs.[2] Such direct support[3] may be provided in the form of subsidies to cover not only part of agricultural producers' costs for inputs, particularly fertilizer and improved seeds, but also pesticides (especially for cash crops), animal feed, water for irrigation, farming equipment,[4] and electricity and fuel for agricultural machinery and infrastructure. Subsidies also come in the form of output price support to raise the prices that farmers receive for their crops and livestock. Besides subsidy expenditures, other forms of public intervention to the food and agriculture sector are food subsidies to consumers; spending with a public-goods character that provide broad-based benefits rather than serving as transfers to individual agents, such as on agricultural research and development (R&D); price controls; and intervention through other fiscal and non-fiscal measures, such as taxation of domestic food, and, commonly, VAT concessions on agricultural products, which may have similar effects as output price subsidies. Figure 1 provides a structure and taxonomy of these forms of public intervention. In this paper, we mainly focus on expenditure programs of direct support to producers (red category in Figure 1).[5]

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[1] Systematic, up-to-date, and global data on the share of farmers falling into these three categories is scarce. From 500 million smallholder farm households in low- and middle-income countries a decade ago, about 300 million primarily consume their farm output, selling only a small share of it (Christen and Anderson 2013). Country studies provide further indication that in many agrarian contexts, a large share of farm households are net food buyers, and few are commercialized. For example, only a minority of smallholders in Ghana, Tanzania, and Ethiopia (38, 29, and 11 percent, respectively) sell more than half of their crop production (Hazell and others 2017). However, many of these farmers also rely on nonfarm rural employment for cash income. For example, in Malawi, merely less than a third of the total annual net income of farming households is accounted for by agricultural income (which includes the value of own farm production consumed) (Benson and De Weerdt 2023). In that country—a highly agricultural economy in which 79 percent of all households operate their own farm—only 11 percent of these are commercial, that is, sell most of their production (Gordeev 2022). In fact, half of Malawian farm households produce less than 17 percent of the calories they consume, and merely a quarter produce more than 76 percent of their caloric consumption.

[2] As shown in Figure 1, "direct support" refers to fiscal subsidies to producers as well as price incentives. As the paper focuses on the former, we refer to subsidies when using the term "direct support," unless it is apparent from the context that the reference is to both fiscal and non-fiscal direct support.

[3] Subsidies on electricity and fuel as an input to agricultural production are more commonly seen in emerging market and middle-income economies and in advanced economies, for example, in Belgium, Belize, Estonia, Poland, Slovenia, and Spain, among others. Subsidies on electricity are associated with large-scale irrigated farming, while those on fuel and agricultural machinery with a significant mechanized agricultural sector.

[4] In Moldova, for example, since 2012, nearly all producer subsidies have been for fixed capital formation (Herzfeld, Lucasenco, and Zvyagintsev 2022).

[5] In a forthcoming companion paper, we provide an overview of food subsidies to consumers and other food assistance spending.

Figure 1. Categories of Public Intervention in the Agriculture and Food Sector

Direct Support to Agricultural Producers (Nominal Rate of Assistance)				
PRICE INCENTIVES TO AGRICULTURE	**PUBLIC EXPENDITURES IN THE FOOD/AGRICULTURE SECTOR**			**OTHER FISCAL/NON-FISCAL SUPPORT TO AGRICULTURE**
(Nominal Rate of Protection)	**Subsidies to Producers**	**Subsidies to Intermediary Agents and Consumers**	**Public Goods Spending**	▪ Taxation of domestic food ▪ Legislation (for example, on marketing, fortification, etc.) ▪ Regulations (for example, on land use, etc.) ▪ Subsidized interest rates, insurance, directed credit
▪ Market price control ▪ Import tariffs/quotas ▪ Export taxes/bans/subsidies	▪ Input subsidies ▪ Output subsidies ▪ Subsidies based on land, labour, machinery, etc. ▪ Other subsidies	▪ Direct food distribution ▪ Food subsidies ▪ Food vouchers ▪ Food-security oriented cash transfers ▪ Subsidies to intermediary agents	▪ Agricultural R&D ▪ Infrastructure (for example, irrigation) ▪ Market information ▪ Inspection and quality control ▪ Public stockholding	

Source: Authors' adaptation from FAO and others (2022).

Size and Scope of Agricultural Producer Subsidies

Globally, more than half of total government support to the food and agriculture sector goes to agricultural producer subsidies. During 2013–18, among 89 countries, 57 percent of government support to food and agriculture was allocated as subsidies to farmers (FAO and others 2022). Only a quarter is dedicated to support for public goods in the sector, with the remaining 17 percent flowing to food-related subsidies to consumers (Figure 2a). The largest share of agricultural producer subsidies is provided in the form of input support (38 percent) and subsidies connected to other factors of production, such as based on the amount of land under cultivation (30 percent) (Figure 2b). Twenty-eight percent of producer subsidies, such as lump-sum payments to all farmers and subsidies tied to environmental outcomes, are decoupled from production. Only about 4 percent of producer subsidies take the form of output price support.[6]

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[6] After the surge in global food prices because of Russia's invasion of Ukraine, more than half of governments globally—and 40, 18, and 31 percent of AEs, EMEs, and LIDCs, respectively—provided new fiscal or non-fiscal support to the food and agriculture sector (Amaglobeli and others 2023). It should be noted, however, that this does not necessarily stand in contrast to the above-mentioned allocations in prior years, as the available statistic is based on a survey of government measure that captures the number of countries providing support, not the size of this support.

Figure 2. Fiscal Support to the Food and Agriculture Sector (US$ Billion, Annual Average for 2013–18)

a. Components of Overall Fiscal Support
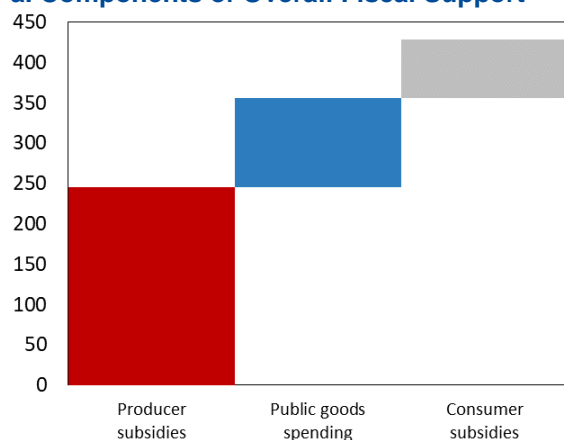
b. Modalities of Agricultural Producer Subsidies
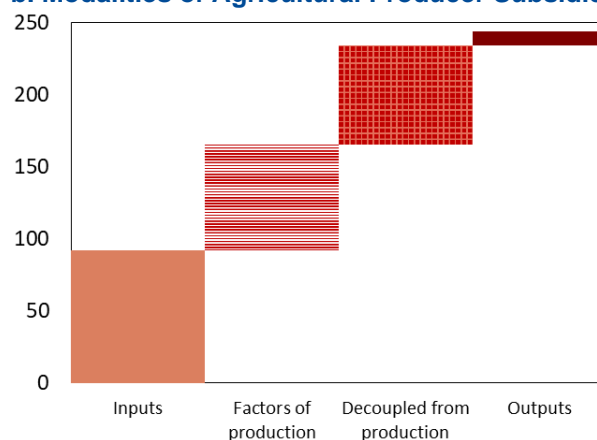
Source: Authors' calculations based on FAO and others (2022).

A long-term modest decline in food and agriculture subsidies has been interrupted by spikes during global shocks. Based on a country-level, 18-year panel dataset (comprising close to 90 percent of global GDP), we find that, globally, food and agriculture subsidies in the form of input subsidies and direct monetary transfers on the basis of outputs and other factors were between 0.32 and 0.43 percent of GDP over time (Figure 3a). However, when considering all explicit and implicit subsidies emanating from domestic and border policies, global direct support amounts to between 0.35 and 0.68 percent of GDP (Figure 3b).[7] Subsidies spiked during the global food price shock in 2009 and again during COVID-19 in 2020. Emerging market economies (EMEs, not including European Union [EU] countries) provided far greater amounts (as a share of their GDP) of input, food, explicit output, and other subsidies to the sector than advanced economies (AEs) and low-income developing countries (LIDCs), reaching 0.7 percent of GDP during the food price spike over a decade and a half ago.[8] Explicit and implicit subsidies combined have been volatile and on an upward long-term trend EMEs (without EU), while these subsidies have been smoothly declining in AEs (with the EU). It is notable that overall direct support to agriculture in LIDCs has been strongly negative for most of the years. This is wholly driven by the fact that, in the aggregate, LIDC farmers have experienced an implicit taxation of their outputs, with farmgate prices for certain crops far below the border reference price—as shown in Figure 3a and 3b. A closer examination of the data showed that the implicit taxation is applied to export/cash crops, but not or rarely to staple crops that are consumed domestically.[9]

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[7] The National Rate of Assistance (NRA) database of AgIncentives Consortium (2024) contains four categories of agriculture and food subsidies: (1) input subsidies; (2) subsidies on the basis of factors of production such as land; decoupled producer subsidies not linked to the amount of inputs, outputs, or factors of production, and food subsidies; (3) output subsidies provided to farmers as direct monetary transfers; and (4) a measure of implicit output subsidies (or implicit output net taxation, if values are negative) related to the difference between farmgate output prices and a reference output price, the latter of which pertains to the price that would prevail in the absence of interventions such as government-set output prices and trade restrictions. Figure 3a captures (1) through (3) combined and Figure 3b (1) through (4) combined.

[8] The dataset only provides aggregated statistics for the EU. In our analysis, we thus had to group the EU with one of the two income groups to which EU countries belong. As AE countries in the EU make up over 30 percent of AE GDP, but EME countries in the EU only comprise under 4 percent of EME GDP, we group EU with AE.

[9] Some caution is warranted in interpreting the LIDC figures. While overall the data represent close to 90 percent of GDP, they represent only 62 percent of LIDC GDP, while representation of EMEs and AEs is high at 82 and 93 percent of GDP, respectively.

Figure 3. Agricultural and Food Subsidies, by Income Group (Percent of GDP)
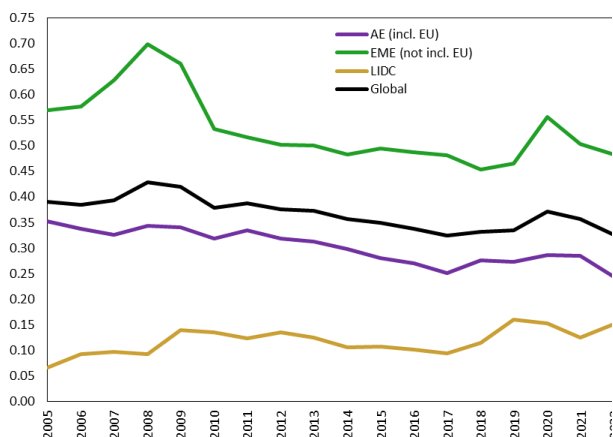
a. Globally and by Income Group   **b. Globally and by Income Group, Including Implicit Subsidies**
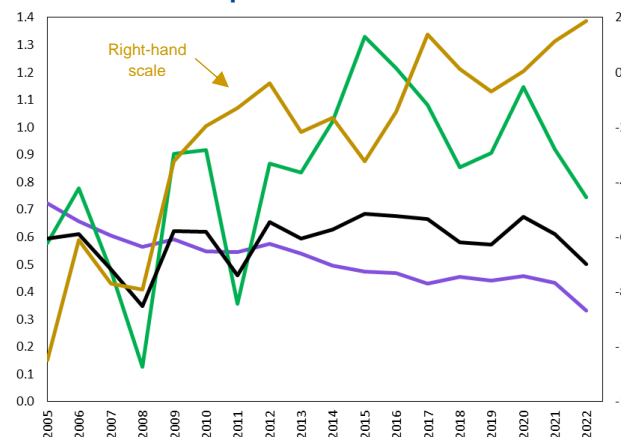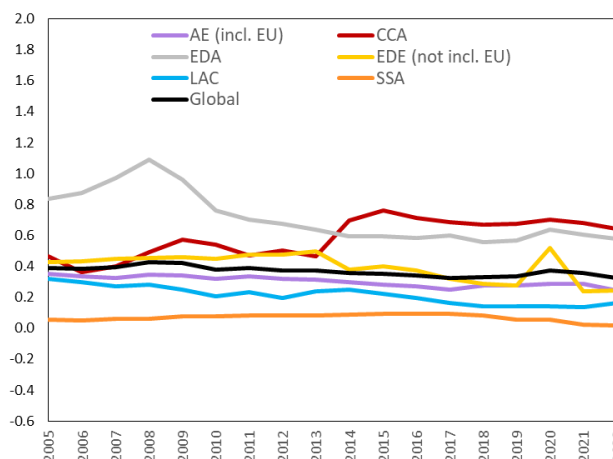

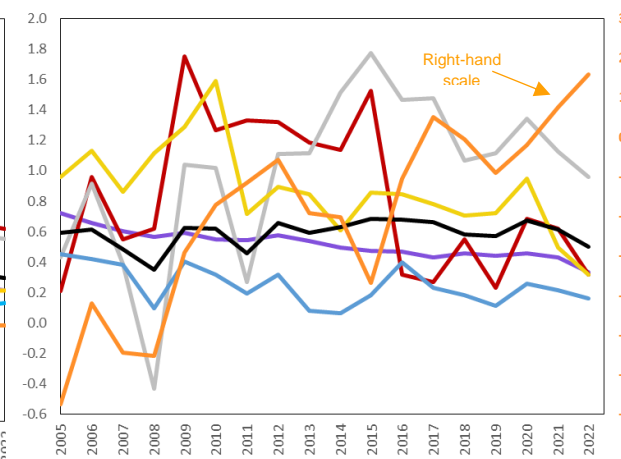Source: Authors' calculations based on data from AgIncentives Consortium (2024).

Across regions, overall (explicit and implicit) agriculture and food subsidies are lowest (in fact, often negative) in sub-Saharan Africa, relatively low in Latin America and the Caribbean, stable in AEs (including EU), and highly volatile elsewhere (Figure 4b). Implicit output price support raises overall subsidization in AEs (including EU) and especially in Emerging Europe (without EU), as seen when comparing these regions' aggregates in Figure 4a and 4b.[10] In Caucasus and Central Asia, implicit output support is particularly high for several years after the global financial crisis. In Emerging and Developing Asia, implicit support starts out negative—a tax on agriculture (seen by the fact that overall subsidies are lower than food, input and explicit output/other subsidies)—and after the late 2000s, it becomes strongly positive. The regional trends also convey that the strong implicit taxation of LIDCs' agriculture observed in Figure 3b is primarily a sub-Saharan African phenomenon (Figure 4b).

Figure 4. Agricultural and Food Subsidies, by Region (Percent of GDP)

a. By Region   **b. By Region, Including Implicit Subsidies**
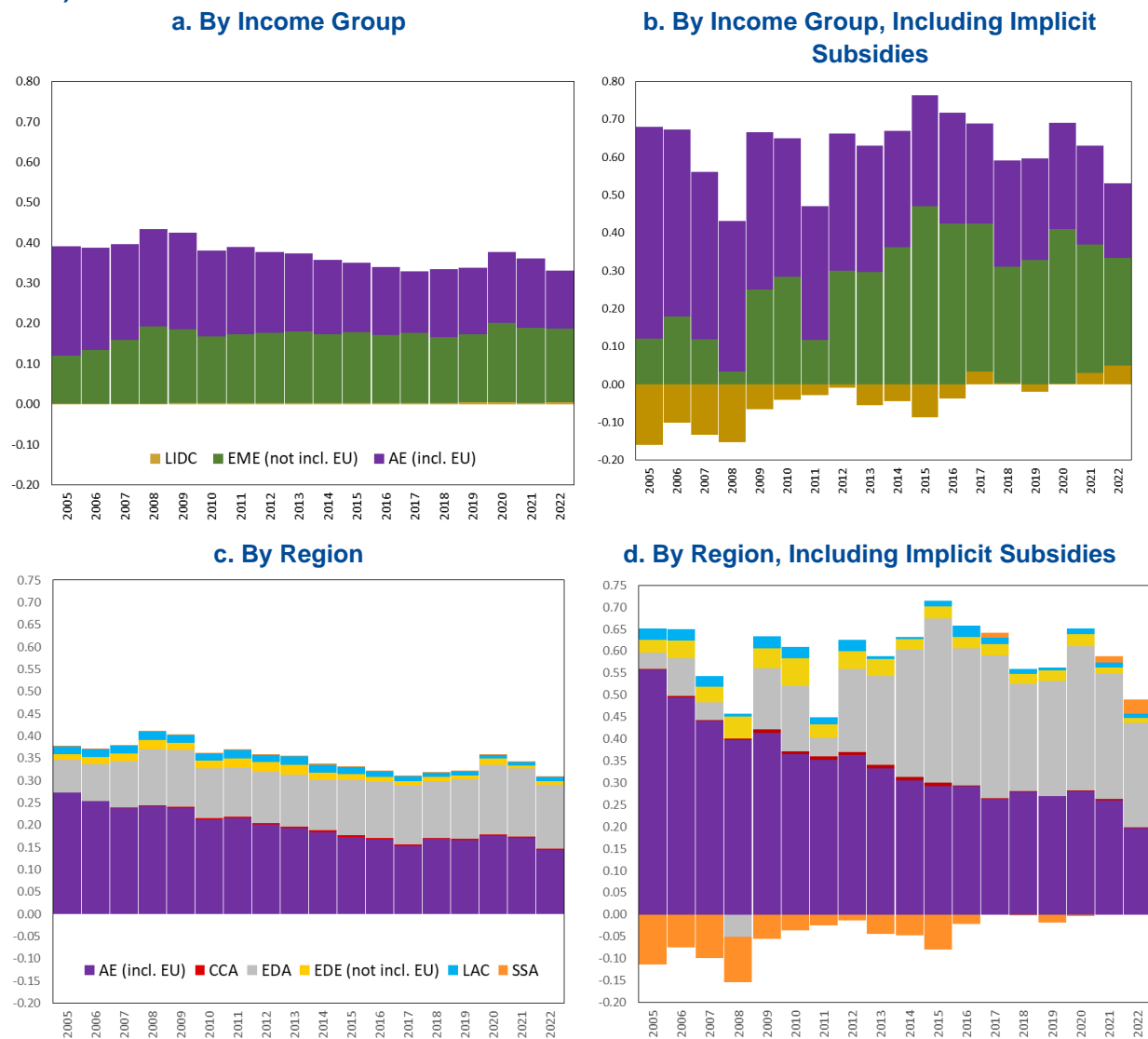

Source: Authors' calculations based on data from AgIncentives Consortium (2024).

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[10] Analogous to the information in a previous footnote: AEs and EDE countries in the EU make up 30 and 25 percent of AE and EDE GDP, respectively; thus, for purposes of this analysis, we grouped the EU with AEs.

As a share of global GDP, subsidies are largest in AEs (with EU) and EMEs (without EU), and are generally declining in the former and rising in the latter. Input and explicit output and other subsidies are minimal, as a share of global GDP, in LIDCs (Figure 5a), and mostly negative considering both implicit and explicit support (Figure 5b). Across regions, subsidies are dominated by AEs (including EU) and Emerging and Developing Asia (Figure 5c and 5d).[11] The narrative from the earlier trends based on analysis relative to regions' own GDP emerges more prominently when examining subsidies as a share of global GDP: Overall subsidy support in AEs and the EU combined is on a steady decline, while those in Emerging/Developing Asia is rapidly rising (Figure 5d).

Figure 5. Country Groups' Weight in Global Agriculture and Food Subsidies (Percent of Global GDP)

a. By Income Group

b. By Income Group, Including Implicit Subsidies

c. By Region

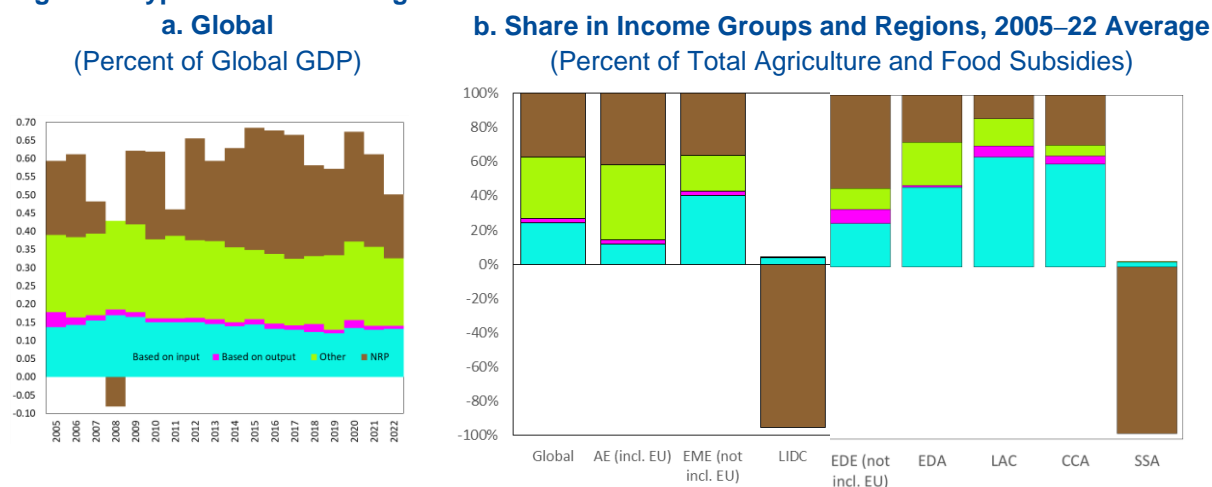

d. By Region, Including Implicit Subsidies

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[11] Given the differential data coverage across country groups, the subsidy amounts in each country group are adjusted, assuming the data are reasonably representative for each country group. Thus, the magnitudes are not to be interpreted as reflecting the differences in coverage.

Globally, implicit output price subsidies tend to dominate the overall food and agriculture subsidy portfolio and are on the rise, while input subsidies—as well as food, decoupled and other subsidies—have been mildly declining (Figure 6a). Explicit output subsidies are minor globally, and across all income groups (Figure 6b). Of all country groups—that is, regions and income groups—the subsidy portfolio of Emerging and Developing Europe (not including EU countries) has the largest share of implicit and explicit output subsidies. However, the region with the most dominant role of input subsidies in its portfolio is Latin America and the Caribbean. Decoupled, food, and other subsidies are most prominent in AEs (including EU).

Figure 6. Types of Food and Agriculture Subsidies

a. Global
(Percent of Global GDP)

b. Share in Income Groups and Regions, 2005–22 Average
(Percent of Total Agriculture and Food Subsidies)

Source: Authors' calculations based on data from AgIncentives Consortium (2024).
Note: NRP = Nominal rate of protection, capturing implicit output subsidies arising from domestic and border policies.

Many LIDCs established their input subsidy programs over the past few decades. Input subsidies were widely prevalent in the agricultural programs of developing countries in the 1960s and early 1970s. During the 1980s and 1990s, the protection of urban consumers through policies that kept domestic food prices low tended to penalize farmers (Bates and Block 2011). By the early 2000s, many governments chose to reestablish producer subsidies, often with the support of donors. Over the past two decades, input subsidy programs have become a common policy choice again, particularly in sub-Saharan Africa, with the goal of bolstering agricultural development and addressing food insecurity by increasing the productivity of staple food crops (Jayne and Rashid 2013). Particularly in countries prone to food insecurity, input subsidy programs can be substantial. For example, half of all public expenditures in support of food and agriculture in Malawi between 2006 and 2013 went toward the country's input subsidy program (FAO 2015). Systematic global data on the size of input subsidy spending for each country is not available, but an examination of selected literature on Africa shows that such programs can range from a fraction of a percent to multiple percentages of GDP (Table 1).

There is only limited data on the scale and size of direct commodity price support programs for farmers in LIDCs. Some evidence of the generally ineffectual price support provided to farmers can be seen in the results of an assessment of the difference between farmgate and international border prices (MAFAP 2022). Farmgate prices for maize in 14 countries in sub-Saharan Africa, adjusted for transportation and a few other costs, exceeded border prices by more than 10 percent in three countries, suggesting that farmers were benefiting from government interventions in the marketing and trade of maize in those

countries. However, farmgate prices were more than 10 percent lower than border prices in seven of the countries, implying that those governments provided lower maize prices to consumers at the expense of the producers from whom they purchased the crop.

Producer subsidies as a share of the value of agricultural production generally increase with a country's income. Between 2013 and 2018, subsidies to agricultural producers in LIDCs were estimated to be just 0.6 percent of the value of their agricultural production. For EMEs, this share is between 4 and 5 percent. It becomes significantly larger in AEs at 12.6 percent (FAO and others 2022). The limited fiscal space of LIDCs is the primary reason for the relatively lower level of subsidy support provided to farmers. Furthermore, the net assistance provided to agriculture—accounting not only for subsidies and expenditure on public goods but also for border measures and market price control (see Figure 2)—in most low-income countries is negative; so farmers remain disadvantaged, receiving fewer benefits than they would with no state intervention in the agricultural sector (FAO and others 2022).

Table 1. Characteristics of Recent Agricultural Input Subsidy Programs in Sub-Saharan African Countries

Country	Program	Subsidy Package per Beneficiary	Total Beneficiaries	Targeting Strategy	Beneficiaries' Share of Costs	Total Costs
Ghana	Planting for Food and Jobs, 2017–22	Maize, rice, soybean, sorghum, and vegetables; inputs for up to 2 ha of cropland	Increased from 200,000 farmers to 1.95 million—two-thirds of smallholders	Resource-poor smallholders with between 0.4 and 2.0 hectares	50 percent of seed and fertilizer cost	0.25 percent of GDP from 2017 to 2022
Kenya	Fertilizer Subsidy Program, 2023	Max. 200 kg (4 bags) fertilizer per acre cropland; max. 100 bags	5 million farmers registered; 6 million bags available	Registered farmers only; roll-out by target district	54 percent of fertilizer cost	0.025 percent of GDP
Malawi	Affordable Inputs Program, 2020/21–2022/23	5–7 kg maize, sorghum, or rice seed; 100 kg fertilizer	Around 3.7 million in 2020/21 and 2021/22; 2.5 million in 2022/23	Almost all smallholders in 2020/21; two-thirds in 2022/23	33 percent of seed and fertilizer costs in 2020/21	0.7 percent of GDP, 2020/21–2022/23
Nigeria	Growth Enhancement Support Scheme, 2012–14	100 kg fertilizer	7.2 million in 2014	"Poor" farmers, but criteria used to identify them not clear	50 percent of fertilizer cost	0.2 percent of GDP in 2014
Rwanda	Crop Intensification	Subsidy on fertilizer applied at	[no data]	Effectively an untargeted	65 percent to 85 percent of market price,	0.15 percent of GDP

	Program, 2015–22	point of input sale		subsidy system	depending on fertilizer type	in 2021/22
Zambia	Comprehensive Agricultural Support Program (formerly Farmer Input Support Program)	In 2022/23: 300 kg fertilizer; 10 kg maize; 20–25 kg groundnut or soybean seed	About two-thirds of all smallholders in 2021/22 and 2022/23	Agricultural cooperative members; larger landholders more likely to benefit	Less than 10 percent of seed and fertilizer cost	3.3 percent of GDP in 2019/20

Sources: Authors' compilation, based on World Bank (2021), Spielman and others (2022), Pauw (2022), Nyondo and others (2021), Chirwa and Dorward (2013), Olomola (2016), and National Cereals & Produce Board, Kenya (2022).

Intended Benefits and Actual Limitations of Producer Subsidies

The main stated objective for the use of subsidies in farm production is to increase food security or agricultural development (or both). Such programs aim to affect farmers' production choices, thereby altering the returns that farmers obtain, either by maintaining a crop price at or above a certain level using output price subsidies, or by reducing the marginal costs of crop production by subsidizing inputs (Morris and others 2007). In turn, this is to support one or both of two broad objectives—food security and economic growth through the agricultural sector. More specifically, the higher net returns that the subsidized farmers receive are intended to lead to improvements in one or more of the following:

- *Food availability* through higher production.
- *Food security of consumers* by means of reduction in prices through the supply response to subsidies.
- *Food security of farmers* who consume their production.
- *Stability of food prices* and, more generally, of agricultural markets.
- *Agriculture sector performance* through higher returns on investments.
- *Rural economic development* by stimulating demand for both farm and nonfarm products.
- *Competitiveness* of agricultural exports.

However, agricultural producer subsidies could have unfavorable efficiency implications. Institutional capacity constraints may prevent farmers from receiving inputs before the planting rains fall. In the same vein, inaccurate national estimates of the supply of and demand for target crops result in ineffective and expensive producer price support programs. By increasing the net prices for farmers for the commodities they produce above what they would receive in the market, these programs of direct support distort patterns of production. This results in outputs by beneficiary farmers in locations where it is not economically justified (that is, if it were based on the unsupported price level of a commodity). At the same time, farmers who do not benefit from such support will reduce their production of the commodity, even if operating in locations in which the unsupported price for the commodity suggests they should have a comparative advantage in its production. Higher production of a commodity where it is not economically well suited to be produced and lower production where it is suited results in an aggregate net cost.

The evidence on the distributional aspects of agricultural subsidies is mixed, and incidence may reflect other policy objectives besides equity. Where subsidies are linked to production—either to output or to factors of production—they will, by design, tend to accrue to larger (and thus usually better-off) farmers.

Whether such a distributional effect of subsidies is a policy failure or one feature of a trade-off depends on the underlying policy objective. If policymakers sought to pursue equity objectives with a subsidy program, a regressive incidence points to inappropriate targeting or deficiencies in design enforcement. If, however, decision-makers' goal was to increase agricultural productivity (for example, through a fertilizer subsidy program), and if larger farmers achieved higher yields from subsidized inputs, then the inequitable distribution would be seen as a possibly unattractive but accepted outcome of the program (see "Targeting Producer Subsidies: Opportunities and Constraints" and Box 2 for further discussion on trade-offs in targeting subsidies). Local communities themselves may favor greater efficiency at the expense of equity by targeting better-off, more productive farmers with subsidies, and recipient smallholders may convert received subsidies into de facto cash transfers by selling the fertilizer to nonbeneficiaries (Giné and others 2022). Empirical analysis of the incidence of agricultural producer subsidies shows a varied picture. Larger farmers tend to benefit from direct payments through the EU's Common Agriculture Policy, as in the US farm subsidies; however, subsidies make up a larger share of smaller farmers' assets (Kirwan 2007; Dinis 2024). In lower-income countries, some evidence points to farmers in the middle of the income distribution participating at highest rates and receiving the most subsidy, but received subsidies make up the highest percentage of poor farmers' incomes (Damania and others 2023).

Farm subsidies can also inadvertently foster practices that harm the environment and climate. The overuse of nitrogen as a result of fertilizer subsidies—a phenomenon more commonly observed in AEs and some EMEs, less so in LIDCs—can lead to the contamination of groundwater and surface water (OECD 2012). Fertilizers applied in excess of optimal levels fail to be fully absorbed by the crops to which it is applied, resulting in its leakage into water systems. Moreover, although fertilizer subsidies are often thought of as resulting in agricultural intensification (higher outputs per land area), they can also stimulate agricultural extensification (expanded area of land under cultivation), achieved in part by conversion of forests into farm through deforestation, which in turn exacerbates climate change given the carbon sequestration function of forests (Damania and others 2023). Output subsidies such as those for livestock production can have similar effects, with demand for pasture and feedstock production (for example, maize or soybean) driving deforestation (Bailey and others 2014). In turn, climate change–induced agriculture productivity losses, such as from droughts and other disasters, lead to food price surges (Okou and others 2022). This could encourage policymakers to institute or expand input and output subsidies—potentially leading to a vicious circle. However, "green subsidies" have seen a recent increase. These are subsidies on environmentally less harmful inputs or on outputs less associated with greenhouse gas emissions, or can involve payments to farmers for ecosystem services. These, make up a minor share of all subsidies and are mainly in advanced economies. Recent analysis suggests that their beneficial impact is muted and that they have high compliance-monitoring costs (Gautam and others 2022).

Producer subsidies, moreover, contribute to global distortions, similar to trade restrictions. Trade policy and agricultural subsidies interact in important ways. First, trade restrictions can be used to achieve the price-increasing or price-reducing effects of agricultural subsidies. For example, high import tariffs on agricultural outputs and nontariff trade barriers, such as stringent sanitary and phytosanitary standards, can elevate the domestic price of a good in a similar manner to output subsidies. Similarly, export restrictions on inputs, such as export bans or duties, can lower the domestic price of inputs and operate like an input subsidy. LIDCs may be more likely to use these trade restrictions to support producers given their more limited fiscal space, while AEs may have both high output trade barriers and domestic support programs. The WTO includes rules and obligations on agricultural domestic support and export subsidies in the Agreement on Agriculture and subsequent decisions, and these are laid out in the joint IMF, OECD, World Bank, and WTO report on subsidies and trade (IMF and others 2022) (see Appendix for further

details). Second, agricultural subsidies can contribute to global distortions, with important implications across income groups. Relatively high producer subsidies in AEs can have negative spillovers on LIDCs, making it harder for the latter to compete in the global market or encouraging governments in LIDCs to raise their own subsidies. Finally, trade integration can address certain objectives of subsidies, without the latter's distortionary effects. Trade liberalization, in addition to its other economic advantages, can reduce economic volatility, especially if country-specific shocks are more important than sector-specific shocks (Caselli and others 2020). However, rising skepticism about the value of economic integration risks harming economic prospects, manifesting in the form of greater trade fragmentation from significant geoeconomic tensions (Aiyar and others 2023).

There are various policy measures that serve as more effective alternatives to agricultural producer subsidies. These increase the food supply by improving agricultural technology (for example, through spending on agricultural R&D);[12] enhancing farmers' skills in using this technology and in farming practices (spending on extension services), agricultural infrastructure that increase yields (for example, irrigation), and rural infrastructure that make agricultural input and output markets more efficient (spending on rural information and communication technology, rural transport, and electrification); improving land governance to enable farmers to make decisions founded on more secure land property rights; strengthening agricultural financial markets to relieve the credit constraints to purchasing (unsubsidized) inputs;[13] and spending on cash transfers to farmers, which both bolsters farmers' income base for better access to food and enables them to undertake needed private on-farm investments (Mogues, Fan, and Benin 2015; Goyal and Nash 2017; Prifti, Daidone, and Davis 2019).[14]

Farm subsidies often have greater political salience than other more effective spending measures, making exits from subsidies rare. Where farmers constitute a large or powerful segment of the electoral base, subsidy programs can provide significant political dividends. Political considerations in adopting agricultural subsidy programs are not uncommonly part of the reasons why subsidies are maintained despite the availability of more effective policy alternatives to achieve the same objectives. The above-mentioned indirect, multifaceted forms of spending to strengthen agricultural productivity and food security are perceived as politically less rewarding than input subsidy programs, which can be more easily recognized by farmers as a more salient form of government support (Mogues and Olofinbiyi 2020). They do not as readily make the same associations with public investments in agricultural research or extension, for example—investments which are often of greater significance to agricultural development and improved food security in the medium to longer-term (Swinnen and others 2000; Mogues 2015). Smart exposure through the dissemination of information that renders more visible valuable public services would increase the political cost of underinvestment in such public goods (Mogues and Billings 2019).

There are only a few empirical cases of agricultural subsidies being permanently eliminated. Subsidy reforms do at times result in their reduction, or less commonly, in removal. For example, several African countries temporarily removed agricultural subsidies when fiscal space dwindled during debt crises in the 1980s and 1990s that led to structural adjustment reforms (Holden 2018)—but often, political pressures

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[12] Several country and cross-country analyses, summarized in a number of meta-analyses, consistently demonstrate the strong net positive impacts of agricultural research investments. As one example of a meta-analysis, Alston (2010) finds that the benefits from productivity growth to R&D spending exceed the costs by an order of magnitude or more.

[13] It should be noted that certain government measures in credit markets themselves could constitute an indirect form of agricultural producer subsidies. For example, in Kyrgyzstan, the government arranges for private banks to provide farmers loans at a fixed rate and compensates banks if the market rate falls below the fixed rate (CIAT and World Bank 2018).

[14] Mogues, Fan, and Benin (2015) provide a literature review of the relative impacts of several of these policy measures on agricultural growth and poverty reduction.

lead to their reinstatement after a few years. Their reappearance was also often prompted by inadequate market infrastructure taking the place of subsidies. For example, in Malawi, with marketing networks and private input traders not taking the place of government distribution systems, various output markets shuttered; in Tanzania and Ghana, the use of fertilizer dramatically declined with the rise in input prices (Ahmed and Lipton 1997). In some countries, however, fertilizer-to-crop price ratios fell after subsidy removal, either because the distribution channels became more efficient or because rising output prices more than compensated for increasing fertilizer prices (Kherallah 2002). A rare case of both sustained and successful subsidy removal is that of New Zealand: the country abolished nearly all agricultural subsidies in the mid-1980s as part of broad-based economic reforms following the economic challenges in the wake of declining agricultural and other exports (Saunders 2019).

The Conceptual Argument for Agricultural Subsidies and the Underlying Assumptions

Agricultural Input Subsidies

Input subsidies can help overcome information problems and the financial risks farmers face while they learn how to profitably use commercial inputs. The principal justification for providing farmers with subsidies on newly introduced high-productivity technologies is to accelerate their adoption by enabling farmers to discover increased returns to the use of modern inputs. Farmers in LIDCs generally apply lower amounts of farm inputs than is economically optimal: the level of application of the input at which the value of additional crop output is equal to the cost of an additional unit of input. This was attributed to farmers not having adequate information to accurately estimate the gains from the use of new inputs. This results in a market failure, in that farmers are not producing as much output as they profitably might produce with increased input use, resulting in reduced crop supply and a cost to society. Subsidies on commercial farm inputs can temporarily reduce the costs and financial risks to farmers. By enabling farmers to employ commercial inputs at a lower cost for several seasons, it is expected that farmers will learn how to consistently employ the inputs profitably and better understand the risks they must manage in doing so (Ellis 1992).

A standard partial equilibrium economic analysis illustrates the conceptual effects of input subsidies (Figure 7). At the initial equilibrium point A, the supply curve for the crop of interest without subsidized inputs crosses the demand curve. The introduction of a subsidy on inputs reduces the marginal cost associated with each level of crop output and the supply curve shifts rightward from S to S'. In the new equilibrium B, the producer receives, and the consumer pays the lower output price P', and a higher amount of produce Q' is sold. The fiscal cost of the subsidy program is the blue-shaded area $|P' P'' C B|$. The change in the value of the benefits of the subsidy received by farmers is the striped area of polygon $|P P'' C A|$, which is the area above the original supply curve reflecting the increase in farmers' "effective" price because of input subsidies. The value of the additional benefits received by consumers is the plaided area of polygon $|P' P A B|$, arising from the reduction in price as a result of increased production. The value of the total benefits to producers and consumers does not fully cover the fiscal cost of the subsidy and the dotted area of triangle $|A C B|$ represents the deadweight loss of the subsidy program.

Figure 7: Stylized Diagram of Impacts of Farm Input Subsidies
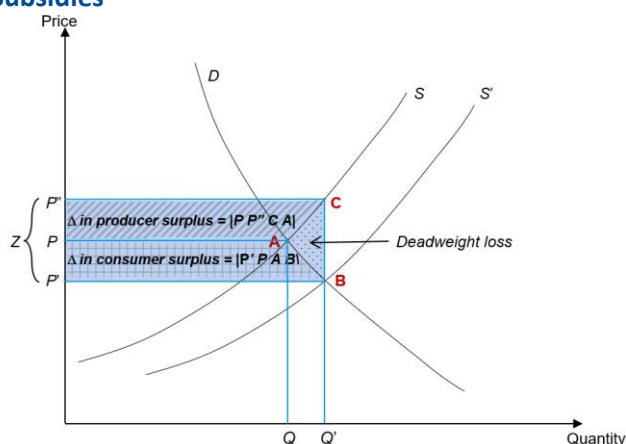
Source: Authors' illustration.

In the presence of market failures, the subsidies would, instead, eliminate a net welfare loss arising from underproduction. Specifically regarding input subsidy programs being implemented to provide farmers with the information and experience they require to profitably use such inputs, as farmers become familiar with their use over several years of the program, the shift in the supply curve to *S'* will increasingly reflect the abilities of the farmers to use the inputs more efficiently, rather than solely being a result of the reduction in the costs of inputs associated with each level of crop output for the farmer. With this farmer learning, even if the input subsidy program ends, the supply curve is not expected to revert from *S'* back to *S*. The original market failure motivation for the input subsidy program will have been addressed.

Price elasticities of supply and demand of subsidized crops determine the effectiveness of the program, distribution of benefits between consumers and producers, and the deadweight loss. The extent to which the subsidized crop is a traded good also influences the welfare impact of the subsidies. Crops with relatively inelastic demand, such as staple foods that are traded mostly locally, are associated with consumers receiving a relatively large share of benefits from the subsidy program. Crops with relatively inelastic supply are associated with a relatively large share of benefits accruing to producers. Crops that have an inelastic supply curve may have this characteristic because of constraints on farmers' crop productivity. Crops with either elastic demand or supply are associated with large deadweight losses. Demand is more elastic for cash crops destined for global markets and for staple crops that are heavily traded internationally (relative to domestic market sales), such as rice and wheat. Given the relatively high deadweight costs that result in such a context, such crops may be poor candidates for input subsidy programs.

Agricultural Output Subsidies

Guaranteeing a minimum price for a crop is another way that governments incentivize farmers to produce more of specific crops in the short term. If farmers are confident the price will be honored even if the market price is lower when the crop is delivered after harvest, they will make their production decisions at planting based on this minimum price. All things being equal, with such a price support program in place, farmers can be expected to provide larger supplies of the crop than if they were making their decision on

a more uncertain and likely lower market price for the crop.[15] However, such programs are more likely to raise production of the targeted crops but not the total agricultural production, as the price elasticity of supply for agricultural commodities as a whole is low because of farm resources being somewhat fixed in the short term. Particularly where cropland is already used quite intensively with little left to fallow each season, farmers cannot easily restructure the production pattern of their entire farm in response to seasonal price changes.

Over time, output price interventions can be used to direct the evolution of agricultural sector. Price support for specific crops, if sustained, will alter the crops and other agricultural outputs to which farmers separately allocate their farming resources each cropping season. These individual production decisions will influence the overall composition of a country's agricultural production by changing the relative supply of key farm outputs. Beyond agriculture, if price support programs for farmers are sustained, they will be among the factors investors in the country consider in evaluating the rate of return they are likely to realize through investing in agricultural production versus elsewhere in the economy. In consequence, price support programs are used among other factors to guide the trajectory of a country's economic development, either by altering commodity-specific private investments within agriculture or by prompting the reallocation of capital from other sectors into agriculture. The aggregate effect for growth can be detrimental, if subsidies result in a reallocation away from more productive sectors—or from agricultural activity with a greater contribution to agricultural value-added—to a potentially less productive agricultural sector or subsector.

Price interventions to benefit farmers will also affect the welfare of consumers. Output price support programs can have important effects on how incomes are distributed across farm and nonfarm households. In consequence, how the prices are set to induce these effects is an important consideration in designing such programs (Box 1). To attain food security objectives, for example, the increased production of food provided in part through providing producers with higher prices for specific food crops will also increase the volumes marketed and thus reduce consumer price levels and volatility, and therefore the vulnerability of poor households to food insecurity. However, as will be discussed, if the prices consumers pay for the targeted food crops are not independent of the (higher) subsidized prices farmers receive, many poor households will not be able to afford all of the food they require at the resultant higher prices and may end up with reduced access to food and lower real incomes.

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[15] Subsidizing output prices directly is one of the several ways that the government can act to change the prices farmers receive for their output, as seen in Figure 1. Other more indirect instruments include levying taxes on producers, processors, or consumers of target commodities; imposing taxes/quotas or offering subsidies on specific agricultural imports or exports; and manipulating the exchange rate to modify how world prices for a commodity affect domestic price formation. However, given the focus of this note on policy mechanisms that provide direct expenditure support to farmers, these other approaches are not discussed here.

> **Box 1. Setting Crop Prices under Output Price Support Programs**
>
> Policymakers use several approaches to support prices farmers receive. These include basing output prices on:
> - *The average total cost of production of the target crop(s)* under normal growing conditions for typical farmers using improved production technologies at full market costs, including the costs of land and labor.
> - *Border prices*—the export or import parity prices—for the crop. For staple foods, given the food security considerations, the import parity price typically will be an important reference point. This price reflects the opportunity costs of not producing enough of the staple food crop. For export crops (for example, cotton), the export parity price, less processing costs, is at times used as a starting point for a guaranteed price.
>
> There are a few parity considerations to set the supported price:
> - *Terms-of-trade parity* involves setting the support price for the target crop so that it is not so low (or so high) that the price diverges significantly from trends in a broader set of farm and nonfarm goods. The initial support price level may be set to address past price divergence or to promote specific development objectives. Annual price adjustments thereafter would help maintain parity between the price of the target crop and broader price trends.
> - *Crop-based price parity* is more narrowly focused on the output price farmers obtain for a particular crop relative to other prices associated with the production or processing of the crop. For example, output prices can be set relative to the price of inputs or to the price of processed goods made from the crop. Intercrop price comparisons can also be used, for example, a support price for maize could keep the price ratio for maize to rice relatively constant.
> - *Income parity* involves setting prices for the target crops, which ensures that farmers can generate incomes comparable to those obtained by nonfarmers.
>
> Source: Authors' synthesis based on Ellis (1992).

Direct output price subsidy programs generally involve government agencies buying crops from producers and selling them to consumers. In an open market system, agricultural traders seek to obtain sufficient supplies of the crop at the lowest price that farmers offering the crop will accept. With a price support program in place and under normal cropping conditions, traders in the open market will likely not offer farmers the higher support price the government stipulated to buy the crop. For a given demand, and with supplies of the crop having increased after the harvest because of the price incentive offered to farmers, open market prices will be lower than would have been the case without the price support program. This results in governments establishing parastatal crop marketing agencies or more specialized buffer stock management agencies.[16] The agency commits to buy all the crop farmers offer for sale after harvest, at the price they were guaranteed, even if the latter is substantially above the local market price. The fiscal costs involved in providing farmers this premium on market prices can be significant, particularly when the supply is large.

Before the start of the farming season, the agency typically will establish a price band for the target crop. The band consists of a floor price of the crop that farmers are guaranteed to receive, and a ceiling price that the consumer will ever face. When the market price is below the floor price that the agency commits itself to ensuring the producer, it raises prices back to the floor by buying up crops from the market at the floor price, adding this purchase to its buffer stock. If instead, market prices were to rise above the consumer's ceiling, it draws down its inventory by selling at the upper level of the price band, effectively subsidizing consumers along with the subsidization of producers. The size of the price band—the difference between the ceiling and the floor prices—will directly affect the fiscal costs incurred in

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[16] The literature has examined the effectiveness of national food buffer stocks in reducing food price volatility to achieve food security objectives. A broad finding is that in most low-income developing countries, management of buffer stocks to stabilize the prices of staple foods has proven very difficult to implement successfully in practice (Timmer 2015, Chapter 6), while also imposing a significant fiscal burden on the government (World Bank 2012; see also Mogues (2020)).

managing these staple food stocks (Baulch and Botha 2020). The narrower the price band that the government or agency establishes, all else equal, the more frequently it will have to intervene.

Purchases into the government food stock benefit producers, while sales from the stock benefit consumers (Figure 8). The government seeks to maintain the crop price at *P*, establishing a buffer stock agency to do so. Rather than a price band, a single target price is used in the diagram, but the same principle will apply in efforts to maintain the price within a band. Supply curve *S'* reflects an increased crop supply situation, such as would arise after a cropping season in which the rains were abundant and timely. The amount of crop supplied to the market rises to *Q'*, and prices will drop to *P'*. To raise the price of the crop to the target of *P*, the buffer stock agency will use its financial resource, including transfers received from the government, to buy up the crop quantity *Q' − Q* and add this to the buffer stock. Instead, a surplus supply situation—such as might arise after a cropping season with poor rains, diminished use by farmers of improved seed and fertilizer, or contracted area planted to the crop—is characterized by supply curve *S"*. Crop supply contracts to *Q"* and prices will rise to *P"*. The buffer stock authority will sell from its stock the crop quantity *Q − Q"* to the market, which will bring the price back down to the target *P*. Purchases by the buffer stock benefit producers and cause losses to consumers, while sales from the buffer stock benefit consumers and cause producer losses.

Figure 8: Stylized Diagram Food Staple Buffer Stock Agency Operations to Stabilize Crop Prices
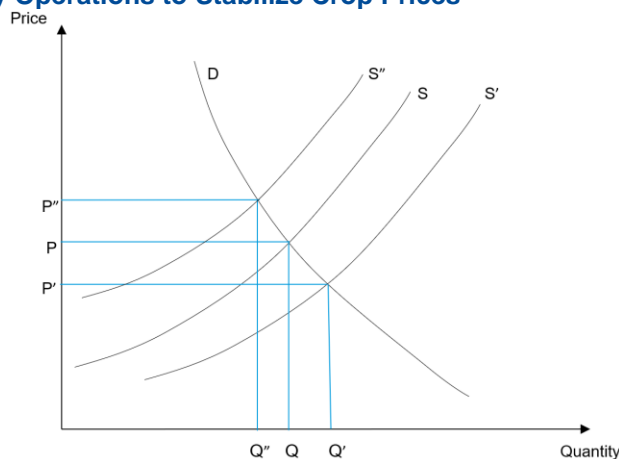
Source: Authors' illustration.

However, such assessments do not account for operational costs and financial risks for the buffer stock agency. The financial and logistical ability and storage capacity of the government agency responsible for defending both the producer (floor) price and the consumer (ceiling) price can become overwhelmed as commodity supply or demand conditions change (World Bank 2012). Costs to the agency can be significant if accumulated stocks are not disposed of quickly through sales to domestic or international markets; these arise from the expenses of constructing and maintaining storage facilities, and from wastage if crops held too long in storage deteriorate. Moreover, if the agency continually holds significant stocks or sets a narrow price band, this is likely to decrease storage by private firms and may even lead to significant private sector exit from such activities, requiring the public sector to step up even further. In the face of public-private efficiency differences, price variability may be exacerbated, counter to the original objective of stabilization programs. Finally, a potential drawback of output subsidies necessitating government stockholdings is that these are generally applied to cereals, the stockpiling of which is more manageable than higher-value products such as dairy, meat, fruits, and vegetables. This may skew food

consumption toward lower-quality calories and away from more nutritious food needed for human capital growth through physical and cognitive development.[17]

Targeting Producer Subsidies: Opportunities and Constraints

Input- and output-based direct support to farmers differ significantly in the degree to which they can be targeted to selected farmers. Input subsidies can be narrowly targeted, assuming that sufficient information is available on all farmers in the program implementation area to determine eligibility criteria for beneficiary selection. In contrast, it is administratively often difficult to offer higher subsidized prices to some producers and not to others. Therefore, price support programs are almost impossible to target at poorer producers as part of a country's poverty reduction efforts. Consequently, the discussion in this section only examines the targeting of subsidized inputs.

Broad-based input subsidy programs tend to be regressive and fiscally costly.[18] The rate of input subsidization under untargeted programs is generally lower than in targeted programs. For example, the share of the market price that is covered by subsidies range between 15 and 35 percent (leaving farmers to pay 65–85 percent of the market price) in the untargeted program in Rwanda and 66–90 percent in the targeted programs in Malawi and Zambia (**Error! Reference source not found.**). A potentially large s ubset of poor farmers who do not use any unsubsidized inputs because they cannot afford them may not be able to pay the lower price for subsidized inputs under an untargeted program, as a result of poorly functioning financial markets for low-income farmers. However, providing more subsidized inputs to all farmers would result in much higher fiscal costs, as well as considerable diversion of the inputs to crops other than those targeted by the program. When poorer farmers are the principal beneficiaries of the highly subsidized inputs, some targeting is required. Even then, there are trade-offs in who should be targeted (Box 2).

Box 2. What Types of Farmers, if Any, Should Be Targeted by Input Subsidy Programs?

Food security objectives may seem to suggest targeting poor and more food insecure farmers. Under such scenario, the program can help increase crop productivity and the amount of food to which poor farmers have access (Hemming and others 2018). However, to maximize the impact on both agricultural sector growth and food security, the argument is made that subsidized inputs should be targeted at farmers with the highest productivity levels. These farmers have demonstrated that they are able to produce more crop output than other farmers from the same amount of inputs. While they are unlikely to be poor, targeting the subsidized inputs to them may nonetheless enable the subsidy program to achieve the largest possible impact on crop production and availability, to meet broader food security needs across vulnerable populations in the country.

However, the choice to target nonpoor productive farmers to attain improvements in food security for poor farming households requires that local markets work efficiently. Such a targeting approach makes sense if poor farming households have sufficient income to purchase as much of the now lower-priced food that high-productivity farmers produce with the subsidized inputs. Markets in LIDCs are, however, often inefficient. Moreover, from a

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[17] Cost-benefit analysis of buffer stocks and public stockholdings would provide further insights, but goes beyond the scope of this paper. Furthermore, literature conducting such analysis is scarce, as acknowledged in FAO (2021), an extensive report dedicated to the topic of public stockholdings for food.

[18] The discussion in this section focuses on input-based subsidies, as targeting output-based subsidies can be difficult. Input subsidies can be narrowly targeted, assuming that sufficient information is available on all farmers in the program implementation area to determine eligibility criteria for beneficiary selection. In contrast, it is administratively often difficult to offer higher subsidized prices to some producers and not to others.

political perspective, many stakeholders will view as misjudged the provision of subsidized inputs to nonpoor farming households.

These trade-offs in targeting strategies are reflected in the policy variability in the large inputs subsidy programs in Malawi and Zambia over the 15 years. These vacillated between targeting poor, food insecure farmers, and the most productive farmers (Lunduka, Ricker-Gilbert, and Fischer 2013; Mason, Jayne, and Mofya-Mukuka 2013). In recent years, Zambia shifted its input subsidy targeting disproportionately more productive farmers (World Bank 2021), while Malawi scaled up its program in 2020 to cover most smallholder households, regardless of their food security status or productivity.

Targeting comes with higher administrative costs. Efforts to provide subsidized inputs to farmers not currently using specific inputs or to those who have the potential to see significant increases in their productivity if they were to increase their use of inputs could be justified. However, effective targeting requires substantial information to correctly identify the eligible population. Obtaining good information is generally expensive, with these costs reducing the share of program resources distributed to beneficiaries (Coady, Grosh, and Hoddinott 2004). When targeting is warranted, the most appropriate form from a range of possible targeting methods to meet that objective within the specific context of the program would need to be identified. For example, Houssou and others (2019) find that in Ghana, poor and smallholder farmers can be cost-effectively targeted using proxy means testing, with the cost reduction gained from targeting amply justifying the administrative costs of proxy means testing. Unlike in untargeted programs, where the application of subsidies can be done at the import or wholesale point in input supply, targeting may have to take place at the point of retail distribution. Under these circumstances, monitoring will be required to ensure that retail distributors are providing farmers with inputs at discounted prices that reflect the subsidy. To benefit from economies of scale in input distribution, beneficiaries may be required to be members of primary farmer cooperatives or other farmer groups—a condition that may be seen as a loose form of targeting.

The Design and Implementation of Agricultural Producer Subsidies

Important challenges exist in the design and implementation of producer subsidy programs. The conceptual discussion earlier on the two types of programs focused on the theoretical benefits and costs of each under the assumption of perfect design and implementation. In practice, however, the benefits such programs typically provide are significantly less and the costs are typically greater than what the theoretical scenarios suggest. There are three broad challenges to input subsidy programs, while there is a single dominant challenge to the sustainability of price support programs.

Design Challenges of Input Subsidy Programs

Efficient use of the subsidized inputs is critical to deriving strong benefits from subsidy programs. Assessments of most national input subsidy programs in LIDCs over the past 20 years demonstrate that they consistently improve crop productivity and overall production of the targeted crops (Jayne and others 2018). However, these improvements are significantly less than what agricultural researchers have demonstrated farmers should be able to obtain. The poor crop yield response to fertilizers is the main explanation for the shortfalls in programs' objectives. For example, in Malawi, farmers, who have access to good land, obtain hybrid seed and inorganic fertilizer before the planting rains, control crop threats like weeds, pests, and diseases, and are able to apply sufficient labor, should be able to obtain around 8 kg of maize grain for every kg of fertilizer applied (Benson 2021). However, evaluations conducted of the

national input subsidy program have consistently shown much lower maize yield responses. For example, Lunduka, Ricker-Gilbert, and Fisher (2013) computed a response rate of only 2.7 kg of maize grain per kilogram of fertilizer applied over three years of the program.

Late delivery and inadequate technical contents and amount of subsidized inputs are key sources of agronomic inefficiency. While subsidized and unsubsidized fertilizers are chemically the same, problems with the timely implementation of input subsidy programs typically result in sub-optimal use of the subsidized fertilizer. Arranging the importation of thousands of metric tons of fertilizer for a national input subsidy program requires many months of preparation to obtain import financing, secure orders from global exporters, ship them to the country, and then distribute bags to farmers across the country. Delays at any point may result in the fertilizer being delivered after the planting rains have come. Late application of fertilizer to the crop will directly result in substantial reductions in the additional crop output enabled by the subsidized fertilizer. In addition, seed and fertilizer subsidy programs should offer suitable seeds for local agroecological conditions and fertilizers meeting the soil nutrient requirements of the target crop. Providing information on the effective and profitable use of these inputs is crucial, necessitating an integrated agricultural extension component (Morris and others 2007).

The final consideration is assessing the financial viability for farmers to use those inputs at current (unsubsidized) prices. If the market costs of fertilizer, for example, are much higher than the additional value of the target crop that can be expected from using that fertilizer, the financial rationale for subsidized high-productivity inputs is weak, at least as an agricultural development strategy.[19] More efficient crop and agricultural input markets in which fertilizer-to-crop price ratios are sufficiently small would need to be in place before farmers could hope to make profitable use on the crop of fertilizer obtained at its full market price (Bonilla-Cedrez, Chamberlin and Hijmans 2021). In the absence of such markets, sustained agricultural growth will not be achieved through subsidizing commercial inputs.

Implementation Constraints of Input Subsidy Programs

Implementation weaknesses are another major challenge for input subsidy programs. These include:

- Sub-optimal targeting, such as subsidizing farmers without complementary factors of production (that is, without sufficient land or labor) to make effective use of the subsidized inputs.
- Leakage of inputs to farmers who are not intended beneficiaries, such as to nonpoor commercial farmers who are more likely to apply fertilizer to cash crops rather than staples, reducing the impact of the input subsidy program on food availability.
- Smuggling of subsidized inputs out of the country. While beneficiary farmers selling subsidized inputs to smugglers will receive some benefit, the gains to total agricultural production from the use of the inputs will be lost to the country.
- Rent-seeking behavior by certain agents involved in subsidy program administration extorting bribes from qualified beneficiaries as a condition for accessing the subsidized inputs.
- Negative exogenous shocks, such as extreme weather events, crop disease, and pest infestations, and spikes in international prices could result in unfavorable terms-of-trade between crop inputs and outputs. With such shocks, the costs and the impact of the program can sharply differ from what was designed.

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[19] In contrast, if the principal objective of the input subsidy program is food security, a more important financial calculation is whether the total fiscal cost of the input subsidy program is less than the fiscal cost of importing the equivalent amount of staple foods (Carr 2014).

Standard administrative best practices should be in place to minimize these challenges. Several of these are inherent to the implementation of any public social support or development program, and support from international risk mitigation institutions may be required (Lloyd's 2015). However, it should be recognized that the impact of some of these challenges, depending on the objectives of the subsidy program, may not be wholly adverse. For example, when beneficiary farmers with inadequate labor to make use of subsidized inputs hire workers, this is likely to benefit rural landless or land-poor households, improving their incomes and hence food security. A sensible assessment is needed of just how adverse the net impact of some of these challenges is to achieving the objectives for which an input subsidy program was designed, before steps are taken to address them.

Fostering Sustainable Commercial Input Supply

A third set of challenges is how such programs might promote the expansion and sustainability of private input suppliers. As discussed, the role of input subsidies in spurring national agricultural development can only be conceptually justified as a temporary measure—to enable farmers to learn how to use commercial inputs to raise their production and improve their financial health so that eventually they do not require a subsidy. A corollary to building effective demand for commercial inputs among farmers is building a sustainable system of commercial input supply through which farmers can reliably obtain the inputs they require at competitive full-market prices (Benson and Mogues 2018). Input subsidy programs are government programs, but consistently relying primarily on government agencies to supply these physical inputs is wasteful and ultimately not sustainable.

Several actions can be taken to mitigate potential disadvantages for private input suppliers from government input subsidy programs. These include designing programs in a manner that supports increased private sector investment in input supply within a regulatory framework that promotes competition and efficiency (Morris and others 2007). Box 3 describes the use of vouchers, increasingly in digital form, to expand the role of private input suppliers in subsidy program implementation. With reliable private agricultural input supply, increasingly the government will be able to contract one or several of these private agencies to manage the logistics of supplying inputs to farmers. While direct fiscal outlay arising from the difference between market and subsidized price still remains, a more efficient system may contain the administrative costs. The government's role in implementing input subsidy programs would narrow to program design, due diligence in selecting the firms involved, providing contracted firms with the necessary support to implement the program, and monitoring their operations.

Box 3. The Use of Vouchers in Agricultural Subsidy Programs—African Case Studies

Since about 2000, most input subsidy programs have been replacing direct physical distribution by government agencies of subsidized inputs to beneficiaries with the use of vouchers. Vouchers in principle are intended to enable increased participation of private input suppliers in subsidy programs: Beneficiary farmers present these vouchers to local input retailers to redeem the physical inputs. However, private sector participation may not materialize in this way in practice. Malawi has been using vouchers since 2000, with private importers delivering the subsidized fertilizer to distribution points, but without any involvement of private agro-input dealers' distribution, after their early engagement was aborted because of allegations of misuse of the vouchers (Minot and Benson 2009). Tanzania's plan as of 2008, in contract, enabled farmers to redeem their vouchers at any private input dealer. Ghana's program started in 2008 and restricted participation to those agro-input dealers affiliated to the fertilizer importers. Some of the implementation weaknesses of traditional subsidy delivery methods also vexed voucher programs, such as late delivery to farmers.

With the widespread coverage of mobile telephones in rural areas even in LIDCs, increasingly digital vouchers are being used. Electronic transactions are used to distribute the vouchers to beneficiaries, to validate and redeem the vouchers for inputs from suppliers, and for the supplier to submit the redeemed vouchers to the government agency

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concerned for compensation. These digital systems contain costs for both farmers and suppliers and reduce program leakages. While the few analyses of e-voucher systems to date agree that they have considerable potential to improve input subsidy programs, challenges in field implementation must still be overcome. For example, Mason and others (2020) found that e-vouchers in Zambia did not meet their objectives because of a series of operational failures: farmers were unaware of the range of agricultural inputs and implements the e-vouchers could be used on, many retailers did not stock all products that could be obtained with the vouchers given their uncertainty whether these inputs were part of the program, and e-voucher holders had to travel farther to use their vouchers than those farmers relying on traditional distribution methods. World Bank (2019) identified additional practical constraints with digital vouchers in their study of Mali, Niger, Guinea, and Chad: Given high illiteracy, key information sent to beneficiaries was not absorbed by the farmers or was lost as many accidentally deleted their vouchers because of unfamiliarity with the digital arrangements. Poor connectivity and farmers not being equipped with the requisite hardware, or a mobile phone number, added to the failure points.

However, input subsidy programs, even if designed in a manner that promotes private input supply, inherently impede such development. Difficulties in preventing the leakage of subsidized inputs to unintended farmers lead to substitution of commercially supplied inputs with these subsidized inputs. This not only imposes unjustifiable costs on the government but also reduces the sales of commercial providers of inputs, jeopardizing their businesses. The resulting program mistargeting and leakage undermine the existing demand for commercial inputs. Empirical analyses of recent subsidy programs found that each metric ton (1 MT) of subsidized fertilizer raised total fertilizer use by 0.38 MT in Kenya, 0.55 MT in Malawi, and 0.58 MT in Zambia, as subsidized fertilizer leakage substituted for commercial sales (Jayne and others 2018). While the subsidy programs increased the amount of inputs used by farmers, the impact of the programs on agricultural production and improving food security was significantly lower than it would have been without diversion of inputs.

Design and Implementation Challenges of Output Price Subsidies

The sustainability of price support programs is a key challenge in most emerging market and developing economies (EMDEs). This is because of the relatively high prevalence of poverty among farmers and the potential for food insecurity among consumers. If consumers end up paying higher prices than in the absence of the output price support programs, many poor households will not be able to afford the food they require. To avoid this, some countries simultaneously provide food subsidies to consumers. If the two subsidy programs—one for farmer-producers and one for consumers—operate in tandem, this may lead to high fiscal costs. Moreover, the opportunity cost of neglecting other development priorities while implementing both subsidy programs may be substantial.

There are useful alternatives to holding buffer stocks to achieve the objective of stabilizing prices. As earlier discussed, holding food buffer stocks may not be the most efficient strategy for stabilizing staple food prices. For many countries, it may be as effective and cheaper in the long term to rely on imports to reduce price volatility in such crops (Minot 2014). Furthermore, if staple food prices spike regularly because of negative supply shocks, for example, during droughts, the development of more drought-resilient crop varieties through agricultural R&D investments will be a better long-term solution to stabilize crop production levels and, hence, prices. In planning programs to promote agricultural development and food security, alternative mechanisms should be closely considered instead of—and in the short term, alongside—price support programs (FAO 2021).

In contrast to input subsidy programs, producer price support programs have been more difficult for LIDCs to implement effectively. The structural adjustment reforms of the 1980s and 1990s sought to further restrict their use. However, several countries continue to set producer prices for important staple crops, promising producers a price that will induce them to expand production of the crops. However, these prices tend to be aspirational rather than firm: Most LIDCs have insufficient resources to compel or incentivize private buyers to pay those prices or to guarantee farmers that the agencies will purchase at

the stated prices all of the target crops farmers supply to the market. Few LIDCs' interventions to maintain higher-than-market staple food prices for producers—either through direct price support programs or indirectly through trade or other market interventions—achieve that goal.

Navigating Policy Considerations with Regard to Agricultural Producer Subsidies

The appropriateness of different policy stances toward agricultural producer subsidies depends on a number of considerations, making a single recommendation for all cases imprudent. The relative feasibility as well as the suitability of policy measures on these subsidies—whether they relate to the targeting, institution, or removal of the programs, or the duration, timing, and pacing of such actions—will depend on a host of factors. These include, but are not limited to, the policy objective underlying the action, the country's fiscal space, the fiscal cost or savings of the measure, the extent to which there are market failures that the subsidies could help rectify, administrative capacity in designing and implementing the programs, and political constraints, to name a few. These and other considerations have been touched upon throughout this note. Therefore, it is difficult to make a blanket recommendation on such measures. Given the size and prevalence of agricultural subsidies, rendering them macrocritical, the note focused on laying out some of the most significant limitations associated with such programs, but also provided a nuanced view on where they may be more and where less of an economic concern.

By way of conclusion, we seek to bring together some of the policy considerations in a summary fashion (Table 2). These are, of necessity, selective and incomplete, and cannot replace granular economic policy advice on agricultural subsidies at the country level. The table presents a few illustrative cases of existing subsidy policies and the objectives that motivated them, lists some key features of the contextual settings in which the measures may be enacted, and then provides both subsidy-related and other policy measures that are commonly suitable given the context. The last column of the table describes the rationale for the public actions. These considerations should not be seen as firm policy recommendations—instead, they ought to be viewed as a starting point for exploring options for formulating policy on agricultural producer subsidies.

Beyond the specific policies on agricultural producer subsidies, a comprehensive reform-sequencing and communication strategy must be part of any subsidy policy formulation or its reform. Many countries have struggled with reforming agricultural producer subsidies—even where the benefits of removal are acknowledged. This is because subsidy reform in general is far more than a technical problem. Especially where agricultural subsidies have been persistent for several decades, beneficiary farmers may not be aware of the magnitude of the subsidy component of the input (output) price that they pay (receive). The long duration of subsidy programs may also cement norms around what the government ought to be subsidizing. Furthermore, reforming subsidies would not only impact farmers but also various stakeholders along the agricultural commodity value chain and institutions involved in administering the program, and who may resist change. Changing misinformation, perceptions, and norms, as well as addressing concerns among those that would be negatively affected in the short run, takes time and requires a well-planned and executed communication strategy. Beyond appropriate communications, carefully thought-through timing and sequencing of the reform is paramount. A dedicated design of strategies for both communications and timing and sequencing goes beyond the purview of this note, and it is best developed for specific cases of countries and subsidy programs, to be as relevant as possible to these cases' particularities.

Table 2. Policy Considerations with Regard to Agricultural Producer Subsidies

Existing Subsidy Policy and Selected Aspects of Domestic and International Context					Policy Measures that Are Commonly Suitable Given the Context		
Existing Subsidy Policy	Primary Policy Objective Underlying Subsidy Is to Increase:	Administrative Capacity to Design and Implement Subsidy Program Is:	International Price[2] of Subsidized Product	Fiscal Space (Limited/Some/Substantial)[1]	Measures with Respect to Subsidies	Measures on Other Key Agricultural and Nonagricultural Areas (Nonexhaustive)	Rationale
Input subsidy	Incomes of commercialized/nonpoor farmers	Low	Medium or High	Limited	Phase out subsidies in the short term	Create enabling regulatory environment for private agents in input supply chain (import, wholesale, distribution, retail)	Constrained fiscal space and medium/high international input prices imply sizable and much-needed fiscal savings from timely removal of subsidies, which were furthermore inefficient due to low capacity to administer the program. Enabling policies for private input supply support input access by commercialized farmers
Input subsidy	Food security of consumers	Medium or High	Medium or High	Some	Phase out subsidies gradually (in the medium term)	Temporary, targeted cash transfers to the most vulnerable consumers; agricultural and other public goods spending to improve efficiency of domestic food systems; reduce	Phase-out generates sizeable fiscal savings given medium/high international input prices. Existence of some (as opposed to limited) fiscal space, and moderate/low

							restrictions on food imports	inefficiencies of subsidy program, allow for graduality in phase-out. Graduality is also reasonable given food security concerns until the non-subsidy measures are in place and support food availability and access by consumers
Untargeted input subsidy	Agricultural productivity	Medium or High	Low or Medium	Substantial		In the short term: Target subsidies more narrowly to productive farmers; ensure subsidies are alleviating market failure	Agricultural and other public goods spending to improve efficiency of agricultural production and markets	Adequate fiscal space enables maintaining subsidies if there is an economic justification for them and if they can be administered effectively.

Targeting to productive farmers ensures alignment with policy objective |
| Untargeted input subsidy | Food security of small subsistence farmers | Medium or High | Low | Limited | | In the short term: Target more narrowly to poor subsistence farmers. In medium term: gradually remove subsidies | Strengthen extension services for smallholders; social assistance to poorest farmers during subsidy reduction | Targeting (versus full removal) of subsidies in the short run manages the impact on poor farmers, and is also reasonable even in the face of limited fiscal space, as full removal would yield only limited fiscal savings. |

							More effective demand- and supply-side measures should take the place of subsidies in the medium term.
No subsidy	Aggregate agricultural development/productivity[3]	Low, Medium, or High[3]	Low, Medium, or High	Some or Substantial	Maintain existing subsidy policy	Robust public goods spending in the agricultural and related sectors, for example, extension, agricultural data systems, R&D, rural roads, rural electrification	Institute or strengthen the suite of good practices spending measures on public goods, to support the stated policy objective/concern
Output subsidy	Income support for farmers of exported commodity	Low or Medium	Low	Some	Gradually reduce price floor	Institute/strengthen social assistance for affected poorest farmers; public investment in agricultural and rural infrastructure to improve farmers' profitability; reduce agricultural trade distortions (where exist)	Subsidy reduction is called for, given operational costs arising from capacity constraints, high fiscal costs due to gap between international and administered prices of output, and fiscal space limitations. Gradual adjustment allows time for the other measures to take effect
Narrow band for farmgate price on domestically	Income stability for farmers by stabilizing output prices	Low or Medium	Low, Medium, or High	Some	Gradually widen price band; adjust band around long-term	Regulatory improvements and relaxation of legal constraints on private sector involvement	Operational costs of public marketing boards can run high, even if price stabilization were

					market price trends	throughout the supply chain; support better agricultural/food market information systems; public infrastructure improvements that crowd in private investment along the value chain; gradually limit marketing board activities to public goods provision, for example, insurance against extreme price volatility, and strategic grain reserves for emergencies	effectively calibrated to be fiscally neutral in the medium term Constrained capacity, moreover, can lead to inefficiencies and food waste during government-managed storage and distribution activity Administrative challenges of government marketing boards in calibrating price band may result in higher consumer prices than in the absence of intervention, affecting food security for vulnerable households. The non-subsidy measures help reduce price volatility by tackling its sources
consumed output							

Source: Authors' compilation.

[1] These categories follow the conceptual framework on fiscal space in IMF (2018).

[2] For the case that subsidized input is imported/subsidized output is exported.

[3] In the case of no existing subsidy, objective refers more generally to policymakers' concerns, and administrative capacity refers to what government's capacity would be if a subsidy were to be newly instituted.

Bibliography

AgIncentives Consortium. 2024. "Nominal Rate of Assistance (NRA)." Accessed January 4, 2024. https://www.agincentives.org/nominal-rate-of-assistance-nra/. Based on data from OECD, FAO, IDB, and World Bank compiled by the International Food Policy Research Institute (IFPRI).

Ahmed, Ismail, and Michael Lipton. 1997. "Impact of Structural Adjustment on Sustainable Rural Livelihoods: A Review of the Literature." IDS Working Paper 62. Poverty Research Unit, Institute of Development Studies.

Aiyar, Shekhar, Jiaqian Chen, Christian Ebeke, Roberto Garcia-Saltos, Tryggvi Gudmundsson, Anna Ilyina, Alvar Kangur, Tansaya Kunaratskul, Sergio Rodriguez, Michele Ruta, Tatjana Schulze, Gabriel Soderberg, and Juan Trevino. 2023. "Geoeconomic Fragmentation and the Future of Multilateralism." Staff Discussion Note SDN/2023/001. International Monetary Fund, Washington, DC.

Alston, Julian 2010. "The Benefits from Agricultural Research and Development, Innovation, and Productivity Growth." OECD Food, Agriculture and Fisheries Papers, No. 31, OECD Publishing, Paris.

Amaglobeli, David, Mengfei Gu, Emine Hanedar, Gee Hee Hong, and Céline Thévenot. 2023. "Policy Responses to High Energy and Food Prices". IMF Working Paper WP/23/74, International Monetary Fund, Washington DC.

Abokyi, Emmanuel, Dirk Strijker, Kofi Fred Asiedu, and Michiel Daams. 2020. "The Impact of Output Price Support on Smallholder Farmers' Income: Evidence from Maize Farmers in Ghana." *Heliyon* 6 (9): e05013.

Bailey, Rob, Antony Froggatt, and Laura Wellesley. 2014. "Livestock—Climate Change's Forgotten Sector." Energy, Environment and Resources, Chatham House. Royal Institute of International Affairs.

Bates, Robert, and Steven Block. 2011. "Political Institutions and Agricultural Trade in Africa." *American Journal of Agricultural Economics*, 93(2): 317-23.

Baulch, Bob, and Rosemary Botha. 2020. "Can a Maize Price Band Work in Malawi?" Malawi Strategy Support Program Policy Note 38, International Food Policy Research Institute, Lilongwe.

Benson, Todd. 2021. *Disentangling Food Security from Subsistence Agriculture in Malawi*. Washington, DC: International Food Policy Research Institute.

Benson, Todd, and Joachim De Weerdt. 2023. "Employment Options and Challenges for Rural Households in Malawi." Malawi Strategy Support Program Working Paper 40, International Food Policy Research Institute, Lilongwe.

Benson, Todd, and Tewodaj Mogues. 2018. "Constraints in the Fertilizer Supply Chain: Evidence for Fertilizer Policy Development from Three African Countries." *Food Security* 10: 1479–500.

Bonilla-Cedrez, Camila, Jordan Chamberlin, and Robert Hijmans. 2021. "Fertilizer and Grain Prices Constrain Food Production in Sub-Saharan Africa." *Nature Food* 2: 766–72.

Carr, Stephen. 2014. "The Challenge of Africa's Nitrogen Drought: Some Indicators from the Malawian Experience." Malawi Strategy Support Program Policy Note 19, International Food Policy Research Institute, Lilongwe.

Caselli, Francesco, Miklós Koren, Milan Lisicky, and Silvana Tenreyro. 2020. "Diversification through Trade". *Quarterly Journal of Economics* 135 (1): 449–502.

CIAT and World Bank. 2018. "Climate-Resilient Agriculture in the Kyrgyz Republic." CSA Country Profiles for Asia Series. International Center for Tropical Agriculture; World Bank, Washington, DC.

Chirwa, Ephraim, and Andrew Dorward. 2013. *Agricultural Input Subsidies: The Recent Malawi Experience*. Oxford: Oxford University Press.

Christen, Robert Peck, and Jamie Anderson. 2013. "Segmentation of Smallholder Households: Meeting the Range of Financial Needs in Agricultural Families." Focus Note 85, Consultative Group to Assist the Poor (CGAP), Washington, DC.

Coady, Dave, Margaret Grosh, and John Hoddinott. 2004. *Targeting of Transfers in Developing Countries: Review of Lessons and Experience*. Washington, DC: World Bank.

Daidone, Silvio, Benjamin Davis, Sudhanshu Handa, and Paul Winters. 2019. "The Household and Individual-Level Productive Impacts of Cash Transfer Programs in Sub-Saharan Africa." *American Journal of Agricultural Economics* 101: 1401−31.

Damania, Richard, Esteban Balseca, Charlotte de Fontaubert, Joshua Gill, Kichan Kim, Jun Rentschler, Jason Russ, and Esha Zaveri. 2023. *Detox Development: Repurposing Environmentally Harmful Subsidies*. Washington, DC: World Bank.

Dinis, Isabel. 2024. "Examining Disparities in Common Agriculture Policy Direct Payments among Farming Systems: Evidence from Portugal" *Agriculture and Food Economics* 12 (7): 1−23.

Ellis, Frank. 1992. *Agricultural Policies in Developing Countries*. Cambridge: Cambridge University Press.

FAO. 2015. "Analysis of Public Expenditure in Support of Food and Agriculture in Malawi." Monitoring and Analyzing Food and Agricultural Policies (MAFAP) Technical Notes Series, Rome: Food and Agriculture Organization of the United Nations (FAO).

FAO. 2021. *Public Food Stockholding: A Review of Policies and Practices*. Rome: Food and Agriculture Organization.

FAO, IFAD, UNICEF, WFP, and WHO. 2022. *The State of Food Security and Nutrition in the World 2022: Repurposing Food and Agricultural Policies to Make Healthy Diets More Affordable*. Rome: FAO (Food and Agriculture Organization of the United Nations).

FAO, IFAD, UNICEF, WFP, and WHO. 2023. *The State of Food Security and Nutrition in the World 2023. Urbanization, Agrifood Systems Transformation and Healthy Diets across the Rural−Urban Continuum*. Rome: FAO.

FAO, IFAD, and WFP. 2013. *The State of Food Insecurity in the World 2013: The Multiple Dimensions of Food Security*. Food and Agriculture Organization, Rome, Italy.

FAO, IMF, World Bank, WFP, and WTO. 2022. "Second Joint Statement by the Heads of Food and Agricultural Organization, International Monetary Fund, World Bank Group, World Food Program, and World Trade Organization on the Global Food Security and Nutrition Crisis." September 21. https://www.imf.org/en/News/Articles/2022/09/21/pr22313-second-joint-statement-by-the-heads-of-fao-imf-wb-wfp-and-wto-on-the-global-food-security.

Gautam, Madhur, David Laborde, Abdullah Mamun, Will Martin, Valeria Piñeiro, and Rob Vos. 2022. "Repurposing Agricultural Policies and Support: Options to Transform Agriculture and Food Systems to Better Serve the Health of People, Economies, and the Planet." World Bank and International Food Policy Research Institute (IFPRI), Washington, DC.

Giller, Ken 2020. "The Food Security Conundrum of Sub-Saharan Africa." *Global Food Security* 26: 100431.

Giné, Xavier, Shreena Patel, Bernardo Ribeiro, and Ildrim Valley. 2022. "Efficiency and Equity of Input Subsidies: Experimental Evidence from Tanzania." *American Journal of Agricultural Economics* 104 (5): 1625–55.

Gordeev, Stepan 2022. "Nutrition Demand, Subsistence Farming, and Agricultural Productivity." STEG Working Paper WP010, Structural Transformation and Economic Growth.

Goyal, Aparajita, and John Nash. 2017. *Reaping Richer Returns: Public Spending Priorities for African Agriculture Productivity Growth*. Washington, DC: World Bank.

Hazell, Peter, Stan Wood, Melanie Bacou, and Bhramar Dey. 2017. "Operationalizing the Typology of Small Farm Households." In Africa Agriculture Status Report: The Business of Smallholder Agriculture in Sub-Saharan Africa, by Alliance for a Green Revolution in Africa, 20–24. Nairobi: Alliance for a Green Revolution in Africa.

Hemming, David, Ephraim Chirwa, Andrew Dorward, Holly Ruffhead, Rachel Hill, Janice Osborn, Laurenz Langer, Luke Harman, Hiro Asaoka, Chris Coffey, and Daniel Phillips. 2018. "Agricultural Input Subsidies for Improving Productivity, Farm Income, Consumer Welfare and Wider Growth in Low- and Lower-Middle-Income Countries: A Systematic Review." *Campbell Systematic Reviews* 14: 1–153.

Herzfeld, Thomas, Eugenia Lucasenco, and Dmitry Zvyagintsev. 2022. "Agricultural Policy Development in Moldova Over One Decade: Recent Estimates and an Outlook towards EU Accession." *Economy and Sociology* 2: 7–21.

Holden, Stein. 2018. "The Economics of Fertilizer Subsidies." Center for Land Tenure Studies Working Paper No. 9/18, Norwegian University of Life Sciences (NBMU).

Houssou, Nazaire, Collins Asante-Addo, Kwaw Andam, and Catherine Ragasa. 2019. "How Can African Governments Reach Poor Farmers with Fertilizer Subsidies? Exploring a Targeting Approach in Ghana." *Journal of Development Studies* 15 (9): 1983–2007.

IMF. 2018. "Assessing Fiscal Space: An Update and Stocktaking." IMF Policy Paper, International Monetary Fund, Washington, DC.

IMF, OECD, World Bank, and WTO. 2022. "Subsidies, Trade, and International Cooperation." International Monetary Fund, Organisation for Economic Co-operation and Development, World Bank, and World Trade Organization. Washington DC.

Jayne, Thomas, and Shahidur Rashid. 2013. "Input Subsidy Programs in Sub-Saharan Africa: A Synthesis of Recent Evidence." *Agricultural Economics* 44: 547–62.

Jayne, Thomas, Nicole Mason, William Burke, and Joshua Ariga. 2018. "Review: Taking Stock of Africa's Second-Generation Agricultural Input Subsidy Programs." *Food Policy* 75: 1–14.

Kherallah, Mylène, Christopher Delgado, Eleni Gabre-Madhin, Nicholas Minot, and Michael Johnson. 2002. *Reforming Agricultural Markets in Africa*. Baltimore: IFPRI and Johns Hopkins University Press.

Kirwan, Barrett. 2017. "U.S. Farm Dynamics and the Distribution of U.S. Agricultural Subsidies." *Applied Economics Letters*, 24(3): 207-9.

Lloyd's. 2015. "Food System Shock: The Insurance Impacts of Acute Disruption to Global Food Supply. Emerging Risk Report, Lloyd's, London.

Lunduka, Rordney, Jacob Ricker-Gilbert, and Monica Fischer. 2013. "What Are the Farm-level Impacts of Malawi's Farm Input Subsidy Program? A Critical Review." *Agricultural Economics* 41: 563–79.

MAFAP. 2022. Monitoring and Analyzing Food and Agricultural Policies (MAFAP) price incentives dataset. https://www.fao.org/fileadmin/user_upload/mafap/docs/1_Price%20incentives%20dataset_MAFAP_Sept2022.xlsx.

Mason, Nicole, Auckland Kuteya, Hambulo Ngoma, Dagbegnon Tossou, and Katharine Baylis. 2020. "Does Shifting to a Flexible e-voucher Approach Improve Input Subsidy Program Outcomes? Quasi-experimental Evidence from Zambia's Crop Forecast Surveys." Feed the Future Innovation Lab for Food Security Policy Research Paper 165, Michigan State University, East Lansing, MI.

Mason, Nicole, Thom Jayne, and Rhoda Mofya-Mukuka. 2013. "Zambia's Input Subsidy Programs." *Agricultural Economics* 44: 613–28.

Mellor, John. 2017. *Agricultural Development and Economic Transformation: Promoting Growth with Poverty Reduction.* Cham, Switzerland: Palgrave Macmillan.

Minot, Nicholas. 2014. "Food Price Volatility in Sub-Saharan Africa: Has It Really Increased?" *Food Policy* 45: 45–56.

Minot, Nicholas, and Todd Benson. 2009. "Fertilizer Subsidies in Africa: Are Vouchers the Answer?" IFPRI Issue Brief 60, International Food Policy Research Institute, Washington, DC.

MoAFS, Malawi. 2012. *Guide to Agricultural Production and Natural Resources Management in Malawi.* Lilongwe: Department of Agricultural Extension Services, Ministry of Agriculture and Food Security, Government of Malawi.

Mogues, Tewodaj 2015. "Political Economy Determinants of Public Spending Allocations: A Review of Theories, and Implications for Agricultural Public Investment", *European Journal of Development Research*, 27(3): 452-73.

Mogues, Tewodaj. 2020. "Food Markets during COVID-19." Note in Special Series on COVID-19, International Monetary Fund, Washington, DC.

Mogues, Tewodaj, and Lucy Billings. 2019. "The Making of Public Investments: The Role of Champions, Co-ordination, and Characteristics of Nutrition Programs in Mozambique." *Food Policy,* 83: 29–38.

Mogues, Tewodaj, Shenggen Fan, and Samuel Benin. 2015. "Public Investments in and for Agriculture." *European Journal of Development Research*, 27(3): 337-52.

Mogues, Tewodaj, and Tolulope Olofinbiyi. 2020. "Budgetary Influence under Information Asymmetries: Evidence from Nigeria's Subnational Agricultural Investments." *World Development* 129: 104902.

Morris, Michael, Valerie Kelly, Ronald Kopicki, and Derek Byerlee. 2007. *Fertilizer Use in African Agriculture: Lessons Learned and Good Practice Guidelines.* Directions in Development; Agriculture and Rural Development, Washington, DC: World Bank.

National Cereals & Produce Board, Kenya. 2022. Government Subsidized Fertilizer Program - FAQs. https://ncpb.co.ke/wp-content/uploads/dlm_uploads/2022/10/FAQS-on-Subsidy-Fertilizers-October-2022.pdf.

Nyondo, Christone, Makaiko Gonapanyanja Khonje, Julius Mangisoni, William Burke, Jacob Ricker-Gilbert, and Lemekezani Chilora. 2021. "Lessons Learnt: Promises, Achievements, Shortcomings, and Pitfalls of Inputs Subsidy Programs in Malawi." Working Paper No. 21/05, MwAPATA Institute, Lilongwe.

OECD. 2012. "Water Quality and Agriculture: Meeting the Policy Challenge." OECD Studies on Water. OECD Publishing, Paris

OECD. 2022. *Agricultural Policy Monitoring and Evaluation 2022: Reforming Agricultural Policies for Climate Change Mitigation*. Paris: Organisation for Economic Co-operation and Development (OECD) Publishing.

Okou, Cedric, John Spray, and Filiz Unsal. 2022. "Staple Food Prices in Sub-Saharan Africa: An Empirical Assessment." IMF Working Paper No. WP/22/135. International Monetary Fund, Washington DC.

Olomola, Aderibigbe. 2016. "Driving Agricultural Transformation with the Power of Information and Communication Technology: The Performance of Nigeria's Growth Enhancement Support Scheme." Nigeria Strategy Support Program Working Paper 30, International Food Policy Research Institute, Abuja.

Pauw, Karl. 2022. "A Review of Ghana's Planting for Food and Jobs Program: Implementation, Impacts, Benefits, and Costs." *Food Security* 14: 1321−35.

Prifti, Ervin, Silvio Daidone, and Benjamin Davis. 2019. "Causal Pathways of the Productive Impacts of Cash Transfers: Experimental Evidence from Lesotho." *World Development* 115: 258−68.

Rother, Bjoern, Sebastian Sosa, Daehaeng Kim, Lukas Kohler, Gaelle Pierre, Naoya Kato, Majdi Debbich, Chiara Castrovillari, Khamza Sharifzoda, Elizabeth Van Heuvelen, Fabiana Machado, Céline Thevenot, Pritha Mitra, and Dominique Fayad. 2022. "Tackling the Global Food Crisis: Impact, Policy Response, and the Role of the IMF." Note/2022/004, International Monetary Fund, Washington, DC.

Saunders, Caroline. 2019. "Sustainable Agriculture – Life beyond Subsidies: Lessons from New Zealand." *Journal of Agricultural Economics* 70 (3): 579–94.

Spielman, David, Serge Mugabo, Gracie Rosenbach, Sosthene Ndikumana, Gilberthe Benimana, and Chantal Ingabire. 2022. "Policy Options for Fertilizer Subsidy Reforms in Rwanda: A Simulation-Based Analysis and Synthesis of Prior Studies." Rwanda Strategy Support Program Working Paper 5, International Food Policy Research Institute, Kigali.

Swinnen, Johan, Harry de Gorter, Gorden Rausser, Anurag Banerjee. 2000. "The Political Economy of Public Research Investment and Commodity Policies in Agriculture: An Empirical Study". *Agricultural Economics*, 22: 111-22.

Timmer, Peter 2015. *Food Security and Scarcity: Why Ending Hunger Is So Hard*. Philadelphia: University of Pennsylvania Press.

World Bank. 2012. "Using Public Foodgrain Stocks to Enhance Food Security." Agriculture and Rural Development (ARD) Report no. 71280-GLB, World Bank, Washington, DC.

World Bank. 2019. "Digitizing Agriculture: Evidence from e-voucher Programs in Mali, Chad, Niger, and Guinea." AFCW3 Economic Update, Washington, DC: World Bank.

World Bank. 2023. World Development Indicators. https://databank.worldbank.org/source/world-development-indicators.

World Bank. 2021. "Zambia's Farmer Input Support Program and Recommendations for Re-designing the Program." World Bank Discussion Note, World Bank, Washington, DC.

Appendix: World Trade Organization Rules on Agricultural Subsidies[1]

Under the World Trade Organization (WTO) Agreement on Agriculture, all domestic support for agricultural producers is subject to rules. The Agreement sets out two categories of domestic support:

- "Green box" measures with no, or minimal, trade-distorting effects or effects on production. There are no financial limitations on the ability of countries to use these measures. These measures must be from public-funded government programs and must not be transfers from consumers or provide price support for producers. The measures can include direct payments to producers that are decoupled from production, as well as general governance service programs, such as R&D. There is special treatment for developing countries, which also permits government stockholding for food security and subsidized food prices for urban and rural poor. Outside of the "green box" measures, the WTO also exempts other categories of measures from reduction commitments, including measures to support the development programs of developing countries, direct payments liked to production limiting programs, and a *de minimis* threshold.

- "Amber box" measures are considered to distort production and trade. This category covers all measures not specified in the "green box" or other exempt measures. The WTO members can only use these subsidy measures if they are below the *de minimis* threshold or are within the "Total Aggregate Measurement of Support" (Total AMS) for the 32 members that have specific reduction commitments.

In addition, all WTO members are allowed certain *de minimis* amounts of distortionary support, while some are allowed additional amounts of support up to their final bound total AMS limits. Two other categories of support are also excluded from the Total AMS calculators: (1) development programs under Article 6.2 and (2) direct payments under production-limiting programs under Article 6.5.

The WTO also has notification obligations for all members to notify the Committee on Agriculture of the extent of their domestic support measures. This notification requires members to list all measures under the different exempt categories and show that any other measures are within the *de minimis* threshold or within their Total AMS. Notifications are required annually, with additional notification of any modifications or additions of measures in the exempt category.

The 2015 Nairobi Decision prohibits agricultural export subsidies. These obligations immediately applied the developed countries, with a phase in for developing and the least developed countries. The Nairobi decision also introduced new rules on other forms of farm export support including export credits, agricultural exporting state trading enterprises, and international food aid.

The WTO Agreement on Fisheries Subsidies will prohibit fisheries subsidies, which promote the unsustainable depletion of fish stocks. The Agreement was adopted in 2022 and will enter into force when two-thirds of the WTO members deposit instruments of acceptance. The Agreement includes provisions, which prohibit illegal, unreported, and unregulated fishing; prohibit subsidies for fishing of overfished stock; prohibit subsidies to fishing on the unregulated high seas; and promote transparency and capacity building. Negotiations continue on Phase II including obligations on the issues of overfishing and overcapacity.

Negotiations at the WTO continue on agricultural reform, including on new rules on public stockholding for food security purposes and domestic support.

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[1] Further information on the WTO rules on subsidies is included in IMF and others (2022).

PUBLICATIONS

Agricultural Producer Subsidies: Navigating Challenges and Policy Considerations