

# Giving Input: How Producer Organizations Help African Farmers Get State Benefits

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## Abstract

This paper examines the distributive politics of government policies targeting rural African communities. I make two claims. First, politicians mobilize supporters by steering benefits towards members of rural producer organizations (RPOs; cooperatives and farmers' associations), economic groups whose organizational capacity makes them valuable political partners. Second, better organized RPOs and those with ties to local politicians benefit the most. I test my arguments in two ways. I begin by examining the allocation of agricultural input subsidies using survey data from nearly 32,000 households in seven African countries. Rather than following a logic of ethnic favoritism or models of core or swing voting, there is a consistent, positive relationship between RPOs and subsidies. Next, using an in-depth survey from Ethiopia's Amhara region, I analyze how organization characteristics influence the distribution of benefits from the country's Productive Safety Net Program. After matching on program targeting criteria, RPO members are 12 percent more likely to receive benefits than non-members, and members of more organized RPOs and organizations connected to local politicians are particularly likely to benefit. This paper contributes to our understanding of distributive politics in sub-Saharan Africa and suggests research on African politics should more fully consider the political role of formal economic groups in addition to social organizations such as ethnic groups and traditional institutions.

**Word Count: 8418**

\*All errors are my own.

*“The co-operative gets [the hybrid maize seeds] from the government, but the co-op selects whom to give them to and [opposition party] members cannot get them. The same with fertilizer or seedlings for cattle fodder from the rural development office. Those who do not support the government get nothing.”*

- Ethiopian Farmer from Merawi (Human Rights Watch, 2010).

Agricultural policy lies at the heart of African politics. The agricultural sector employs more Africans than any other, cash crops provide a valuable source of export earnings, and food security is a pressing issue in many countries. Most research treats agricultural policy in Africa like other distributive policies, emphasizing the role of ethnicity (Kasara, 2007) and incentives to target core or swing voters. These accounts overlook a central feature of African agriculture: organized interests. Across Africa, thousands of organizations bring together farmers to increase farming returns. I argue that these organizations facilitate political bargains between politicians and African farmers, providing politicians with organized blocks of supporters in exchange for subsidized state benefits. Two factors increase the likelihood of an exchange: a group’s organizational capacity and its ties to local politicians.

Prior studies focus on several logics to explain the distribution of benefits to African farmers. Politicians may use ethnicity (Abman and Carney, 2020) or home regions (Takeshima and Liverpool-Tasie, 2015) to express ethnic or regional favoritism. They may try to exchange benefits for electoral support from core or swing voters (Banful, 2011; Mason, Jayne and van de Walle, 2017), or traditional leaders (Baldwin, 2014). These accounts typically treat Africans as either atomized actors or reduce them to members of cultural institutions such as ethnic groups or traditional communities.

Moreover, they overlook a pivotal institution: rural producer organizations (RPOs), which are ubiquitous in sub-Saharan Africa. They unite households to increase economic returns from farming. In addition to this economic role, RPOs alter the political landscape by changing the logic of targeting and pressing politicians for state benefits. They provide politicians with identifiable, pre-existing organizations that feature a demonstrated ability

to motivate their members' behavior. In this article, I argue that politicians target RPO members when allocating state benefits to gain political support from these blocks of voters. If correct, this argument leads to three observable implications. First, RPO members should receive more benefits than non-members. Second, members of RPOs with a greater ability to organize collective action should receive more benefits due to their ability to make more credible promises of support. Finally, members of RPOs connected to local politicians should receive more benefits, as these ties reduce transaction costs.

I test my first hypothesis with survey evidence from eight sub-Saharan African countries. Using surveys from the World Bank's Living Standards Measurement Study, I analyze the distribution of agricultural input subsidies in seven countries: Ghana, Malawi, Mali, Niger, Nigeria, Tanzania, and Uganda. Using responses from nearly 32,000 households, I show a consistent association between RPOs and the likelihood of receiving subsidies. Furthermore, this explanation outperforms theories that suggest politicians supply goods to co-ethnics, core, or swing voters. Alternative model specifications support these results, and a sensitivity analysis suggests unobserved confounding factors probably do not explain this association.

Next, I test for the relationship between benefits and a group's organizational capacity and connections to local politicians by analyzing Ethiopia's Productive Safety Net Programme (PSNP). This analysis takes advantage of in-depth surveys from the country's Amhara region. Testing my argument in a mono-ethnic setting from a single region rules out rival explanations that focus on ethnic and regional favoritism by design. After matching survey respondents based on the PSNP's targeting guidelines, I show that RPO members benefit the most from this program and that RPOs displaying higher levels of collective action, RPOs with access to more and higher value incentives, and members of RPOs connected to local politicians benefit the most. A sensitivity analysis again suggests that unobserved confounds are unlikely to explain these associations.

By focusing on several programs using beneficiary-level survey responses, this paper avoids the pitfalls of studies that focus on a single case (Kramon and Posner, 2013) or those

that rely on geographically based measures of distributive goods. By testing my argument on different policies in several countries, it is less likely that policy-specific idiosyncrasies confound the results. This approach should give more confidence in applying my argument to similar policies in other countries. Additionally, I use individual-level measures of distributive outcomes that appropriately match theoretical constructs instead of geographic or aggregate-level measures often found in other studies. Finally, this paper's analyses complement one another methodologically. The analysis of input subsidy programs illustrates my argument's relative strength against explanations that center on ethnic politics or incentives to target core or swing voters, and it allows for some consideration of potential scope conditions. In contrast, the analysis of Ethiopian PSNP benefits allows a rigorous examination of specific mechanisms while holding rival explanations constant by design.

This article makes several substantive and theoretical contributions. It is one of the first to seriously consider the political role of RPOs and how they help shape agricultural policy in Africa. Similarly, this study helps us understand the new generation of targeted subsidies on which African governments are increasingly relying to support rural communities and increase agricultural production. While prior research examines whether these programs reach intended beneficiaries (see Jayne et al. 2018 and Holden 2019 for recent reviews), none consider the role of organized interests in explaining program targeting.

Furthermore, this paper builds on a recent turn in the clientelism literature that stresses the importance of non-partisan brokers (de Kadt and Larreguy, 2018; Holland and Palmer-Rubin, 2015; Larreguy, Montiel Olea and Querubin, 2017), and outside organizations in mobilizing voters (Thachil, 2014). In particular, this study complements Gottlieb and Larreguy's (2020) emphasis on the importance of voter coordination. However, I take their research a step further by stressing how the ability to overcome collective action problems that are non-political can serve as a useful signal to politicians. This is particularly valuable in countries with weak parties that fail to penetrate society. In these settings, the benefits of outsourcing the organization of voting blocks to civil society organizations such as

RPOs become even more apparent. Studies of distributive politics in sub-Saharan Africa should move beyond models that focus on ethnic favoritism, core and swing voters, and a limited focus on the supply of benefits. Instead, scholars need to pay more attention to economic organizations that cross-cut other cleavages, organize local populations around shared interests, and articulate political demands.

## 1 Competing Theories of Distributive Politics

Politicians alter the allocation of state benefits to help them gain and retain political office. In Africa, where people have lived in historically rural communities sustained by agriculture, politicians manipulate agricultural policies to generate political patronage (Bates, 1981; Kasara, 2007), or gain electoral supporters (Bates and Block, 2013).

This is not unique to democratic settings, however. Even in autocracies politicians are frequently incentivized to use state benefits to mobilize supporters during elections (Frye, Reuter and Szakonyi, 2014; Geddes, 2005; Lust-Okar, 2006).<sup>1</sup> In autocracies with mass parties making revolutionary appeals, mobilizing supporters during elections can demonstrate a regime's legitimacy (Zolberg, 1966). Successfully mobilizing supporters can help local politicians establish their competence as they seek promotion and nomination to higher offices (Blaydes, 2011). Authoritarian politicians may mobilize supporters due to factional struggles within the ruling regime, or they may mobilize supporters during elections as a show of strength, warding off potential challengers. Finally, politicians may distribute benefits to foster citizens' dependence on them for their material well-being, enabling the creation of a punishment regime should citizens fail to deliver their political support during elections (Magaloni, 2006).

In Africa, research on distributive politics often focuses on the role of ethnicity (e.g., Ejdemyr, Kramon and Robinson, 2017; Franck and Rainer, 2012; Kitschelt and Wilkinson,

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<sup>1</sup>Bratton and van de Walle (1997, 63-8), for example, note that distributing benefits to regime supporters was a common feature in post-colonial African regimes.

2007), positing that politicians engage in ethnic favoritism to steer benefits towards co-ethnics. Once in office, politicians reward their co-ethnics, who support the politician during elections. Notably, ethnic favoritism is present in authoritarian and democratic settings, with some research even suggesting ethnicity-based distributions of benefits are more prevalent in autocracies (Burgess et al., 2015).

Many works on distributive politics frame the debate by invoking a politician's incentives to supply either swing or core voters with benefits. Proponents of swing models suggest politicians target political goods to unaligned voters (e.g. Dixit and Londregan, 1996). Stokes (2005), for instance, argues that over time core supporters cannot credibly threaten to withhold support if parties ignore them, creating incentives to target swing voters. On the other hand, core models focus on the value of getting your supporters to vote. Cox and McCubbins (1986), for example, argue that parties target goods towards supporters since parties are more confident about how those voters will respond, while swing voters are less predictable. Therefore, uncertainty over how voters will act may influence a politician's distributive decisions.

Recent research highlights how politicians face a broader set of choices than many canonical vote-buying models stipulate. For example, Gans-Morse, Mazzuca and Nichter (2014) and Nichter (2008) highlight how voters turning out to vote in the first place is an observable behavior of interest to politicians. Additionally, politicians often rely on more complicated strategies to maximize their support. Albertus (2013), for instance, develops a model in which politicians target both core supporters and swing voters with different types of goods.

In developed countries, lobbying and demands for benefits by economic groups feature more prominently than in developing countries (Becker, 1983; Peltzman, 1976; Rickard, 2020). In Africa, the role of economic interest groups in securing state benefits receives less attention, with researchers instead emphasizing the role of social organizations such as ethnic groups and traditional institutions (Baldwin, 2016; Koter, 2016).<sup>2</sup>

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<sup>2</sup>This line of argument is not absent from some other world regions, however, including Russia (Frye, Reuter and Szakonyi, 2014) and India (Sukhtankar, 2012).

## 1.1 Securing Benefits Through Rural Producer Organizations

In this paper, I focus on how RPOs distort the allocation of benefits from programmatic guidelines by pulling benefits down to their membership. Rather than being full of atomized actors, the African countryside is full of organizations that alter a politician's political logic. RPOs communicate demands for benefits and offer politicians convenient political partners.

Agriculture remains an important aspect of life for many African households. According to the World Bank, over 50 percent of Africans work in the agricultural sector, many of them smallholders or subsistence farmers. African agriculture remains largely reliant on rain and traditional modes of production. In this context, improving access to agricultural inputs such as fertilizers, pesticides, improved seeds, farming equipment, and irrigated water can increase yields and, by extension, household incomes.<sup>3</sup>

While migration continues to African cities, politicians still require a significant share of the rural vote to win. In many countries elections are won or lost in the countryside. However, securing rural votes can be costly as the population is less dense, there are fewer roads, and less access to communication technology. One potential solution is to secure pre-existing blocks of voters. RPOs provide this opportunity.

RPOs are local institutions consisting of smallholder farmers, a potentially large electorate in most African countries. They are voluntary organizations that typically provide members benefits such as discounted inputs, training, communal storage facilities, and marketing services in exchange for dues or an expectation that farmers will market their agricultural products through the organization. RPO leadership can withhold benefits or target members with additional incentives to promote collective action. RPOs exist in every sub-Saharan African country and permeate the countryside. They typically feature open memberships, making them appealing to politicians attempting to build coalitions that cut

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<sup>3</sup>Agricultural inputs refers to resources that help increase a farmer's yields. These include fertilizer, pesticide, fungicide, improved seeds, irrigated water, farming tools and equipment, and livestock used to help till the land or provide organic fertilizer.

across other cleavages such as ethnicity.<sup>4</sup>

RPOs try to maximize memberships' benefits. They provide goods and services that increase yields and crop prices or decrease production costs. These organizations pursue many strategies to achieve such goals. One strategy they employ involves entering the political arena and extracting favorable goods, services, and policies from politicians. Potential benefits include getting the government to place agricultural extension agents in their community (Abebaw and Haile, 2013; Bratton, 1986; Negri and Porto, 2016), and securing rights to productive farmland (Murisa, 2011; Verhofstadt and Maertens, 2014). To achieve their goals, RPOs have clear incentives to demand political benefits from politicians.

Independence-era political coalitions relied partially on RPOs in Côte d'Ivoire (Zolberg, 1964), Tanzania (Hydén, 1983, 114-6), and Zambia (Rotberg, 1965). They again played an important role during third-wave democratizations in places such as Zimbabwe (Ranger, 1985) and participated in the national conferences that swept through Francophone Africa (e.g., Mali and Niger) in the early 1990s. Producer groups once featured prominently political analyses across sub-Saharan Africa (Bates, 1976, 1981, 1989; Bates and Rogerson, 1980; Bratton, 1980). This paper revisits this tradition in considering how RPOs influence the distribution of state benefits today. Crucially, in many countries, the current generation of producer organizations is qualitatively different from those that came before them; they adhere more closely to cooperative principles of open and voluntary membership, autonomy and independence, and democratic member control (e.g. Wedig and Wiegatz, 2018). The political context also differs, with more multiparty competition than in earlier periods.

Several features make RPOs appealing to politicians interested in securing political support. First, they have already overcome the collective action problems associated with their creation and established an ability to get members to contribute towards collective goals. This makes RPOs cheaper for politicians to contract with, as they do not have to pay any costs associated with organizing collective action. Next, RPOs control selective benefits that

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<sup>4</sup>A large literature considers who chooses to join these organizations (e.g. Arcand and Fafchamps, 2012; Arcand and Wagner, 2016; Fischer and Qaim, 2012; Mojo, Fischer and Degefa, 2017).



can incentivize collective action, increasing the credibility of promises of political support. Furthermore, RPOs allow politicians to discriminate and exclude potential beneficiaries. RPOs themselves can set limits or bounds on their membership. Politicians can use these limits to offer a publicly defensible rationale for distributing goods to members of a particular organization while not giving other farmers the same benefits. Potential limits include an RPOs geographic reach, the land quality or expected rainfall of an area, the length of their growing season, the types of crops grown, and local alternatives to farming.

Finally, politicians can easily identify these organizations, as RPOs feature a formal structure and leadership positions. In many countries, governments even require registration with a relevant government authority. As a result, politicians do not need to spend much effort identifying with whom they want to negotiate. This makes these organizations and, by extension, their members more legible to governments (Ferree et al., 2022).<sup>5</sup> Fifth, these organizations have clear and homogeneous demands for goods that politicians can deliver: cheaper inputs, higher prices through marketing boards, extension agents, and so on.<sup>6</sup> Finally, the goods and services politicians provide to these organizations often facilitate short contracting. A fertilizer subsidy may be given one year and not the next. Politicians can withdraw extension agents from a community. Short contracting benefits politicians by giving them more opportunities to punish defecting RPOs.

Given the incentives for RPOs to demand benefits and for politicians to supply them, there is the potential for a mutually beneficial agreement. Politicians satisfy the demands of RPOs, and RPOs provide politicians with the political support they desire. This agreement could be explicit and formal but does not necessarily need to be.

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<sup>5</sup>Government's may lack the right information to target households according to programmatic criteria. RPOs may help fill in this gap, at least among RPO members.

<sup>6</sup>In this paper, I consider goods that politicians are already providing. While politicians can, and sometimes do, give the organizations cash transfers, when programs already exist that provide valuable benefits, it can be simpler to alter the distribution of benefits than to try and pay off groups with cash.

## 1.2 Differences Among RPOs: Why Target Some Groups and not Others?

Not all RPOs are created equal. Some should receive more benefits than others. I highlight two factors influencing whether RPOs and politicians can translate their incentives for a deal into reality. First, a politician's willingness to supply benefits increases with organizations they believe can deliver political support. Second, negotiations between politicians and organizations are subject to transaction costs like any other negotiation, and minimizing those costs can encourage the exchange I outline.

If politicians ultimately deliver benefits to an RPO, they should be confident the RPO will support them politically. If RPOs can demonstrate evidence of overcoming collective action problems, such as marketing agricultural products through their organization, politicians can more confidently believe in promises of political support.

If this direct evidence is not forthcoming, RPOs that demonstrate an ability to apply selective sanctions to members that would enable them to overcome collective action problems may still be regarded as potential partners.<sup>7</sup> The more services an organization offers, the more potential sanctions will be at its disposal. RPOs that provide particularly valuable services to members or services unavailable elsewhere in the community have access to a particularly potent sanction.

Finally, exchanges between politicians and RPOs are subject to transaction costs like any other political contract. These costs may be reduced if the politician is a member of the RPO. Such a politician should be in a position to better understand the organization's particular demands and the amount of support the organization can realistically deliver. For their part, RPOs with politicians as members can better enforce an agreement, as they can sanction the politician just as they can sanction any other RPO member.<sup>8</sup> Having a local

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<sup>7</sup>Potential sanctions include the different services these organizations provide members, e.g., training, weather forecasts, discounted inputs, etc.

<sup>8</sup>Similarly, in other contexts, local political elites have, at times, captured RPOs (Banerjee et al., 2001; Sukhtankar, 2012).

politician as a member could also render the organization more legible to the government by providing a mechanism for channeling information about the organizations and individual members to the government.

### 1.3 Hypotheses and Testable Implications

RPOs use political strategies to secure benefits for their members. This argument implies that political goods valuable to agrarian households are more likely to wind up in the hands of RPO members than non-members.

**H1:** RPO members are more likely to receive targeted benefits than non-members.

However, some RPOs are better partners and are more effective at pressing the government for benefits. I expect members of RPOs connected to local politicians and those better able to demonstrate an ability to overcome collective action problems to be especially likely to receive benefits.

**H2a:** Members of RPOs with a demonstrated ability to overcome collective action problems are more likely to receive targeted benefits.

**H2b:** Members of RPOs that provide more services to members are more likely to receive targeted benefits.

**H2c:** Members of RPOs that provide particularly valuable services to members are more likely to receive targeted benefits.

**H3:** Members of RPOs connected to local politicians are more likely to receive targeted benefits.

## 2 Empirical Approach

This paper combines two empirical analyses to test my hypotheses. I begin by analyzing the allocation of input subsidies from seven African countries using the World Bank's Living Standards Measurement Surveys. This analysis allows me to consider my argument's external

validity and scope conditions and test my main hypothesis against other canonical models of distributive politics. However, I can only test my first hypothesis in these cases, as I lack detailed data about RPO organizational features to probe for specific mechanisms.

In addition to my analysis of input subsidies, I also analyze Ethiopia’s PSNP using detailed survey evidence collected from 2011 to 2014 in Ethiopia’s Amhara region. For my main analysis, I match respondents based on the official targeting criteria listed in the PSNP project implementation manual. I also probe for other potential mechanisms linking RPOs to PSNP benefits, and find little support for alternative explanations that focus on efficiency, remoteness, and ties to the central government. Finally, I also show that unobserved confounds probably do not explain these results.

## 2.1 Agricultural Input Subsidies in sub-Saharan Africa

Many African governments implemented input subsidies during the 1970s and 1980s, overseeing universal subsidy policies by purchasing fertilizer on world markets and using parastatal organizations to re-sell it to domestic farmers at a discount. These policies increased food production for urban consumers and enabled the state to reap larger rents from cash crop exports. With the end of the Cold War and the onset of the Washington Consensus, international donors pressured African countries to end these programs. During the 1990s, virtually no countries had active input subsidy programs. In the mid-2000s, fertilizer subsidies received renewed attention following the so-called “Malawi Miracle” when, following a poor maize harvest, a new Malawian subsidy program limited the country’s need for food aid. Today most African countries have some kind of fertilizer subsidy program (Figure 1, see Holden (2019) for a review).<sup>9</sup>

These programs aim to promote food security and improve agricultural performance among impoverished communities and households. Although some countries continue to use

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<sup>9</sup>Many of these programs are relatively large. For example, Zambia’s program consumed 13.6% of its 2011 budget, while Malawi’s consumed 6.3% of its 2013 budget. See Appendix C for a list of programs.

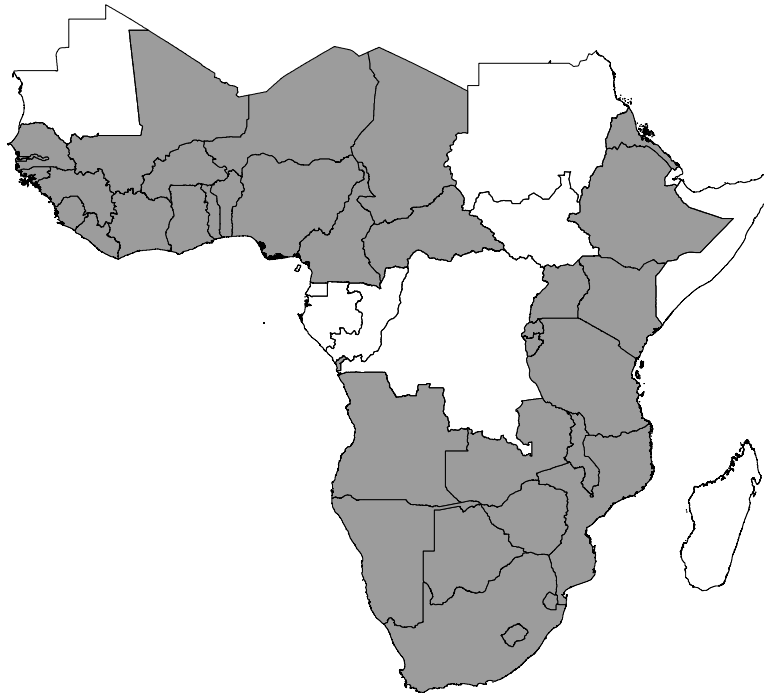


Figure 1: Countries with Agricultural Input Subsidies

universal subsidy programs, voucher programs have become increasingly common. Under these programs, the government targets households according to publicly disclosed criteria, giving them a voucher the household later redeems for fertilizer or other agricultural inputs.<sup>10</sup> Existing research suggests distributions rarely follow the stated criteria (Chibwana, Fisher and Shively, 2012; Mason, Jayne and Mofya-Mukuka, 2013). Instead, studies often argue that political criteria influence targeting decisions (Brazys, Heaney and Walsh, 2015; Jayne et al., 2018).

<sup>10</sup>In some cases, RPO membership is an explicit targeting criterion. For example, in Zambia, subsidy recipients must be RPO members (Mason, Wineman and Tembo, 2020, 1160). None of the programs considered here list RPO membership as an explicit targeting criterion.

Input subsidies are obvious candidates for political manipulation, but the literature that explores the distribution of input subsidies has produced contradictory findings. For instance, some studies find that co-partisans and core supporters are more likely to receive subsidies (Mason and Ricker-Gilbert, 2013; Mason, Jayne and van de Walle, 2017), while others find opposition supporters are more likely to receive subsidies (Banful, 2011; Mather and Jayne, 2018). Similarly, some scholars highlight the role of political networks and find that those related to politicians (Pan and Christiaensen, 2012) or those residing in a politician’s home district (Takeshima and Liverpool-Tasie, 2015) receive subsidies. On the other hand, a field experiment of Nigerian farmers Liverpool-Tasie (2012) finds that political networks do not affect who gets subsidies but instead that they influence the number of subsidized goods received. However, most of these studies focus on single cases and are interested in recovering the causal effect of subsidies on outcomes such as fertilizer use, food prices, and production, not on the distribution of fertilizer subsidies itself.

Beyond considering subsidy distributions, a few studies also consider whether these subsidies win votes. Dionne and Horowitz (2016), for instance, show subsidy recipients report a closer affinity to the incumbent ruling party, while Ferree and Horowitz (2010) describe how subsidies are one mechanism Malawi’s incumbent president used to transcend ethnic labels.

### 2.1.1 Data and Methods

This section analyzes the distribution of input subsidies using 11 LSMS surveys from seven countries using logistic regressions.<sup>11</sup> Appendix C contains a full description of each input subsidy program analyzed. I first estimate a model that pools together all survey rounds, including country, subnational region, and survey-round fixed effects. I then estimate separate models for each country.<sup>12</sup> My dependent variable is whether a household receives any

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<sup>11</sup>Surveys included are: Ghana 2009, Malawi 2013, Malawi 2016-17, Mali 2014, Niger 2011, Nigeria 2012-13, Nigeria 2015-16, Tanzania 2010-11, Tanzania 2012-13, Uganda 2009-10, and Uganda 2011-12.

<sup>12</sup>In countries with more than one available survey, I pool together respondents and include survey-round fixed effects.

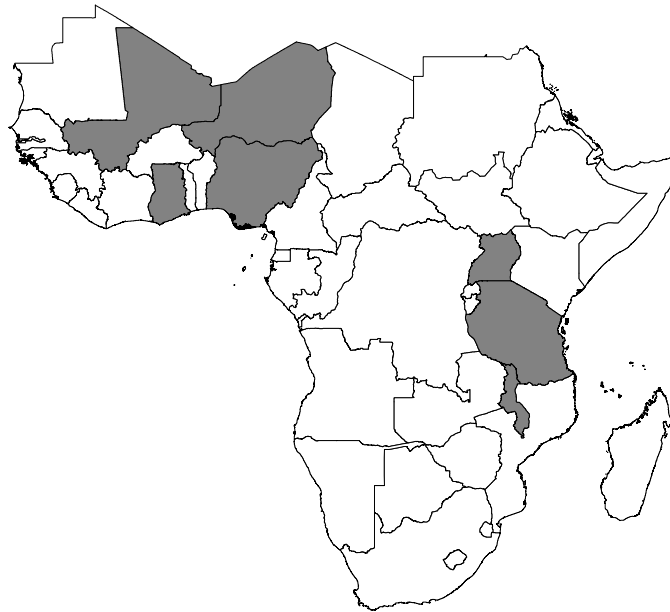


Figure 2: Countries Included in Input Subsidy Analysis

subsidized agricultural inputs from the central government.<sup>13</sup>

I attempt to control for both alternative explanations and variables influencing the targeting of subsidies.<sup>14</sup> To that end, I include a dummy variable for whether the incumbent president's party won the region and a variable that measures the margin of victory between the top two candidates in the region during the most recent presidential election. These variables are taken from national electoral commissions in all cases, with the lowest-level results (typically first-order subnational administrative units) used. Unfortunately, in Niger, I cannot locate subnational results from the country's 2011 presidential election, so this case

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<sup>13</sup>In Ghana, Malawi, Mali, Tanzania, and Uganda, households are asked if they received a voucher, coupon, or subsidy from the government to purchase fertilizer or other inputs. In Niger and Nigeria, enumerators ask households where and how they acquired fertilizer and other inputs. In these two countries, I code households as receiving a subsidy if they say the government or other political figures were involved in acquiring inputs.

<sup>14</sup>Full variable descriptions are in Appendix A.

omits these variables. I control for the potential effect of ethnic and regional favoritism by including dummy variables for the president’s co-ethnics, whether a household is in the president’s birth region, and whether a household is in the same region as the country’s capital.<sup>15</sup> Finally, I include controls for variables corresponding to popular targeting criteria outlined by governments. These include indicators for urban households and whether a household member earns wages or has a job with a salary. Where available, I also include a measure of the distance to the nearest road to control the possibility that more remote households do not get benefits due to delivery costs.

I estimate a series of logistic regressions predicting a household’s receipt of input subsidies:

$$Y_{ij} = \alpha_j + \beta_1 RPO_i + \beta_2 X_i + \beta_3 Z_j \quad (1)$$

where  $Y_{ij}$  is whether the respondent received any input subsidy,  $\alpha_j$  are subnational unit fixed effects,  $RPO_i$  is a dummy variable indicating RPO membership,  $X_i$  is a vector of individual-level covariates, and  $Z_j$  is a vector of subnational unit-level covariates. First, I pool all available respondents together into a single model. Then, I run models in each country, pooling rounds together when a country has more than one round. I include fixed effects for subnational regions and, when applicable, for survey round to help account for geographic and temporal confounds such as local growing conditions, regional variation in crop production, and rainfall shocks. Finally, models weigh respondents to recover nationally representative samples and cluster standard errors by sampling unit. In Appendix B, I re-estimate these models as Linear Probability Models and Probit regressions with consistent results.



Table 1: RPOs and Subsidies - Logistic Regressions

	All	Ghana	Malawi	Mali	Niger	Nigeria	Tanzania	Uganda
RPO	0.362*** (0.097)	-0.423 (0.336)	0.267** (0.082)	0.934*** (0.228)	2.155* (0.963)	0.280 (0.290)	0.352+ (0.207)	0.824** (0.309)
Co-Ethnic	0.122 (0.116)	1.023*** (0.240)	0.043 (0.141)	-1.265*** (0.381)	-0.416 (0.793)	-0.948 (0.835)	1.092+ (0.607)	0.460 (0.463)
Employed	0.023 (0.108)	-0.227 (0.233)	-0.243* (0.113)	-0.488 (0.302)	1.533** (0.523)	0.452 (0.303)	-0.192 (0.140)	0.292 (0.301)
Urban	-0.075 (0.130)	-0.225 (0.269)	-0.231 (0.184)	0.226 (0.473)	-17.423*** (0.520)	-0.280 (0.242)	0.094 (0.260)	-0.589 (0.429)
Birth Region	0.142 (0.242)	13.911 (10.645)	0.833*** (0.148)	-0.481 (0.534)	-17.964*** (0.874)	0.455 (0.690)	-15.755*** (0.359)	-0.744 (1.117)
Capital	-0.540*** (0.138)	-17.180*** (3.022)	0.242 (0.162)	-11.287*** (0.872)	15.037*** (1.210)	16.443*** (1.630)	-2.698*** (0.811)	-12.102*** (0.598)
Incumb. Victory		5.892 (4.342)	0.559*** (0.123)	0.232 (0.363)		0.466 (0.475)	0.090 (0.828)	0.116 (0.437)
Elec. Margin		-33.056 (23.260)	-0.075 (0.225)	-0.048 (0.756)		0.331 (1.302)	2.088*** (0.596)	-0.488 (0.678)
Road Dist.			0.005 (0.004)		0.012 (0.024)	-0.004 (0.018)	-0.007 (0.006)	0.024+ (0.015)
Constant	-18.153*** (0.340)	-1.423** (0.433)	-0.735** (0.234)	-2.317** (0.882)	-5.611*** (1.219)	-20.547*** (1.075)	-4.216*** (0.754)	-3.875*** (0.493)
Subnat. Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	No	No	No	No	No	No	No
Round FEs	Yes	No	Yes	No	No	Yes	Yes	Yes
Num. Clusters	3680	233	943	721	180	583	694	326
N	31,608	2,351	10,572	1,945	2,267	4,698	6,219	3,551

+p < .1; \*p < .05; \*\*p < .01; \*\*\*p < .001

Survey Design and Weights Included. Standard errors clustered by PSU.

## 2.1.2 Empirical Results

In the pooled model, RPO members are more likely to receive subsidies. Looking at each country separately, the results from Malawi, Mali, Niger, Tanzania, and Uganda support my hypothesis that RPO members receive benefits.<sup>16</sup> In only Ghana and Nigeria is there no support for my main hypothesis. Figure 3 shows the predicted probabilities from the pooled model of receiving an input subsidy in the last year. These results suggest that RPO members are, on average, roughly eight percent more likely to receive a subsidy voucher than non-members.

Beyond RPOs, these results show mixed support for alternative explanations. This should

<sup>15</sup>In most cases, ethnicity is taken from LSMS questions asking for a respondent's ethnicity or language spoken at home. However, in Mali, Nigeria's 2012-13 survey, and in Tanzania, the LSMS does not ask these questions. In these cases, I use a dummy variable indicating whether presidential co-ethnics live in the same region as a household according to GeoEPR.

<sup>16</sup>Appendix B features both additional Linear Probability and Probit models and adjusted p-values to account for multiple hypothesis testing. In all cases, my results are broadly consistent.

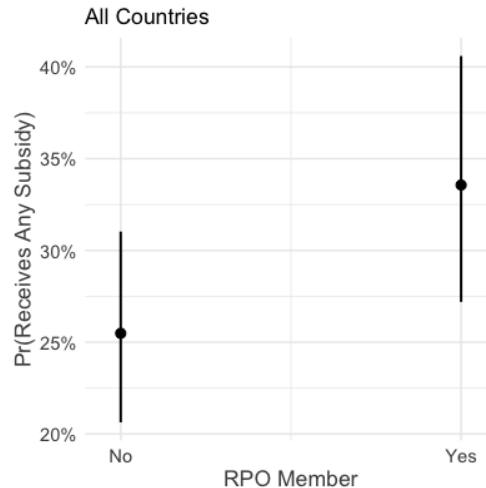


Figure 3: RPOs and Input Subsidies, Pooled Model

be unsurprising as the literature itself is unsettled on their effects. For example, in some cases, being in either a core or swing region, being the president's co-ethnic, or being from either the capital or the president's birth region increases the likelihood of receiving benefits. However, these explanations are neither consistently significant nor in a consistent direction.

This observational analysis should be interpreted cautiously. Although I attempt to control for alternative explanations and potential confounds, it is impossible to definitively rule out all potential confounds. However, in Appendix B, I show the results of a sensitivity analysis for the pooled model. This analysis suggests that any unobserved confound would need to be 100 times stronger than the effect of being in the capital region, the next largest effect, to overturn the effect of RPO membership. This provides strong evidence that some relationship exists linking RPO membership with receiving input subsidies.

### 2.1.3 Discussion of Input Subsidy Results

Although the link between RPOs and subsidies is not statistically significant in every case, it is the most consistent mechanism linking politicians and farmers. In almost every country, RPO members are more likely to receive subsidies. At the same time, other links such as core or swing regions, co-ethnicity, the president's birth region, the capital district, and

urban/rural status are inconsistently associated with receiving subsidies.<sup>17</sup>

These results may also suggest politicians do not target one type of voter to the exclusion of all others but instead use multiple strategies to garner support. Subsidy programs can be divided into two groups. First, there are programs that rely on vouchers or coupons to target individual households, such as in Malawi, Tanzania, and initially Ghana. Second, there are universal programs run through parastatal organizations. The government purchases fertilizer on international markets and then sells it to farmers at a discount, as in Mali, Niger, Nigeria, and Uganda. Comparing these two groups of countries, it appears RPOs potentially affect the likelihood of receiving subsidies in both types of programs.

My results also show links between RPOs and subsidies in a diverse array of cases. Significant relationships linking RPOs to subsidies exist in Francophone (Niger and Mali) and Anglophone (Malawi, Uganda) countries; in West Africa (Mali and Niger), East Africa (Tanzania and Uganda), and southern Africa (Malawi); in competitive political systems (Malawi), transitioning states (Mali and Niger), and one-party states (Tanzania and Uganda).

Several factors may help explain the lack of a hypothesized effect in Ghana and Nigeria. While in theory targeted, the Ghanaian program issued twice as many vouchers as initially intended in the lead-up to the 2008 presidential election, in some ways bringing it closer to a universal subsidy program. Additionally, RPOs are relatively weak in Ghana, which has not significantly changed the legal framework governing these organizations since 1968. Similarly, Nigeria's program has historically been a universal one that would be more difficult to target specific communities. The Nigerian program has an added complexity due to the country's federal system. States and local government areas play a larger role in implementing the subsidies than analogous institutions in other countries.

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<sup>17</sup>One possible interpretation of these results is that the strategy I outline here is the mechanism by which politicians implement some other strategy. Politicians may choose to steer benefits towards co-ethnics, co-partisans, swing voters, or some other group and use RPOs as a vehicle through which they can implement that strategy.

## 2.2 Which RPOs Benefits the Most? Evidence from Ethiopia

The analysis of input subsidy programs shows broad evidence supporting my first hypothesis from across the continent. To consider my other hypotheses, I turn to evidence from a series of detailed surveys from Ethiopia, including information on whether a household benefited from the country's Productive Safety Net Programme (PSNP). I use these surveys to construct a PSNP eligibility score based on official program targeting guidelines and match respondents based on this score.

Ethiopia is an ethno-federal state dominated by a single political party, the Ethiopian People's Revolutionary Democratic Front (EPRDF). The EPRDF came to power after the Ethiopian civil war and maintained control through flawed elections until its replacement in 2019. Although the EPRDF dominated political life in Ethiopia, its unchallenged, ascendant position did not eliminate all competition or prevent the need to mobilize the Ethiopian population during elections. The EPRDF saw itself as a revolutionary party in which mass mobilization around elections was a valuable end in itself (Aalen, 2014). Additionally, material benefits accompany Ethiopian political office (Aalen and Tronvoll, 2008), and there is competition just to be nominated (Ishiyama, 2007). Successfully mobilizing supporters around elections helps local politicians maintain their current office and demonstrate their competence to party leaders to win nomination for higher offices. Furthermore, in the period around former Ethiopian Prime Minister Meles Zenawi's sudden illness and death in 2012 there was renewed competition among the EPRDF's regional factions (Arriola and Lyons, 2016). Finally, following the surprisingly strong performance of opposition parties during Ethiopia's 2005 election, the EPRDF stressed the importance of mobilizing supporters to signal its strength and ward off potential challengers (Aalen and Tronvoll, 2008; Arriola and Lyons, 2016).

For these reasons, Ethiopian politicians attempt to maximize vote shares, increase turnout, and limit nullified ballots. One strategy they use is to distribute patronage and state ben-

efits to potential supporters. EPRDF supporters are alleged to enjoy privileged access to a variety of state benefits (Berhanu and Poulton 2014, S207-9; Nunzio 2014, 16-9). One farmer, for instance, stated that the sole reason they support the EPRDF is to gain access to these benefits, “I am a member of EPRDF because I need relief assistance.... The list of receipts—the proof that I am paying my dues to the party—are required to get relief assistance. I am paying because I do not want to be suppressed or ignored” (Human Rights Watch, 2010).

Around 85 percent of Ethiopia’s labor force currently works in agriculture. Most operate as smallholders growing staple crops, such as teff and barley, or cash crops, such as coffee and oilseeds.<sup>18</sup> These communities suffer from widespread poverty, and drought and famine pose serious development challenges. Administratively the country is broken up into nine regions, each of which consists of *woredas* or districts. Over 650 rural *woredas* exist across the country. An elected council governs each *woreda* locally. Beneath *woredas* are *kebeles*, or wards, which typically govern between 3,500 and 4,000 people. Like *woredas*, governing councils oversee each *kebeles*. Officially the government has pursued a decentralization policy, pushing additional governing responsibilities down to more local levels, bringing responsibility for service delivery closer to citizens.

### 2.2.1 RPOs in Ethiopia

Ethiopia has a long history of rural collective action. During the imperial regime of Haile Selassie the he government provided RPOs with a comprehensive legal framework, but RPOs remained limited in size and scope (Tefera, Bijman and Slingerland, 2017, 435). Significant changes occurred following Selassie’s fall from power in a 1974 coup. RPOs in the 1970s and 80s received extensive support from the Derg regime, which aimed to create a socialist state in Ethiopia operating under a planned economy. All households were required to be members of an RPO. Otherwise, farmers faced sanctions, were barred from purchasing necessary supplies,

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<sup>18</sup>In my data, however, virtually all farmers focus on growing staple crops.

and had difficulty accessing government services (Develtere, Pollet and Wanyama, 2008, 129-30). Since the 1990s, Ethiopian policy towards RPOs has liberalized considerably, and RPOs embrace voluntary membership principles. Still, the government provides privileges to RPO members, giving members access to inputs and services unavailable to non-members (Tefera, Bijman and Slingerland, 2017). In 2007 there were over 24,000 RPOs around the country, with approximately 4.7 million members (Emana, 2009).

### **2.2.2 Ethiopia's Productive Safety Net Programme**

In my analysis, I examine whether a household receives benefits under Ethiopia's Productive Safety Net Programme (PSNP), a government-run social protection program established in 2005 to protect chronically food-insecure households and promote the accumulation of productive agricultural assets. International partners, including the World Bank and the United Nation's World Food Programme, have given billions of dollars in support of the PSNP (Duru, 2016), which the Ethiopian government established to replace emergency food programs. Today the PSNP is the second-largest program of its kind in sub-Saharan Africa, benefiting more than seven million people in 2015.

The PSNP provides cash and food transfers to needy households to help them survive lean seasons and prevent them from selling off productive farming equipment and inputs. In exchange for this aid, the government expects non-disabled beneficiary households to provide labor to construct community assets such as roads and irrigation projects. This requirement shifts the emphasis from emergency aid to the long-term accrual of assets to safeguard communities.<sup>19</sup> Although the PSNP's original motivation was replacing emergency food programs, it is much more than a food aid program. Promoting access to important agricultural inputs such as livestock, useful for farm work and as a source of organic fertilizer, farming tools and equipment, and community irrigation projects are integral aspects of the program.

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<sup>19</sup>Households can be exempt from the work requirement under certain conditions. For instance, if they lack any non-disabled household members due to old age or disabilities.

The Ethiopian government intends for the program to benefit chronically food-insecure households in food insecure communities, and multiple levels of government oversee targeting. First, higher-level institutions identify food-insecure *woredas*, which then identify eligible *kebeles*. A Community Food Security Task Force selects households to receive benefits within identified communities. Targeting criteria include households that have experienced food shortages in the last three years, households that own little land or few oxen, households without non-farm incomes, and household characteristics such as high dependency ratios or a female head of the household (GFDRE, 2010).<sup>20</sup> Once the community has identified eligible households, it provides a list to the *Kebele* council, which sends it to the *Woreda* council for approval. After receiving lists of eligible households, the *Woreda* council determines how much to allocate to each *kebele* and household. Communities typically identify more potential beneficiaries than the program can fund, meaning that not all eligible recipients can receive benefits, forcing politicians to make critical allocation decisions.

While the government intends for the PSNP to benefit the most food-insecure households in the most food-insecure communities, critics contend that the program is a political tool. Councilors may remove known opposition supporters from the list of potential beneficiaries (Rawlence, 2010). Despite this, many assessments find that the PSNP is generally well-targeted (e.g. Coll-Black et al., 2011; Wiseman, Van Domelen and Coll-Black, 2010), with benefits reaching intended households. However, local governments have some flexibility to alter distributions per local norms and practices.

Evaluations of the PSNP find mild but positive results (Berhane et al., 2014; Gilligan, Hoddinott and Taffesse, 2009), with the program improving food security but having less effect on the accumulation of productive assets. However, recent research indicates that the program may help promote the use of organic fertilizer (Araya, 2020), ownership of agricultural tools, and access to irrigated water (Bahru and Zeller, 2022).

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<sup>20</sup>See also Hoddinott and Mekasha (2020) and Duru (2016) for descriptions of PSNP targeting.

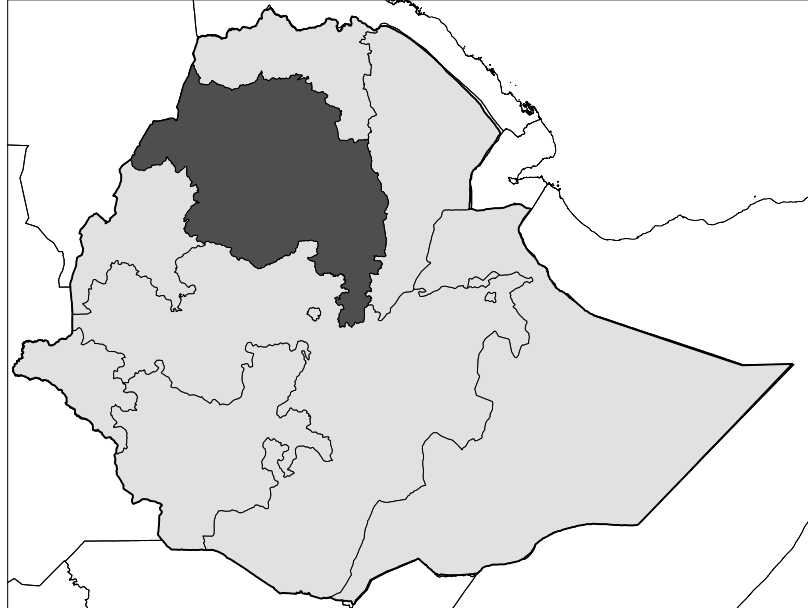


Figure 4: Location of the Amhara Region in Ethiopia

### 2.2.3 Data and Methods

I use panel survey data from Ahmed, McIntosh and Sarris (2020) to consider whether RPO members are more likely to receive benefits than non-members are and how RPO characteristics influence the likelihood of receiving PSNP benefits.<sup>21</sup> The survey covers four rounds from 2011 to 2014, initially in 120 *kebeles*, all located in the Amhara region. In each *kebele*, enumerators sampled 18 RPO households and two non-RPO households. I drop all households in communities not identified by the Ethiopian government as eligible for PSNP benefits from this sample. Ultimately I have nearly 2,400 responses spread out over four rounds of surveys covering household and RPO characteristics. Overall, 99 percent of these respondents are of the Amhara ethnic group, making ethnicity a constant in the analysis.

This survey includes an indicator for my dependent variable, whether a household received PSNP benefits in the past year. I operationalize my explanatory variables in several ways.<sup>22</sup> First, I use a dummy variable indicating whether the respondent is a member of an

<sup>21</sup>Ahmed, McIntosh and Sarris (2020) conduct a field experiment interlinking rainfall index insurance with credit for agricultural inputs in the Amhara region.

<sup>22</sup>All measures are derived from survey questions.



RPO. Next, I measure an RPO's ability to overcome collective action problems by taking the share of RPO members that sell or market their product through the organization.<sup>23</sup> I use a measure of the total number of services the RPO provides.<sup>24</sup> I also include an indicator for one important and challenging service to obtain: the provision of cash credit. Finally, I measure politically connected RPOs by whether their membership includes a *Woreda* Councilor.<sup>25</sup>

I match respondents based on a self-constructed PSNP eligibility score (Sekhon, 2011). Matching has several benefits in the context of this analysis. Although we know the criteria used to target households, we know less about how local governments use these criteria. Officials may weigh specific criteria more heavily than others, and the functional form linking criteria to PSNP benefits may be non-linear. The non-parametric nature of matching is ideal because it imposes no assumptions about specific functional forms. Moreover, regressions may overweight marginal observations biasing estimates. With matching, observations with extreme values may be dropped, reducing statistical power but helping calculate unbiased estimates through more balanced comparison groups.

To construct the PSNP eligibility score, I combine measures of the number of years out of the past ten that a family's agricultural yield decreased by more than 25 percent due to environmental shocks; average agricultural yield; the age, gender, and education of the head of household; the household size and dependency ratio; a household's non-farm income; and the amount of land and oxen a household owns.<sup>26</sup> I do this procedure twice, once on all households and once on a subset of all RPO households. Households with identical eligibility scores should, according to government criteria, be equally likely to receive PSNP benefits.

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<sup>23</sup>See Fischer and Qaim (2014) for a discussion on using marketing as a measure of collective action. To generate a binary indicator for my matching estimates, I split RPOs by whether at least a quarter of their members market through the organization. My results are robust to different cut-offs.

<sup>24</sup>To generate a binary indicator for matching, I split RPOs into those that offer five or more services and those that offer fewer than five services. Five is the median number of services provided by RPOs in the sample. Services include providing inputs, different types of credit, HIV education, literacy programs, marketing services, market information, storage, and transportation.

<sup>25</sup>Appendix A shows summary statistics for all measures.

<sup>26</sup>See Appendix A for more complete descriptions and summary statistics. These factors are also popularly used to explain RPO membership.

Table 2: PSNP Eligibility Score Logistic Regression Models

	Full	RPO Members
Age	−0.014*** (0.004)	−0.031*** (0.004)
Male	1.111*** (0.193)	−0.078 (0.170)
HH Size	0.215*** (0.042)	−0.013 (0.036)
Land	−0.093 (0.094)	−0.051 (0.076)
Oxen	−0.341*** (0.039)	−0.241*** (0.031)
Dep. Ratio	1.804*** (0.264)	0.415 <sup>+</sup> (0.251)
Educ. Head	−0.692*** (0.121)	−0.220* (0.110)
Poor	−0.0001* (0.00005)	−0.00003 (0.00002)
Nonfarm Inc.	0.387** (0.143)	0.001 (0.120)
Shocks	−0.167*** (0.034)	0.183*** (0.033)
Ag. Yield	−0.035 (0.024)	−0.090** (0.029)
Constant	−1.237*** (0.319)	1.856*** (0.356)
N	2,201	1,995
Matches	M1	M1-4

<sup>+</sup>p < .1; \*p < .05; \*\*p < .01, \*\*\*p < .001

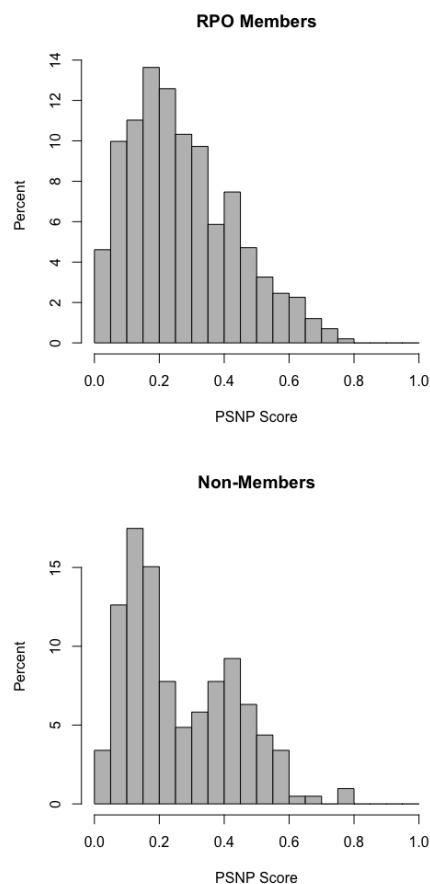


Figure 5: PSNP Eligibility Score Histograms, M1

Table 2 shows the coefficient estimates of the model used to calculate this score, and Figure 5 shows histograms of the eligibility score for RPO members and non-members.<sup>27</sup>

Households are matched 1-to-1 within each survey round based on this score. If one household matches with more than one other household, I use a weighted average of all matches. The household is dropped from the matching estimate if no suitable match is found. I compare means across comparison groups to see if RPO membership or organization features influence the likelihood of receiving benefits. Across all matching estimates, groups

<sup>27</sup>Similar histograms are in the Appendix for other explanatory variables. The histograms illustrate the overlap between comparison groups.

Table 3: Matching Estimates: PSNP Benefits

	Control Mean	Comparison Mean	ATT
M1: RPO Membership	0.223	0.341	0.119** (0.021)
M2: Group Marketing	0.311	0.504	0.193** (0.025)
M3: RPO Services >5	0.284	0.412	0.128** (0.024)
M4: RPO Credit-Cash	0.251	0.417	0.165** (0.030)
M5: Politically Connected	0.242	0.412	0.170** (0.009)

Standard Errors in Parentheses

\*p &lt;.05, \*\*p &lt;.01

M1: All Respondents; M2-M6: RPO Members Only

display balance on all variables used to construct the PSNP eligibility score.<sup>28</sup>

Finally, I consider whether three alternative explanations could account for the relationship between RPOs and PSNP benefits. Specifically, politicians could target profitable organizations or organizations with close ties to the central government. They may not target remote organizations due to the costs of delivering services to those communities. I operationalize these explanations with measures of an RPO's overall profitability, an RPO's taxes paid to the government, whether an RPO received external help when founded, and a farmer's distance to the nearest market.

#### 2.2.4 Matching Estimates

Table 3 shows the ATT estimates when I match households on PSNP eligibility scores. M1, which compares RPO members to otherwise similar non-RPO members, indicates that RPO members are significantly more likely to receive benefits, which is consistent with my first hypothesis and the results from the logistic regression. Next, M2 through M5 show that among otherwise similar RPO members, members of an organization with higher rates marketing their products through the group, members of RPOs that provide more than

<sup>28</sup>See Appendix A for post-matching balance tables.

five services, members of organizations that offer members cash credit, and members of an organization with a *Woreda* councilor, are all significantly more likely to receive PSNP benefits. These estimates are consistent with my second and third hypotheses.<sup>29</sup>

These results are substantively and statistically significant. For example, being in the same RPO as a *Woreda* councilor is associated with an increase in the likelihood of receiving PSNP benefits of over two-thirds, from 24.2 to 41.2 percent, while being in an organization offering more than five services is associated with an increase of nearly 50 percent, from 28.4 to 41.2 percent.

### 2.2.5 Alternative Explanations, Robustness, and Causality

These results provide strong evidence in support of my hypotheses. These relationships are unlikely to result from specific modeling decisions, and in the Appendix, I report additional linear probability, logit, and probit models with consistent results. Similarly, in the Appendix, I show results from bivariate regressions to guard against the possibility that controls are acting as potential colliders instead of confounds, again with consistent results.

I attempt to rule out several alternative explanations and mechanisms explaining both RPO features and PSNP benefits. As previously noted, the sample is 99 percent Amharic, ruling out ethnicity-based explanations. Additionally, since every community sampled has at least one RPO, selection effects related to why some communities may have RPOs while others do not can also be ruled out. In Appendix B and Figure 6, I show results from additional models using measures of efficiency, remoteness, and ties to the central government. If RPOs improve agricultural performance, governments may attempt to support the most efficient households, believing they would make full use of any gains in productive assets. However, if this were true, we should see the government targeting more productive households, either overall or within RPOs. However, this is not the case. Among RPO members, the least productive households are most likely to get benefits. Additionally, members of RPOs with

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<sup>29</sup>In Appendix B, I also estimate models using Logits, Probits, and Linear Probability Models as a robustness check, with consistent results.

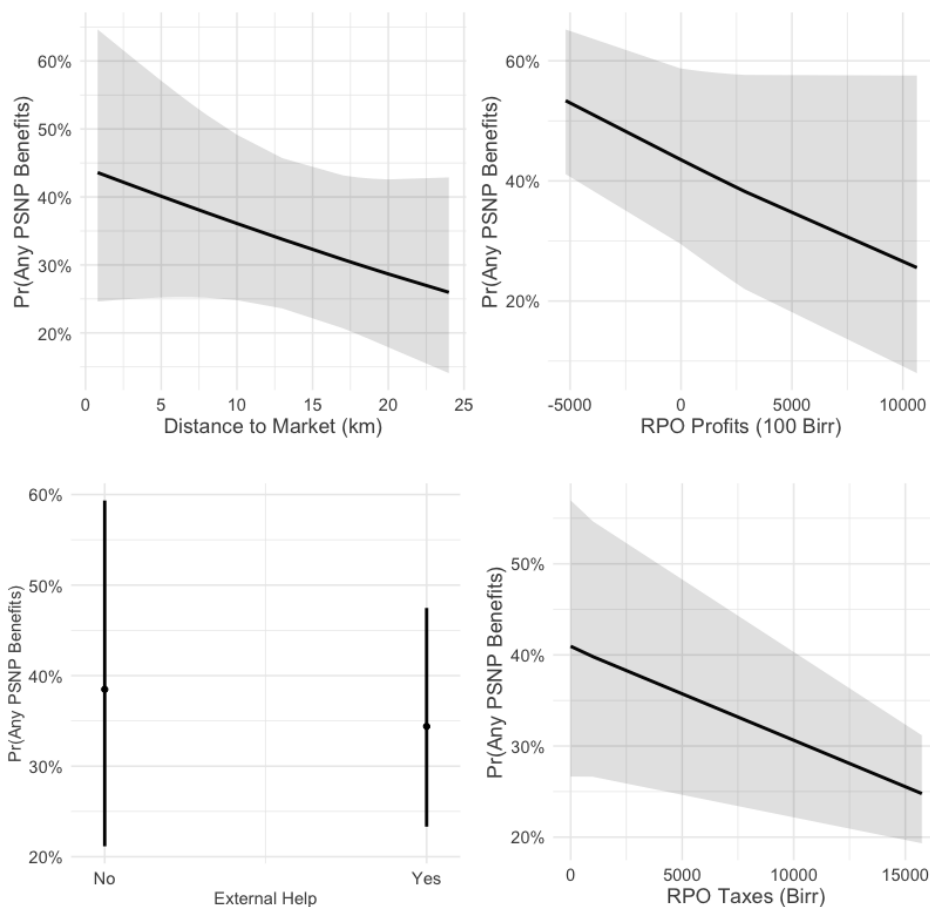


Figure 6: Alternative Explanations

larger profits, a potential measure of RPO efficiency, actually receive fewer benefits. Second, members of RPOs in more remote areas may receive fewer benefits simply because of the difficulty delivering goods to these places. To rule out this explanation, I run models that include distance to the nearest market as a covariate, which does not predict the receipt of benefits.<sup>30</sup>

Finally, a close relationship between RPOs and the central government could explain the supply of benefits. To that end, I run models that include monetary transfers by RPOs to the central government and models with an indicator for whether the RPO received external help in its founding.<sup>31</sup> If the central government picks winners, organizations that give them

<sup>30</sup>See Appendix B for detailed results.

<sup>31</sup>The government is known to have played an active role in helping establish certain RPOs. Although, some research indicated that government-initiated RPOs are less effective than community-initiated organi-

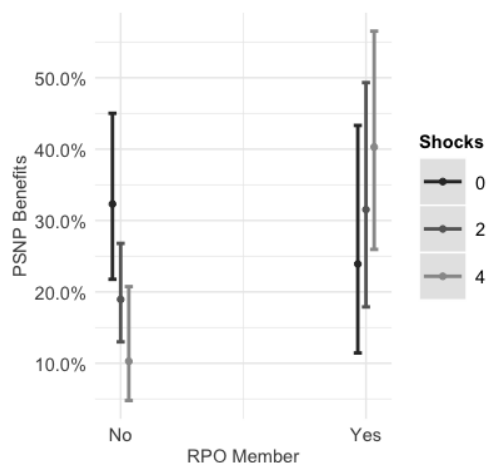


Figure 7: RPO Membership and Production Shocks

money or organizations they helped create may benefit. My results do not support either supposition. This also helps rule out potential reverse causality concerns that government support also determines RPO features.

These non-findings might suggest that the effect of RPOs is due more to altering the demand for benefits rather than the supply of benefits. These alternative mechanisms focus on the government’s incentives to supply benefits to one group or another, whether such incentives are to increase overall output or steer benefits to profitable RPOs that enjoy a relationship with the central government. Still, given this data, it is difficult to distinguish an RPO’s ability to demand benefits from a politician’s willingness to supply them.

Another possibility is that RPOs improve the government’s ability to target benefits. Well-intentioned politicians may lack the information needed to target appropriately, not knowing which potential beneficiaries meets the official criteria. RPOs could provide this information to politicians, rendering their members legible. If true, we might expect targeting criteria to be more closely followed among members than among non-members. Figure 7 shows that among RPO members’, households that experience production shocks reducing output have a greater likelihood of receiving benefits. The opposite is true among non-

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zations (Gezahegn et al., 2020).

members.<sup>32</sup>

As this is observational data, there is always the risk that other factors explain observed outcomes. However, the rigor in this analysis should give us a high degree of confidence in the results presented here. By design, comparison groups should be equally likely to see PSNP benefits according to targeting criteria, yielding two otherwise equivalent groups. The only observed difference between groups is the hypothesized RPO features. By matching on official targeting criteria, and having balance on these criteria, there would need to be some other unobserved factor correlated with both RPO features and PSNP benefits, yet uncorrelated with matching criteria, to overturn these results. While it is impossible to rule out all such explanations definitively, we can understand how strong such a confound would need to be to cast doubt on these results. In Appendix B, I present the results of a sensitivity analysis of an equivalent regression model. These results show that any unobserved confound would need to be three times as strong as the effect of education to overturn the result linking RPO membership to PSNP benefits. The results of this analysis are not an artifact of modeling decisions and cannot be explained by several rival explanations or mechanisms. Moreover, they are unlikely to be driven by unobserved confounds.

### 3 Conclusion

This article considers whether RPO members receive targeted political benefits and, if so, what RPO-level characteristics influence targeting. It contributes to our understanding of distributive politics in sub-Saharan Africa by bringing attention to the role of economic organizations in pressuring governments for benefits. Existing theories of distributive politics argue that politicians target co-ethnics, core supporters, or swing voters. While this may be true in many cases, and with many distributive goods, I argue that RPOs allow farming communities to press politicians for benefits their membership is likely to value. United by a common interest in increasing returns from farming, these organizations articulate agrarian

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<sup>32</sup>See Appendix B for the logistic regression used to generate this plot.

interests and distort the allocation of state programs in their members' favor.

Support for my argument comes from two distinct analyses. First, using survey responses from 32,000 households across seven countries, I find that RPO members are more likely to receive subsidies than non-members. Whether based on ethnic appeals or partisan attachments, no other distributive logic has a relationship as consistent as RPOs. Second, using an in-depth panel from Ethiopia, I show that RPO members are more likely to receive benefits after matching on government targeting criteria than non-members. Furthermore, I show that members of more organized RPOs or RPOs connected to local politicians are most likely to receive benefits. These results are robust to alternative approaches and cannot be explained by arguments emphasizing efficiency, targeting costs, and ties to the central government. Furthermore, they are unlikely to be due to unobserved confounds.

These results help us understand an overlooked political actor: rural producer organizations. Research on contemporary African politics research highlights the role of political intermediaries in bridging the gap between politicians and voters. These intermediaries often come from social organizations such as ethnic groups (Kasara, 2007) or traditional institutions (Koter, 2016). However, this paper illustrates how economic organizations can also occupy a similar institutional space. Future research should consider how these organizations relate to one another and how politicians navigate this institutional space. For instance, a politician's choice of intermediary could depend on local economic, ethnic, and social conditions and features of the goods they are distributing.

Previous research highlights the importance of the rural sector for contemporary African regimes (Boone and Wahman, 2015; Rabinowitz, 2018). However, while many other studies emphasize politicians' incentives to coerce and control the countryside, this paper depicts a more collaborative relationship between politicians and African farmers. RPOs successfully press politicians for benefits by organizing rural households and extracting pro-producer policies such as fertilizer subsidies and food aid. Rather than being atomized objects in a political game, rural communities have opportunities to shape their future.



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## **Appendix A: Variable Descriptions, Balance Tables, and Summary Statistics**

Below I provide a description of each variable used in my analyses. Next, I show summary statistics for both the Ethiopia sample, and for every country included in the analysis of input subsidy programs. I then show classification matrices, illustrating how well the constructed PSNP eligibility score does at predicting the receipt of benefits. Most respondent's who are predicted to receive PSNP benefits ultimately do, with this score performing better among RPO members than non-members. Next, I show balance tables for each matching estimate reported in my analysis of PSNP benefits, showing balance between comparison groups based on official PSNP targeting criteria. This suggests that comparison groups are no different from one another based on observable measures. Finally, I show histograms for PSNP eligibility scores for each comparison group used in my matching estimates.

## A.1 Variable Descriptions

Table A1: Ethiopia - PSNP Analysis

Name	Description
PSNP Benefits	Receipt of PSNP benefits in the last year.
Politically Connected	Membership in the same RPO as a <i>Woreda</i> Councilmember.
Group Marketing	Membership in a RPO where over 25 percent of members market through the organization.
RPO Services	Number of services provided by a respondent's RPO.
RPO Credit-Cash	Membership in a RPO that offers cash credit to members.
PSNP Score	Computed PSNP benefits propensity score using PSNP targeting guidelines.
Age	Age in years of the head of household.
Male	Gender of the head of household.
Educ. Head	Head of household attended some school.
HH Size	Number of household members.
Dep. Ratio	# of children under 12 + Adults over 65 divided by HH Size.
Land	Amount of land owned by the household.
Oxen	Number of oxen owned by household.
Nonfarm Income	Total value of household's nonfarm income (in birr).
Poor	Household in bottom 40 percent of expenditures during round one.
Shock	Number of years (out of last 10) household yields reduced by 25 percent.
Yield	Total kilograms of agricultural production divided by hectares cultivated.
PSNP Village	Village chosen to receive PSNP benefits.
Distance to Market	Distance (in km) to nearest market.
RPO Profits	RPO profits (in birr) last year.
Transfers to Gov't	Amount (in birr) transferred by RPO to the Gov't last year.
External Help	RPO received help from external source during creation.

Table A2: LSMS - Input Subsidy Analyses

Name	Description
Subsidy	Respondent received a voucher for inputs, or says they purchased inputs from the government in the last year.
RPO	Respondent a member of an RPO, or lives in a village with an active RPO.
Employed	Respondent employed with a wage-paying job.
Urban	Respondent lives in urban area.
Co-Ethnic	Respondent of the same ethnic group as national executive, or speaks the home language of the national executive.
Inc. Vict.	National executive won respondent's subnational region in last election.
Margin	National executive's margin of victory or defeat in respondent's subnational region in last election.
Capital	Respondent lives in the same region as national capital.
Birth Region	Respondent lives in the national executive's birth region.
Distance	Respondent households distance to nearest market or input distributor.

## A.2 Summary Statistics

### A.2.1 Ethiopia PSNP Analysis

Table A3: Summary Statistics - Ethiopia

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
RPO	2,374	0.903	0.296	0	1	1	1
PSNP Benefits	2,374	0.321	0.467	0	0	1	1
Age	2,374	49.855	15.271	0	38	60	99
Male	2,374	0.883	0.321	0	1	1	1
HH Size	2,374	4.853	1.697	1	4	6	10
Own Land	2,374	0.626	0.698	0.000	0.000	1.000	5.250
Oxen	2,374	2.626	2.077	0	1	4	19
Dep. Ratio	2,374	0.331	0.216	0.000	0.200	0.500	1.000
Educ. Head	2,374	0.475	0.499	0	0	1	1
Nonfarm Value	2,374	724.154	4,144.506	0	0	0	108,000
Poor	2,374	0.274	0.446	0	0	1	1
Shock	2,319	2.509	1.662	0.000	1.000	4.000	7.000
Yield	2,350	1,163,326.000	51,734,737.000	0.000	450.000	1,200.000	2,500,001,024.000
Politically Connected	2,374	0.776	0.417	0	1	1	1
Services	2,355	4.716	2.075	0.000	4.000	6.000	8.000
Group Marketing	2,276	0.146	0.194	0.000	0.000	0.273	0.914
RPO Credit-Cash	2,374	0.586	0.493	0	0	1	1
Distance to Market	2,374	10.202	7.260	0.800	5.000	18.000	24.000
RPO Profits	1,646	37,219.180	179,708.500	-520,286.700	3,803.380	26,000.000	1,063,244.000
RPO Employees	2,336	2.080	2.048	0.000	0.000	3.000	7.000
Transfers to Gov't	1,786	770.338	3,231.856	0.000	0.000	0.000	15,741.000
External Help	2,374	0.361	0.481	0	0	1	1

### A.2.2 LSMS Survey Analyses

Table A4: Summary Statistics - Ghana

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Subsidy	2,404	0.145	0.352	0.000	0.000	0.000	1.000
RPO	2,353	0.038	0.192	0.000	0.000	0.000	1.000
Urban	2,406	0.146	0.353	0	0	0	1
Birth	2,406	0.136	0.343	0	0	0	1
Co-Ethnic	2,406	0.219	0.414	0	0	0	1
Employed	2,406	0.121	0.326	0	0	0	1
Inc. Vict.	2,406	0.473	0.499	0	0	1	1
Margin	2,406	0.196	0.187	0.005	0.029	0.208	0.679
Capital	2,406	0.002	0.046	0	0	0	1
Survey Year	2009						

Table A5: Summary Statistics - Malawi

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Subsidy	12,502	0.277	0.448	0.000	0.000	1.000	1.000
RPO	12,516	0.501	0.500	0.000	0.000	1.000	1.000
Urban	12,582	0.100	0.300	0	0	0	1
Birth	12,582	0.065	0.247	0	0	0	1
Co-Ethnic	12,582	0.080	0.272	0	0	0	1
Employed	10,676	0.113	0.317	0.000	0.000	0.000	1.000
Inc. Vict.	12,582	0.765	0.424	0	1	1	1
Margin	12,582	0.528	0.300	0.079	0.266	0.798	0.963
Capital	12,582	0.086	0.281	0	0	0	1
Road Dist.	12,581	8.393	6.680	0.000	4.000	11.000	72.000
Survey Years	2013, 2016						

Table A6: Summary Statistics - Mali

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Subsidy	1,945	0.507	0.500	0.000	0.000	1.000	1.000
RPO	2,002	0.069	0.254	0	0	0	1
Urban	2,002	0.030	0.171	0	0	0	1
Birth	2,002	0.960	0.196	0	1	1	1
Co-Ethnic	2,002	0.068	0.253	0	0	0	1
Employed	2,002	0.905	0.293	0	1	1	1
Inc. Vict.	2,002	0.520	0.214	0.011	0.455	0.678	0.823
Margin	2,002	0.005	0.071	0	0	0	1
Capital	2,002	3.518	1.694	1	2	5	9
Road Dist.	2,002	2,014.000	0.000	2,014	2,014	2,014	2,014
Survey Year	2014						

Table A7: Summary Statistics - Niger

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Subsidy	2,576	0.004	0.065	0	0	0	1
RPO	2,267	0.180	0.384	0.000	0.000	0.000	1.000
Urban	2,576	0.460	0.498	0	0	1	1
Birth	2,576	0.175	0.380	0	0	0	1
Co-Ethnic	2,576	0.355	0.479	0	0	1	1
Employed	2,576	0.241	0.428	0	0	0	1
Capital	2,576	0.356	0.479	0	0	1	1
Road Dist.	2,576	8.743	14.882	0.000	0.600	10.500	91.500
Survey Year	2014						

Table A8: Summary Statistics - Nigeria

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Subsidy	4,698	0.028	0.165	0	0	0	1
RPO	4,698	0.306	0.461	0	0	1	1
Urban	4,698	1.880	0.328	0	2	2	2
Birth	4,698	0.035	0.183	0	0	0	1
Co-Ethnic	4,698	0.076	0.265	0	0	0	1
Employed	4,698	0.230	0.421	0	0	0	1
Inc. Vict.	4,698	0.552	0.497	0	0	1	1
Margin	4,698	0.580	0.308	0.035	0.273	0.880	0.995
Capital	4,698	0.005	0.068	0	0	0	1
Road Dist.	4,698	6.925	7.465	0.000	0.952	10.287	47.500
Survey Years	2012, 2015						

Table A9: Summary Statistics - Tanzania

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Subsidy	6,219	0.063	0.243	0	0	0	1
RPO	6,219	0.396	0.489	0	0	1	1
Urban	6,219	0.279	0.448	0	0	1	1
Birth	6,219	0.023	0.150	0	0	0	1
Co-Ethnic	6,219	0.877	0.328	0	1	1	1
Employed	6,219	0.428	0.495	0	0	1	1
Inc. Vict.	6,219	0.947	0.224	0	1	1	1
Margin	6,219	0.364	0.186	0.019	0.200	0.536	0.682
Capital	6,219	0.031	0.174	0	0	0	1
Road Dist.	6,219	79.579	57.367	0.400	30.300	116.350	257.100
Survey Years	2010, 2012						

Table A10: Summary Statistics - Uganda

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Subsidy	3,555	0.022	0.147	0	0	0	1
RPO	3,555	0.137	0.344	0	0	0	1
Urban	3,555	0.125	0.331	0	0	0	1
Birth	3,555	0.021	0.143	0	0	0	1
Co-Ethnic	3,555	0.127	0.333	0	0	0	1
Employed	3,555	0.360	0.480	0	0	1	1
Inc. Vict.	3,555	0.676	0.468	0	0	1	1
Margin	3,555	60.222	445.075	0.012	0.197	0.692	3,373.358
Capital	3,555	0.006	0.075	0	0	0	1
Road Dist.	3,551	7.710	7.390	0.000	1.710	11.450	40.480
Survey Years	2009, 2010						

### A.3 PSNP Benefits - Eligibility Score Classification Matrices

These tables illustrate how well the constructed PSNP eligibility score did at predicting who ultimately received benefits. The tables below split the eligibility score at the mean value, making every one with an above mean eligibility score classified as being predicted to receive benefits.

Table A11: All Respondents

		Predicted	
		Benefits	No Benefits
Observed	Benefits	419	316
	No Benefits	549	917

Table A12: RPO Members

		Predicted	
		Benefits	No Benefits
Observed	Benefits	462	220
	No Benefits	460	853

## A.4 PSNP - Matching Balance Tables

Below I show balance tables after matching for each matching estimate shown in the main text. These tables highlight how, after matching on my constructed PSNP eligibility score, comparison groups are incredibly similar based on observable criteria.

Table A13: Balance - M1

Variable	Control	Comparison
PSNP Score	0.238 (0.135)	0.238 (0.135)
Age	42.638 (15.591)	50.325 (14.332)
Male	0.818 (0.386)	0.882 (0.322)
HH Size	4.223 (1.511)	4.900 (1.652)
Land	0.530 (0.712)	0.616 (0.784)
Oxen	2.475 (2.092)	2.916 (2.194)
Dep. Ratio	0.285 (0.227)	0.330 (0.206)
Educ. Head	0.549 (0.498)	0.521 (0.500)
Nonfarm Income	918.137 (7135.974)	730.742 (4139.592)
Poor	0.231 (0.421)	0.276 (0.447)
Shock	2.205 (1.643)	2.590 (1.647)
Log(Yield)	6.441 (2.517)	6.636 (1.703)
No. Obs. Dropped	962	



Table A14: Balance - M2

Variable	Control	Comparison
PSNP Score	0.367 (0.163)	0.367 (0.164)
Age	47.287 (13.820)	50.459 (13.843)
Male	0.930 (0.255)	0.930 (0.280)
HH Size	4.851 (1.584)	5.065 (1.713)
Land	0.586 (0.718)	0.563 (0.736)
Oxen	2.815 (2.030)	2.742 (2.108)
Dep. Ratio	0.342 (0.206)	0.354 (0.204)
Educ. Head	0.563 (0.496)	0.462 (0.499)
Nonfarm Income	458.574 (2631.123)	458.556 (1659.334)
Poor	0.243 (0.429)	0.322 (0.467)
Shock	2.292 (1.578)	2.621 (1.580)
Log(Yield)	6.666 (1.344)	6.736 (1.379)
No. Obs. Dropped	423	

Table A15: Balance - M3

Variable	Control	Comparison
PSNP Score	0.405 (0.186)	0.405 (0.186)
Age	46.948 (15.517)	49.191 (13.379)
Male	0.881 (0.324)	0.916 (0.277)
HH Size	4.650 (1.666)	5.054 (1.654)
Land	0.563 (0.696)	0.616 (0.778)
Oxen	2.585 (2.013)	2.593 (2.050)
Dep. Ratio	0.339 (0.218)	0.360 (0.207)
Educ. Head	0.479 (0.500)	0.428 (0.495)
Nonfarm Income	247.703 (1453.981)	642.811 (2715.496)
Poor	0.234 (0.423)	0.376 (0.484)
Shock	2.646 (1.703)	2.925 (1.546)
Log(Yield)	6.633 (1.735)	6.384 (2.147)
No. Obs. Dropped	21	

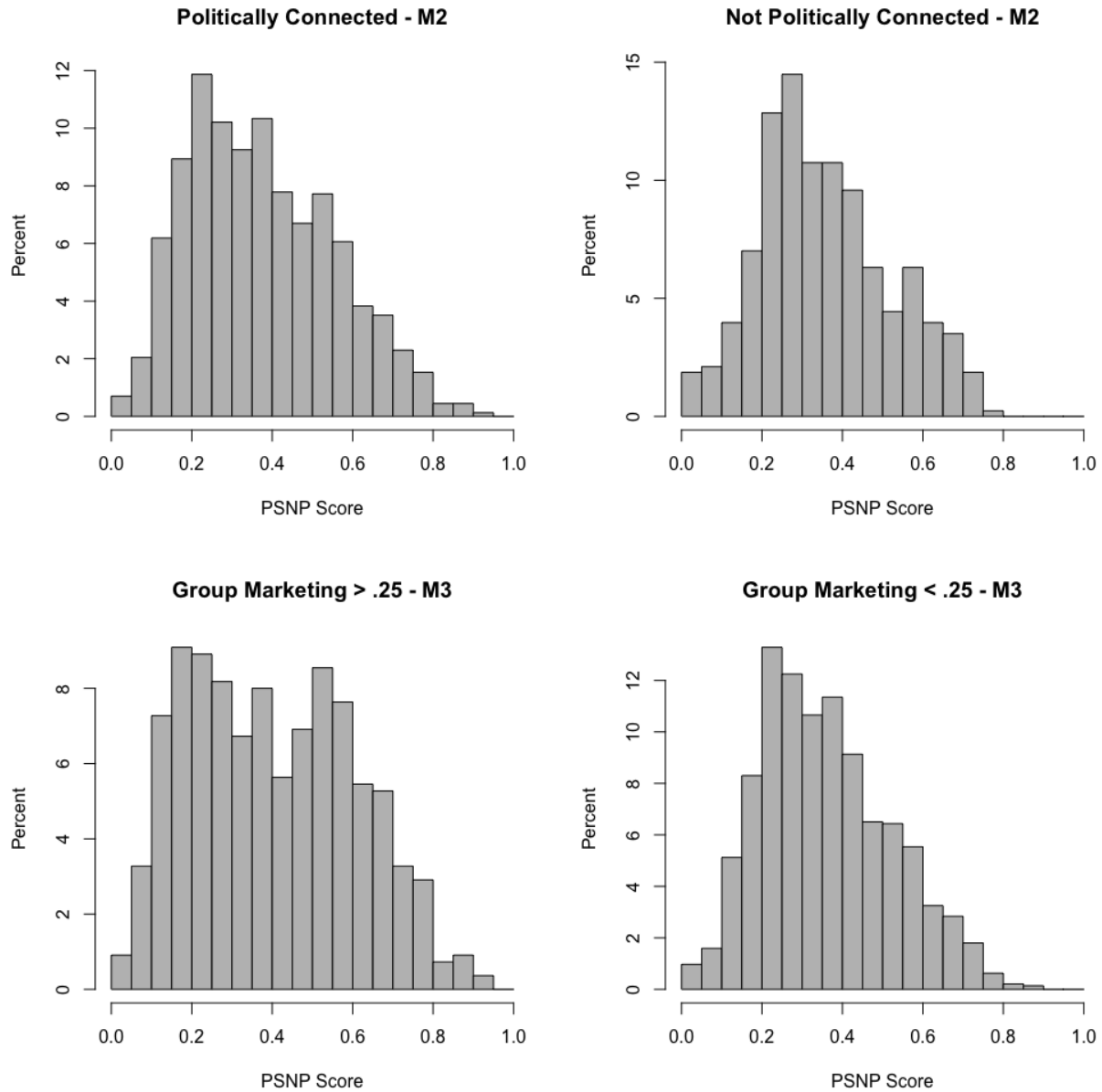
Table A16: Balance - M4

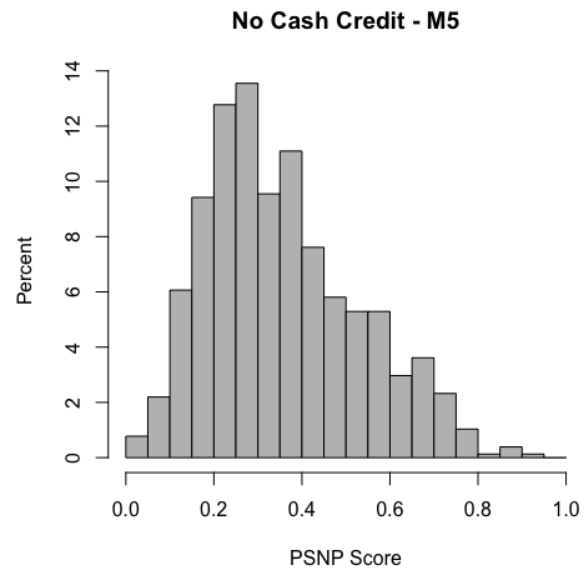
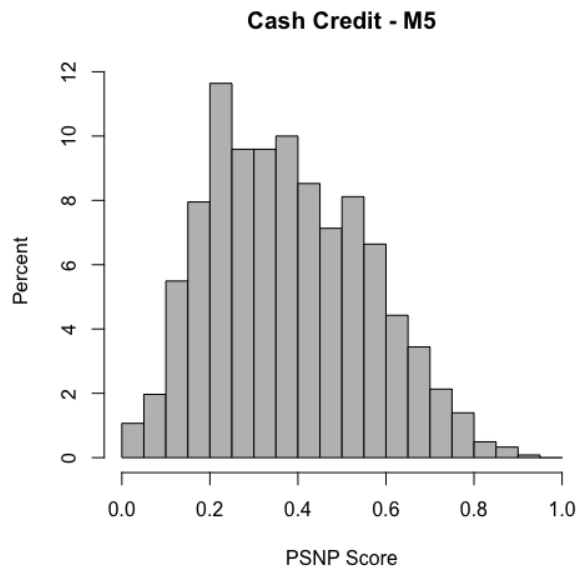
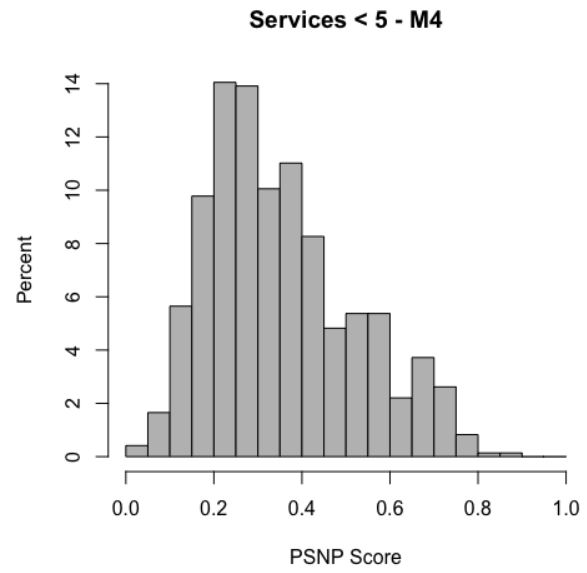
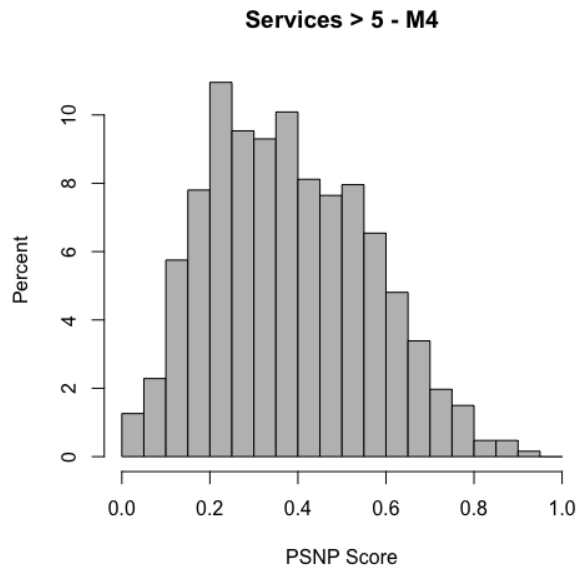
Variable	Control	Comparison
PSNP Score	0.379 (0.179)	0.379 (0.179)
Age	48.193 (16.206)	49.899 (13.562)
Male	0.867 (0.340)	0.911 (0.284)
HH Size	4.721 (1.763)	4.994 (1.649)
Land	0.578 (0.663)	0.585 (0.727)
Oxen	2.663 (1.967)	2.648 (2.190)
Dep. Ratio	0.362 (0.228)	0.349 (0.200)
Educ. Head	0.489 (0.500)	0.464 (0.499)
Nonfarm Income	503.820 (2410.220)	567.041 (2431.732)
Poor	0.271 (0.444)	0.300 (0.458)
Shock	2.386 (1.595)	2.642 (1.618)
Log(Yield)	6.705 (1.156)	6.581 (1.754)
No. Obs. Dropped	79	

Table A17: Balance - M5

Variable	Control	Comparison
PSNP Score	0.369 (0.163)	0.369 (0.163)
Age	45.511 (13.574)	50.635 (13.947)
Male	0.851 (0.356)	0.912 (0.284)
HH Size	4.971 (1.771)	4.976 (1.627)
Land	0.642 (0.875)	0.531 (0.712)
Oxen	3.303 (2.307)	2.660 (2.116)
Dep. Ratio	0.377 (0.216)	0.351 (0.202)
Educ. Head	0.465 (0.499)	0.480 (0.500)
Nonfarm Income	408.134 (1619.871)	480.653 (2152.118)
Poor	0.346 (0.476)	0.279 (0.449)
Shock	2.362 (1.759)	2.574 (1.593)
Log(Yield)	6.528 (1.248)	6.740 (1.329)
No. Obs. Dropped	98	

## A.5 PSNP - Eligibility Score Histograms





## Appendix B: Additional Models and Robustness Checks

Below I report additional models and robustness checks. Overall these results are consistent with my main findings.

First, I repeat my analysis of LSMS data using Linear Probability Models and Probits, and adjust my p-values to account for multiple comparisons. Adjusting in this fashion has little effect on my main results. Next, using the Ethiopian data, I first reproduce the main results using Linear Probability Models, Logistic regressions, and Probit regressions, and report the model used to generate Figure 7. Next, I replicate my matching estimates using bivariate Logits, Linear Probability Models and Probits. I then rule out potential alternative mechanisms using bivariate and multivariate Logitistic regressions. Finally, I repeat my matching estimates using the full sample of respondents rather than just RPO members. Alternative model specifications are generally consistent with the main results reported in the main text, suggesting that my results are not dependent on modeling decisions.

Finally, I conduct a sensitivity analysis for both the Ethiopian and LSMS analyses, illustrating how strong the unobserved confounds would have to be to overturn my results. This analysis suggests it is unlikely that unobserved confounds can explain my results.

## B.1 Input Subsidies

### B.1.1 Additional Models

Table B1: RPOs and Subsidies - Linear Probability Model

	All	Ghana	Malawi	Mali	Niger	Nigeria	Tanzania	Uganda
RPO	0.025*** (0.006)	-0.041 (0.028)	0.052*** (0.016)	0.162*** (0.040)	0.018 (0.013)	0.008 (0.008)	0.023 (0.014)	0.023* (0.010)
Co-Ethnic	0.001 (0.007)	0.143*** (0.037)	0.004 (0.026)	-0.245*** (0.065)	-0.002 (0.003)	-0.024* (0.010)	0.054* (0.021)	0.011 (0.014)
Employed	-0.0001 (0.005)	-0.026 (0.026)	-0.038* (0.018)	-0.095+ (0.054)	0.014 (0.012)	0.017 (0.011)	-0.012 (0.008)	0.006 (0.007)
Urban	-0.004 (0.006)	-0.027 (0.032)	-0.039 (0.033)	0.042 (0.084)	-0.010+ (0.006)	-0.007 (0.007)	0.009 (0.016)	-0.009 (0.006)
Birth Region	-0.010 (0.021)	1.350 (0.953)	0.181*** (0.033)	-0.122 (0.125)	-0.010 (0.007)	-0.002 (0.045)	-0.120*** (0.017)	-0.017 (0.023)
Capital	-0.058*** (0.013)	-0.545+ (0.280)	0.038 (0.029)	-0.009 (0.091)	-0.005 (0.006)	-0.001 (0.029)	-0.125*** (0.024)	-0.014 (0.010)
Incumb. Victory		0.580 (0.401)	0.101*** (0.022)	0.044 (0.060)		0.002 (0.007)	0.018 (0.035)	0.003 (0.009)
Elec. Margin		-3.304 (2.082)	-0.014 (0.046)	-0.016 (0.107)		-0.014 (0.025)	0.147*** (0.043)	-0.011 (0.013)
Road Dist.			0.001 (0.001)		-0.00003 (0.0001)	-0.0002 (0.001)	-0.0004 (0.0004)	0.001 (0.0003)
Constant	0.058*** (0.015)	0.192** (0.061)	0.360*** (0.047)	0.219* (0.099)	0.009 (0.008)	0.028 (0.024)	-0.020 (0.045)	0.022* (0.011)
Subnat. Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	No	No	No	No	No	No	No
Round FEs	Yes	No	Yes	No	No	Yes	Yes	Yes
Num. Clusters	3680	233	943	721	180	583	694	326
N	31,608	2,351	10,572	1,945	2,267	4,698	6,219	3,551

+p < .1; \*p < .05; \*\*p < .01; \*\*\*p < .001

Survey Design and Weights Included



Table B2: RPOs and Subsidies - Probit

	All	Ghana	Malawi	Mali	Niger	Nigeria	Tanzania	Uganda
RPO	0.194*** (0.051)	-0.221 (0.175)	0.158*** (0.048)	0.544*** (0.132)	0.819* (0.377)	0.146 (0.132)	0.169+ (0.102)	0.350** (0.135)
Co-Ethnic	0.080 (0.065)	0.571*** (0.137)	0.023 (0.083)	-0.760*** (0.219)	-0.140 (0.278)	-0.295 (0.371)	0.446 (0.276)	0.200 (0.204)
Employed	0.013 (0.053)	-0.110 (0.124)	-0.132* (0.064)	-0.279 (0.179)	0.600* (0.271)	0.197 (0.140)	-0.100 (0.068)	0.128 (0.128)
Urban	-0.042 (0.067)	-0.116 (0.145)	-0.122 (0.110)	0.127 (0.273)	-4.236*** (0.311)	-0.134 (0.120)	0.044 (0.130)	-0.247 (0.169)
Birth Region	0.046 (0.133)	7.149 (5.383)	0.508*** (0.090)	-0.300 (0.329)	-4.130*** (0.320)	0.224 (0.347)	-4.383*** (0.142)	-0.267 (0.468)
Capital	-0.328*** (0.080)	-5.923*** (1.537)	0.141 (0.095)	-3.091*** (0.389)	3.316*** (0.468)	3.956*** (0.668)	-1.228*** (0.343)	-2.960*** (0.232)
Incumb. Victory		3.043 (2.207)	0.329*** (0.072)	0.107 (0.212)		0.122 (0.193)	0.063 (0.379)	0.036 (0.182)
Elec. Margin		-17.083 (11.762)	-0.040 (0.134)	-0.076 (0.429)		0.156 (0.565)	1.009*** (0.292)	-0.218 (0.281)
Road Dist.			0.003 (0.002)		0.004 (0.009)	-0.003 (0.008)	-0.004 (0.003)	0.009 (0.006)
Constant	-5.307*** (0.148)	-0.870*** (0.242)	-0.440** (0.139)	-1.151* (0.467)	-2.623*** (0.467)	-5.960*** (0.472)	-2.183*** (0.357)	-2.028*** (0.204)
Subnat. Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	No	No	No	No	No	No	No
Round FEs	Yes	No	Yes	No	No	Yes	Yes	Yes
Num. Clusters	3680	233	943	721	180	583	694	326
N	31,608	2,351	10,572	1,945	2,267	4,698	6,219	3,551

+p < .1; \*p < .05; \*\*p < .01; \*\*\*p < .001

Survey Design and Weights Included

Table B3: RPOs and Subsidies - Bivariate Logits

	All	Ghana	Malawi	Mali	Niger	Nigeria	Tanzania	Uganda
RPO	0.360*** (0.087)	-0.484 (0.342)	0.313*** (0.086)	0.969*** (0.228)	2.043* (0.893)	0.209 (0.280)	0.373+ (0.200)	0.845** (0.287)
Constant	-18.754*** (0.283)	-1.460*** (0.369)	-0.382*** (0.115)	-3.400*** (0.607)	-5.433*** (0.917)	-20.318*** (0.295)	-2.520*** (0.268)	-16.377*** (0.214)
Subnat. Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FEs	Yes	No	No	No	No	No	No	No
Round FEs	Yes	No	Yes	No	No	Yes	Yes	Yes
Num. Clusters	3680	233	943	721	180	583	694	326

+p < .1; \*p < .05; \*\*p < .01; \*\*\*p < .001

Survey Design and Weights Included

### B.1.2 Multiple Comparisons - Adjusted P-Values

Table B4: Q-Values - False Discovery Rate, RPOs

	All	Ghana	Malawi	Mali	Niger	Nigeria	Tanzania	Uganda
Logit	0.000	0.240	0.003	0.000	0.043	0.336	0.120	0.016
Linear Probability Model	0.000	0.172	0.002	0.000	0.186	0.303	0.139	0.046
Probit	0.000	0.237	0.003	0.000	0.050	0.271	0.129	0.019

### B.1.3 Sensitivity Analysis - Pooled Analysis

To examine potential threats to inference due to omitted variable bias I have conducted a sensitivity analysis of this paper's finding that RPO membership is associated with a higher likelihood of receiving input subsidies. Specifically, I conduct a sensitivity analysis of the pooled model found in Table 4. This analysis illustrates how vulnerable the effect of RPO membership is to unobserved confounds (Cinelli and Hazlett, 2020). Table C15 and Figure C2 present the results from this analysis. First, in order to eliminate the effect of RPO membership an unobserved confounds that explains all of the residual variation in input subsidies would also have to explain 0.42 percent of the variation in RPO membership.<sup>33</sup> Alternatively, an unobserved confound explaining at least 6.3 percent of the variation in both input subsidies and RPO membership would eliminate this effect, while an unobserved confound explaining at least 3.25 percent of the variation in both input subsidies and RPO membership would drop the RPO membership coefficient below a p-value of .05. Put differently, an unobserved confound would have to be at least one hundred times as strong as the effect observed on being in the capital region for RPO membership to no longer be significant at a p-value of .05.

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<sup>33</sup>There is considerable residual variation in input subsidies, however, making this a very high bar.

Table B5: Sensitivity Analysis: Input Subsidies

Outcome: <i>subsidy</i>						
Treatment:	Est.	S.E.	t-value	$R^2_{Y \sim D   \mathbf{X}}$	$RV_{q=1}$	$RV_{q=1, \alpha=0.05}$
<i>RPO</i>	0.025	0.006	3.932	0.4%	6.3%	3.2%
df = 3646	Bound (1x capital): $R^2_{Y \sim Z   \mathbf{X}, D} = 0.5\%$ , $R^2_{D \sim Z   \mathbf{X}} = 0\%$					

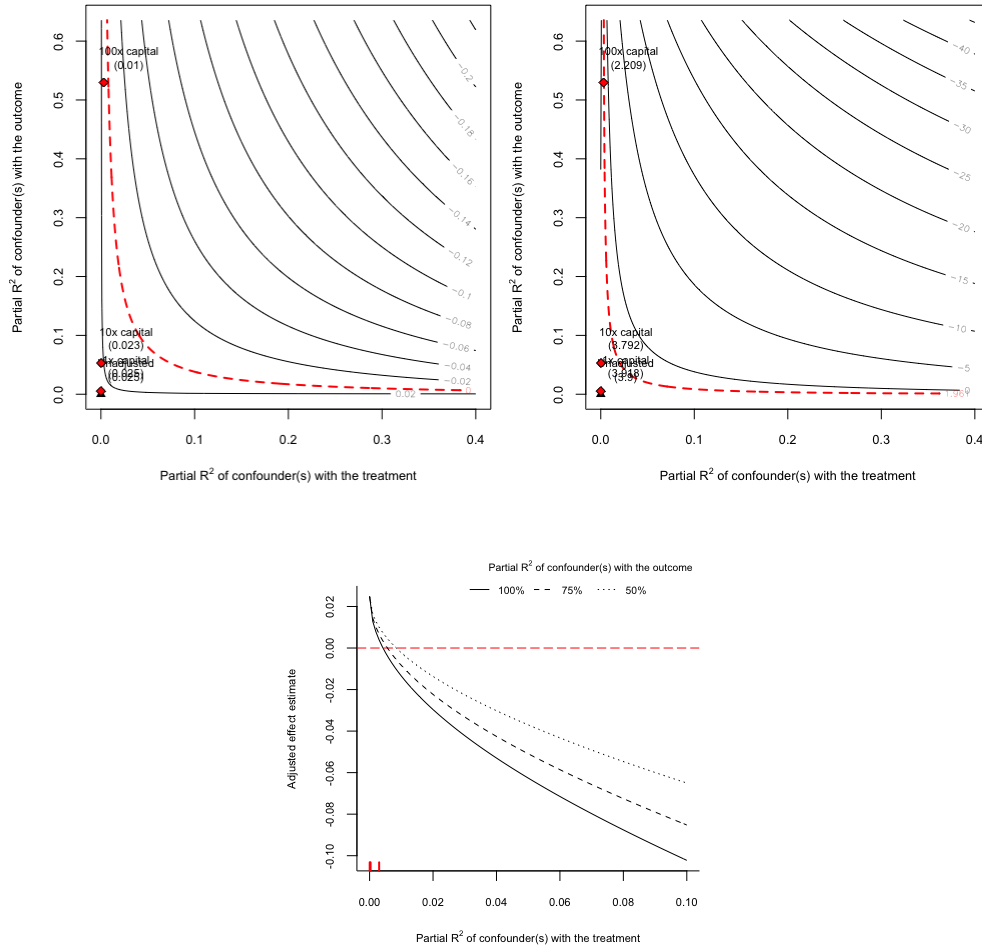


Figure B1: Sensitivity Analysis Plots: LSMS

## B.2 Ethiopia

### B.2.1 PSNP Benefits - Additional Models

Table B6: PSNP Benefits - Logistic Regressions

	Full	RPO Members	Full
RPO Member			0.970* (0.423)
Age	-0.013 (0.010)	-0.030* (0.012)	-0.022* (0.010)
Dep. Ratio	1.815** (0.484)	0.313 (0.317)	1.687** (0.533)
Educ. Head	-0.644+ (0.330)	-0.230 (0.199)	-0.656+ (0.340)
HH Size	0.223** (0.074)	-0.010 (0.049)	0.180+ (0.094)
Land Own.	-0.246 (0.234)	0.007 (0.124)	-0.265 (0.224)
Male	1.030 (0.816)	-0.115 (0.212)	0.986 (0.786)
No. of Oxen	-0.352** (0.079)	-0.278** (0.064)	-0.355** (0.076)
Nonfarm Inc.	-0.142 (0.119)	-0.012 (0.019)	-0.145 (0.106)
Poor	0.373 (0.313)	-0.035 (0.149)	0.233 (0.341)
Shocks	-0.148 (0.100)	0.189** (0.055)	-0.160+ (0.093)
Yield	-0.879 (0.705)	-0.362** (0.081)	-0.652 (0.707)
Constant	-1.401 (0.839)	1.485+ (0.789)	-0.988 (0.866)
Survey Round FEs	Yes	Yes	Yes
Num. Clusters	23	23	23
N	2,295	2,080	2,295

+p < .1; \*p < .05; \*\*p < .01, \*\*\*p < .001

Survey Design and Weights Included. Standard Errors Clustered by Kebele.

Table B7: PSNP Benefits - Linear Probability Model

	Full	RPO Members	Full
RPO Member			0.160 <sup>+</sup> (0.079)
Shocks	-0.025 (0.016)	0.040** (0.010)	-0.026 <sup>+</sup> (0.014)
Yield	-0.021** (0.006)	-0.023** (0.003)	-0.022** (0.005)
Age	-0.002 (0.002)	-0.006* (0.002)	-0.003 <sup>+</sup> (0.002)
Male	0.183 (0.132)	-0.033 (0.051)	0.176 (0.127)
Educ. Head	-0.118* (0.055)	-0.050 (0.041)	-0.114* (0.056)
HH Size	0.037* (0.015)	-0.003 (0.010)	0.028 (0.018)
Dep. Ratio	0.280** (0.086)	0.069 (0.067)	0.244* (0.092)
Poor	0.072 (0.053)	-0.007 (0.030)	0.054 (0.056)
Nonfarm Inc.	-0.003 <sup>+</sup> (0.002)	-0.001 (0.002)	-0.003 (0.002)
Oxen	-0.051** (0.011)	-0.048** (0.012)	-0.050** (0.011)
Land	-0.030 (0.028)	0.003 (0.023)	-0.031 (0.028)
Constant	0.196 (0.141)	0.802** (0.169)	0.259 <sup>+</sup> (0.146)
Survey Round FEs	Yes	Yes	Yes
Num. Clusters	23	23	23
N	2,295	2,080	2,295

<sup>+</sup>p < .1; \*p < .05; \*\*p < .01

Survey Design and Weights Included  
Standard Errors Clustered by Kebele

Table B8: PSNP Benefits - Probit

	Full	RPO Members	Full
RPO Member			0.590* (0.250)
Shocks	-0.088 (0.059)	0.113** (0.032)	-0.099+ (0.054)
Yield	-0.527+ (0.285)	-0.163** (0.018)	-0.387 (0.288)
Age	-0.006 (0.006)	-0.018* (0.007)	-0.012+ (0.007)
Male	0.535 (0.465)	-0.082 (0.133)	0.519 (0.454)
Educ. Head	-0.370+ (0.187)	-0.129 (0.119)	-0.380+ (0.196)
HH Size	0.128** (0.044)	-0.007 (0.029)	0.099+ (0.057)
Dep. Ratio	1.044** (0.273)	0.187 (0.188)	0.973** (0.310)
Poor	0.220 (0.183)	-0.016 (0.091)	0.145 (0.203)
Nonfarm Inc.	-0.058 (0.057)	-0.008 (0.010)	-0.066 (0.053)
Oxen	-0.194** (0.043)	-0.159** (0.038)	-0.198** (0.042)
Land	-0.123 (0.130)	0.006 (0.071)	-0.133 (0.133)
Constant	-0.868+ (0.476)	0.884 (0.476)	-0.613 (0.498)
Survey Round FEs	Yes	Yes	Yes
Num. Clusters	23	23	23
N	2,295	2,080	2,295

+p < .1; \*p < .05; \*\*p < .01

Survey Design and Weights Included  
Standard Errors Clustered by Kebele

## B.2.2 Model Used for Figure 8

Table B9: Table for Figure 3

RPO Member	-0.418 (0.511)
Shocks	-0.357* (0.136)
Yield	-0.775 (0.695)
Age	-0.024* (0.011)
Male	1.027 (0.704)
Educ. Head	-0.635* (0.299)
HH Size	0.139 (0.093)
Dep. Ratio	1.703** (0.597)
Poor	0.262 (0.382)
Nonfarm Inc.	-0.138 (0.100)
Oxen	-0.336** (0.080)
Land	-0.317 (0.242)
RPO*Shock	0.548** (0.157)
Constant	-0.327 (0.801)
Survey Round FEs	Yes
Num. Clusters	23
N	2,295

+p < .1; \*p < .05; \*\*p < .01

Survey Design and Weights Included  
Standard Errors Clustered by Kebele

## B.2.3 PSNP Benefits - Mechanism Models

Table B10: PSNP Benefits Mechanisms - Bivariate Logit

	(1)	(2)	(3)	(4)
Politically Connected	0.903 <sup>+</sup> (0.451)			
Group Marketing		0.869 <sup>+</sup> (0.494)		
RPO Services			0.737 <sup>+</sup> (0.408)	
RPO Credit-Cash				0.741* (0.331)
Constant	-1.276** (0.353)	-0.840** (0.221)	-1.063** (0.270)	-1.004** (0.235)
Survey Round FEs	Yes	Yes	Yes	Yes
Num. Clusters	23	23	23	23
N	2,144	2,055	2,127	2,144

<sup>+</sup>p < .1; \*p < .05; \*\*p < .01

Survey Design and Weights Included  
Standard Errors Clustered by Kebele



Table B11: PSNP Benefits Mechanisms - Bivariate Probit

	(1)	(2)	(3)	(4)
Politically Connected	0.545 <sup>+</sup> (0.270)			
Group Marketing		0.538 <sup>+</sup> (0.308)		
RPO Services			0.450 <sup>+</sup> (0.250)	
RPO Credit-Cash				0.454* (0.205)
Constant	-0.778** (0.205)	-0.520** (0.133)	-0.653** (0.160)	-0.619** (0.140)
Survey Round FEs	Yes	Yes	Yes	Yes
Num. Clusters	23	23	23	23
N	2,144	2,055	2,127	2,144

<sup>+</sup>p < .1; \*p < .05; \*\*p < .01

Survey Design and Weights Included  
Standard Errors Clustered by Kebele

Table B12: PSNP Benefits Mechanisms - Linear Probability Model

	(1)	(2)	(3)	(4)
Politically Connected	0.190 <sup>+</sup> (0.093)			
Group Marketing		0.206 (0.121)		
RPO Services			0.162 <sup>+</sup> (0.093)	
RPO Credit-Cash				0.167 <sup>+</sup> (0.080)
Constant	0.218** (0.060)	0.302** (0.046)	0.257** (0.052)	0.268** (0.046)
Survey Round FEs	Yes	Yes	Yes	Yes
Num. Clusters	23	23	23	23
N	2,144	2,055	2,127	2,144

<sup>+</sup>p < .1; \*p < .05; \*\*p < .01

Survey Design and Weights Included  
Standard Errors Clustered by Kebele

## B.2.4 PSNP Benefits - Alternative Mechanisms

Table B13: PSNP Benefits Alternative Mechanisms - Bivariate Logit

	(1)	(2)	(3)	(4)
Distance to Market	-0.034 (0.028)			
RPO Profits		-0.00000 <sup>+</sup> (0.00000)		
Transfers to Gov't			-0.00005 <sup>+</sup> (0.00003)	
External Help				-0.177 (0.514)
Constant	-0.231 (0.458)	-0.261 (0.313)	-0.366 (0.330)	-0.469 (0.432)
Survey Round FEs	Yes	Yes	Yes	Yes
Num. Clusters	23	23	23	23
N	2,144	1,487	1,613	2,144

<sup>+</sup>p < .1; \*p < .05; \*\*p < .01

Survey Design and Weights Included  
Standard Errors Clustered by Kebele

Table B14: PSNP Benefits Alternative Mechanisms - Multivariate Logit

	(1)	(2)	(3)	(4)
Distance to Market	-0.042 (0.027)			
RPO Profits		-0.00000 (0.00000)		
Transfers to Gov't			-0.00004 (0.00003)	
External Help				-0.255 (0.468)
Shocks	0.168* (0.057)	0.149+ (0.059)	0.147* (0.056)	0.194** (0.053)
Yield	-0.368** (0.069)	-0.351** (0.055)	-0.344*** (0.050)	-0.353** (0.087)
Age	-0.032* (0.011)	-0.040* (0.010)	-0.037* (0.011)	-0.031* (0.011)
Male	-0.174 (0.238)	0.169 (0.202)	-0.031 (0.194)	-0.130 (0.211)
Educ. Head	-0.191 (0.202)	-0.323 (0.239)	-0.302 (0.218)	-0.208 (0.197)
HH Size	-0.018 (0.050)	0.006 (0.058)	-0.021 (0.057)	-0.013 (0.047)
Dep. Ratio	0.278 (0.328)	0.180 (0.397)	0.283 (0.369)	0.309 (0.324)
Poor	-0.110 (0.142)	-0.108 (0.208)	0.056 (0.198)	-0.018 (0.159)
Nonfarm Inc.	-0.014 (0.019)	-0.033 (0.026)	-0.019 (0.021)	-0.011 (0.019)
Oxen	-0.286** (0.065)	-0.309* (0.067)	-0.296** (0.062)	-0.275** (0.066)
Land	0.010 (0.127)	0.127 (0.149)	0.081 (0.142)	0.033 (0.159)
Constant	2.109* (0.863)	2.064+ (0.813)	2.074+ (0.860)	1.589+ (0.836)
Survey Round FEs	Yes	Yes	Yes	Yes
Num. Clusters	23	23	23	23
N	2,080	1,440	1,566	2,080

+p < .1; \*p < .05; \*\*p < .01

Standard Errors Clustered by Kebele

### B.2.5 Mechanism Matching Estimates - Full Sample

Table B15: Matching Estimates - PSNP Benefits, Full Sample

	Control Mean	Comparison Mean	ATT
M2b: Politically Connected	0.330	0.449	0.118** (0.005)
M3b: Group Marketing	0.089	0.243	0.153** (0.034)
M4b: RPO Services >5	0.221	0.265	0.043** (0.008)
M5b: RPO Credit-Cash	0.126	0.287	0.161** (0.010)

Standard Errors in Parentheses

\*p < .05, \*\*p < .01

### B.2.6 Sensitivity Analysis - Ethiopia Analysis

To examine potential threats to inference due to omitted variable bias I have conducted a sensitivity analysis of this paper's finding that RPO membership is associated with a higher likelihood of receiving PSNP benefits. Specifically, I conduct a sensitivity analysis of the full model found in Table 2. This analysis illustrates how vulnerable the effect of RPO membership is to unobserved confounds (Cinelli and Hazlett, 2020). Table C10 and Figure C1 present the results from this analysis. First, in order to eliminate the effect of RPO membership an unobserved confound that explains all of the residual variation in PSNP benefits would also have to explain 15.4 percent of the variation in RPO membership. Alternatively, an unobserved confound explaining at least 34.5 percent of the variation in both PSNP benefits and RPO membership would eliminate this effect, while an unobserved confound explaining at least 3.8 percent of the variation in both PSNP benefits and RPO membership would drop the RPO membership coefficient below a p-value of .05. Put differently, an unobserved confound would have to be at least three times as strong as the effect observed on education for RPO membership to no longer be significant at a p-value of .05.

Table B16: Sensitivity Analysis: Ethiopia

Outcome: *PSNply*

Treatment:	Est.	S.E.	t-value	$R^2_{Y \sim D   \mathbf{X}}$	$RV_{q=1}$	$RV_{q=1, \alpha=0.05}$
<i>RPO Member</i>	0.97	0.423	2.295	15.4%	34.5%	3.8%
df = 29		<i>Bound (1x Education):</i> $R^2_{Y \sim Z   \mathbf{X}, D} = 13\%$ , $R^2_{D \sim Z   \mathbf{X}} = 0.4\%$				

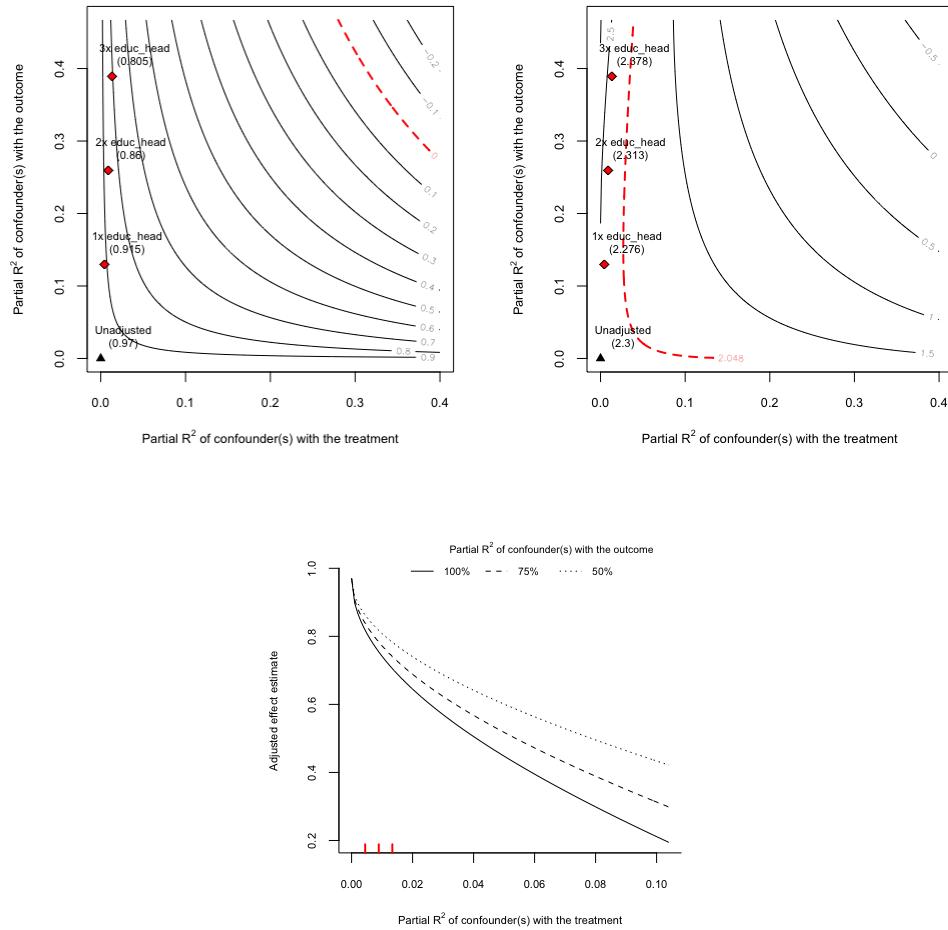


Figure B2: Sensitivity Analysis Plots: Ethiopia

## Appendix C: Description of Fertilizer Programs Analyzed

Below I briefly describe the input subsidy programs included in the analysis of LSMS survey data. For each country, I describe each subsidy program, including who is eligible for benefits, how beneficiaries are legally supposed to be chosen, well-known deviations from how they are chosen, and any other relevant information. In addition to a description of the input subsidy program, I also provide information on a given country's agricultural sector, and the broader political context surrounding the program's creation. Finally, I summarize recent input subsidy programs across sub-Saharan Africa that went into Figure 5.

### C.1 Ghana - Ghana Fertilizer Support Program

Although one of the more developed African countries, agriculture still plays a large role in Ghana. Despite Ghana's growing urban centers like Accra and Kumasi, nearly 45 percent of the country lives in rural communities, with most of that population working in agriculture. Historically cash crops like cocoa played a significant role in the Ghanaian economy, but today agriculture makes up less than 20 percent of the country's GDP. Cocoa is still the country's largest cash crop, but Ghana also has significant mining interests in gold. Ghana has one of the continent's higher rates of fertilizer usage, with over 20 kilograms of fertilizer used on the average hectare of cropland. Prominent staple crops include maize, yams, and cassava.

Ghana's input subsidy program, the Ghana Fertilizer Support Program (GFSP), launched in July 2008. The official rationale for the GFSP is to increase food security after rising food and fertilizer prices in the late 2000s. Political motives, however, are also asserted as an explanation for the GFSP (Banful, 2011). Critics argue outgoing President John Kufuor's New Patriotic Party (NPP) launched the program to benefit his chosen successor

Nana Akufo-Addo. Subsidies were introduced during an election year, but after the primary planting season in the country's south. The incumbent NPP received most of its support in urban constituencies, and this new fertilizer subsidy program was one way of winning voters in opposition strongholds (Banful, 2011). Akufo-Addo lost the election to John Atta Mills by 40,000 votes, less than a half percent of the vote.

For the first two years, the GFSP was a voucher-based system, with the government issuing vouchers to regional agricultural development units, who would distribute the vouchers to farmers within their region. Although the government planned on only issuing 500,000 vouchers in 2008, they eventually issued over 1.1 million (only half were redeemed, however). While in theory all farmers were eligible to receive a voucher, the government made some effort to target growers of staple food crops like rice and maize, as well as cotton farmers in the country's north.

Since 2010 the government has shifted away from a voucher system and towards a more traditional universal system (Houssou et al., 2019). While the total amount of the subsidy varies by fertilizer type and year, subsidies typically cover between 30 and 50 percent of the total cost. Chronic delays and other administrative problems remain a common occurrence in the GFSP.

## **C.2 Malawi - Farm Input Subsidy Program**

Malawi remains one of the least developed countries in Africa. Roughly 84 percent of the country lives in rural communities, and only four percent of the country's rural population has access to electricity. The country's staple food crops include maize, cassava, and sweet potatoes. Malawi's most significant export is tobacco, which comprises over 60 percent of exports.

Malawi's current fertilizer program, the Farm Input Subsidy Program (FISP), is a targeted voucher program launched in 2005 (see Chirwa and Dorward (2013) for an excellent description of Malawi's subsidy program). The FISP's origins lie in Malawi's "Starter Packs"

first distributed in 1998. This program targeted 2.8 million households, providing free seeds and enough fertilizer for households to cultivate 0.1 hectares of maize.

The newly elected President Bingu wa Mutharika launched the more expansive FISP in 2005. During Malawi's May 2004 presidential election, all major parties promised to increase fertilizer subsidies. In many ways, the FISP is a prototypical voucher program. The government, with the help of local authorities, identifies farmers to receive vouchers. The voucher itself is two separate coupons, the first redeems maize or tobacco seeds, and the second a bag of fertilizer which can be purchased at an additional, fixed price.

The value of the voucher varies by year, as the Malawian government prioritizes having stable input prices for voucher recipients. When fertilizer prices peaked in the late 2000s, for instance, the government was subsidizing 90 percent of the price of fertilizer, with the program consuming 16 percent of the government's budget (Baltzer and Hansen, 2011). Reports of fraud and abuse are rampant. Some households report having to pay a fee to local officials to get access to the vouchers, and counterfeit vouchers are common. Although the government outlines targeting criteria, vouchers are frequently distributed to households outside of these official criteria (Basurto, Dupas and Robinson, 2020; Chibwana, Fisher and Shively, 2012; Dorward and Chirwa, 2011).

### **C.3 Mali - the Rice Initiative**

In precolonial times present-day Mali featured early civilizations fed by the seasonal flooding of the Niger's inner delta. Most of Mali's population lives in the country's south, where cotton, the country's leading export, is king. Nearly 62 percent of Malians work in agriculture in some-fashion, and staple foods include sorghum, millet, and maize.

Mali's current subsidy program, the Rice Initiative, was launched in 2009 following increases in food and fertilizer prices in the late 2000s. Like most African countries, Mali launched a universal subsidy after independence, which lasted until economic restructuring in the 1980s. President Amadou Toumani Touré launched the Rice Initiative during his



second term in office. Touré was later deposed in a 2012 military coup during an ongoing insurgency in the country's north.

Despite its name, the program has since been extended to other fertilizer for other crops, most notably cotton, maize, and other food staples. Initially, the program was to be administered as a voucher system like other modern fertilizer subsidies. However, as in Ghana, the government later changed the program into a more traditional universal subsidy.

Mali's program is one of the more administratively complex programs. While universally available, the amount of fertilizer and their prices vary by crop and region. Farmers interested in purchasing subsidized fertilizer must fill out a *caution technique*, which describes which crops they plan on growing and how much they plan to grow. This form is then given to the Ministry of Agriculture, who negotiates prices with fertilizer dealers and sets targets for how much fertilizer should be distributed in different regions of the country.

This program is criticized for having unclear distribution criteria. The government is unable to meet fertilizer needs as expressed by farmers in their *caution techniques* and thus must prioritize certain farmers. Although rice and cotton farmers have been able to meet their expressed needs, farmers of other crops rarely have their full needs met.

### **C.3.1 Niger - Centrale d'Approvisionnement en Intrants et Matériels Agricoles**

Niger straddles the Sahara and the Sahel. The country's south, where most of its population lives, is largely agricultural. Seventy-five percent of Niger's population works in agriculture in some fashion. Niger has some of the lowest fertilizer usage rates on the continent, less than a kilogram on average per hectare. Staple crops include grains such as millet and sorghum and cassava. Groundnuts are the country's largest agricultural export.

Niger's *Centrale d'Approvisionnement en Intrants et Matériels Agricoles* (CAIMA), a government agency, supplies most of the country's fertilizer. CAIMA is organized under the Ministry of Agriculture and operates as a parastatal organization. It distributes fertilizer donated by the international community and has a dedicated government budget for

purchasing fertilizer.

CAIMA came into its current form under a new law approved in June 2010, replacing the *Central d'Approvisionnement* (CA). Months prior, in February 2010, the Supreme Council for the Restoration of Democracy deposed President Mamadou Tandja in a military coup after he attempted to circumvent term limits. In early 2011 the military held presidential and parliamentary elections, returning power to civilian hands.

The origins of this program can be traced to Seyni Kountché's regime in 1978. Kountché seized power in 1974, while Niger was amid a prolonged drought. Kountché gained popularity by focusing on food security. His regime created the CA in 1978 as part of his attempts to create a "development society" in the country, an effort to craft an authentically Nigerien society by focusing on widespread participation in public life.

Niger's subsidy program is ostensibly a universal program. CAIMA collects information from agri-dealers, commercial growers, and RPOs on anticipated demand for subsidized inputs. CAIMA then purchases as much as it can on the market and transfers the fertilizer to regional warehouses. From these warehouses, the fertilizer is distributed through local government offices or RPOs, selling the fertilizer to users and transferring the proceeds back to the government.

#### **C.4 Nigeria - Federal Market Stabilization Program/Growth Enhancement Support Scheme**

The sleeping giant of West Africa, Nigeria, is home to almost 200 million people. Africa's largest economy, half of all Nigerians live in rural communities, with most of them employed in agriculture. Historically groundnuts from Nigeria's northern Hausa-belt and palm oil from the south were Nigeria's most important agricultural exports. However, in recent years cocoa has become the most significant cash crop. With many distinct agro-ecological zones, different parts of Nigeria rely on different staple crops. In the north, root crops such as yams

and sweet potatoes are more common, while in the south, maize and cassava are commonly grown.

Nigeria's contemporary experience with fertilizer subsidies begins with the introduction of the Federal Market Stabilization Program (FMSP) in 1999. This is the same year Nigeria transitioned from military to civilian rule with the election of Olusegun Obasanjo and the People's Democratic Party. The size of the subsidy varies by the Nigerian state and Local Government Area (LGA). States submit to the federal government requests for fertilizer, outlining how much fertilizer the state expects to need. The federal government, in turn, purchases fertilizer in bulk on the international market and sells the fertilizer to states with a 25 percent subsidy. States then distribute the fertilizer to warehouses. States and LGAs can, in principle, add an additional subsidy on top of the federal subsidy. Farmers then purchase fertilizer from government warehouses, with anywhere between 25 and 75 percent of the cost covered by subsidies. As a universal subsidy, no explicit targeting criteria are used to determine who should receive subsidized fertilizer. In practice, large amounts of subsidized fertilizer leak into commercial markets, being sold to farmers at unsubsidized prices (Takeshima and Liverpool-Tasie, 2015).

In 2012 President Goodluck Jonathan, fresh off re-election in 2011, replaced the FMSP with the Growth Enhancement Support Scheme (GESS). Nigeria's new program is a voucher-based system. Starting with the poorest households, the program aims to provide farming households with 100 kilograms of fertilizer with a 50 percent subsidy (25 percent by both the federal and state government), along with a 90 percent subsidy on improved seeds (mostly maize and rice). Attempting to cut down on waste and fraud, the voucher is delivered to a farmer's cellphone (a so-called e-voucher), which entitles them to purchase the subsidized products from any agro-dealer, cutting the government out of directly distributing the subsidy.

## C.5 Tanzania - National Agricultural Input Voucher System

Despite efforts at village-ization and modernization, two-thirds of Tanzanians live in rural communities. Similarly, two-thirds of the country works in agriculture, mostly growing food crops for domestic consumption. Tanzania does have some significant export crops, notably coffee, tea, and tobacco. However, these exports comprise only a small percentage of Tanzania's GDP. Prominent food crops include maize, sorghum, and millet.

Tanzania has a long history of government intervention in the agricultural sector. Following the 1967 Arusha Declaration, President Julius Nyerere famously created "Ujamaa" villages, where subsidized inputs were available, among other government-provided goods and services. During this time, the state-owned Tanzania Fertilizer Company had a monopoly on the purchasing, distribution, and sale of fertilizer in the country. In the early 1990s, Tanzania's fertilizer market was liberalized, and the subsidy on fertilizer reduced to zero.

In 2009 as worldwide increases in food and fertilizer prices squeezed the country, President Jakaya Kikwete oversaw the implementation of the National Agricultural Input Voucher System (NAIVS) (Kinuthia, 2020). Subsidy spending peaked in 2010 when politicians from excluded regions clamored for access to the program. This happened to coincide with Tanzania's 2010 general election. Chama Cha Mapinduzi (CCM), the longest-ruling party in Africa, won the election and retained power.

A voucher system, NAIVS, targeted growers of two staple food crops: maize and rice. It provided farmers with a 50 percent subsidy on fertilizer and improved seed varieties. Village Voucher Committees (VVCs), six-member bodies consisting of three men and three women, oversee the distribution of vouchers. Voucher recipients use them at pre-approved agro-dealers, who turn the vouchers into the government for a rebate. The official targeting criteria given to VVCs is vague. However, the intent seems to be to target productive households or those who put the vouchers to their most efficient use. However, there is substantial evidence vouchers wound up in the hands of political elites at the local level

(Pan and Christiaensen, 2012).

## **C.6 Uganda - National Agriculture Advisory Services**

Despite large growth in Uganda's population, over 80 percent of Ugandans still live in rural communities, with most of them working in agriculture. In part due to its landlocked status, which increases the cost of imports, Uganda has one of the lowest fertilizer usage rates in Africa, using, on average, 2.4 kilograms of fertilizer per hectare of cultivated land. Like many East African countries, Uganda grows large amounts of coffee and tea for export. Uganda's principal food crops include plantains, cassava, and sweet potatoes.

Uganda distributes subsidized fertilizer on a much more ad-hoc basis. The National Agriculture Advisory Services (NAADS), a government agency, does provide some subsidized fertilizer. NAADS was created in July 2001, a few months after President Yoweri Museveni was re-elected to a second term. NAADS aims to improve the country's agricultural performance by providing extension services, training farmers in modern agricultural practices and helping communities form RPOs. Initially limited to a few sub-counties, NAADS has expanded its service area throughout the country. Officially participation in NAADS programs and services is restricted to farmers participating in a registered RPO.

In July 2010, less than a year before Museveni would be elected to a fourth term, NAADS was reformed into its current form (Kjær and Joughin, 2012). NAADS now supplies and distributes subsidized inputs, including fertilizer. The agency expanded its reach into every sub-county in the country. In theory, farmers are still supposed to participate in NAADS programs through RPOs, but in practice, administrators exercise considerable discretion. Outside of RPOs, NAAD does not officially target individuals, although it has long been accused of targeting better-off farmers.

## C.7 Summary of Input Subsidy Programs

The table below briefly compares the subsidy programs analyzed based.

Table C1: Summary of Subsidy Programs

Country	Ghana	Malawi	Mali	Niger
Program Name	Ghana Fertilizer Support Program	Farm Input Subsidy Program	Rice Initiative	CAIMA
Year Initiated	2008	2005	2009	2010
Initial Rationale	Improve Food Security	Improve Food Security	Improve Food Security	Improve Food Security
Universal or Voucher	Effectively Universal	Voucher	Universal	Universal
Targeted	Yes	Yes	Yes	No
Who Targeted?	Rice, Maize, and Cotton Farmers	Poor Households	Rice and Cotton Farmers	N/A
Subsidy Amount	30 to 50 Percent	Variable	Varies by Crop and Region	Variable
Country	Nigeria	Nigeria	Tanzania	Uganda
Program Name	Federal Market Stabilization Program	Growth Enhancement Support Scheme	National Agricultural Input Voucher System	National Agricultural Advisory Services
Year Initiated	1999	2012	2009	2001
Initial Rationale	Increase Yields	Improve Food Security	Improve Food Security	Improve Agricultural Performance
Universal or Voucher	Universal	Voucher	Voucher	Voucher
Targeted	No	Yes	Yes	Yes
Who Targeted?	N/A	Poorest Households	Productive Households	RPO Members
Subsidy Amount	Varies by State and Local Gov't Area	50 Percent for Fertilizer; 90 Percent for Seeds	50 Percent	Varies

### C.7.1 List of African Input Subsidy Programs

The table below provides a partial list of input subsidy programs across sub-Saharan Africa initiated since the year 2000. This table was used to generate 1. Because of the difficulty in identifying some of the programs, the paucity of available information from certain countries, and the existence of informal or ad-hoc subsidies in addition to official subsidy programs, this list should not be taken as an exhaustive list of all programs. Instead, this list should be used to get some idea of the relative frequency of these programs, and some idea of the wider distribution of input subsidies in sub-Saharan Africa from which the cases analyzed in this paper are drawn.

Country	Project	Year	Type	Notes
Angola	No Name	2019	Targeted	Fuel subsidy for farms and fisheries
Benin	Plan Stratégique de Relance du Secteur Agricole (PSRSA) Fonds National de Développement Agricole (FNDA)	2011	Targeted	
		2018	Targeted	
Botswana	Integrated Support Programme for Arable Agriculture Development (ISPAAD)	2008	Targeted	Targets subsistence farmers, replaces several older programs.
Burkina Faso	No Name	2008	Targeted	Targets by crop, RPOs help with targeting and distribution.
Burundi	Programme National de Subvention des Engrais au Burundi (PNSEB)	2013	Universal	Replaces ad-hoc distribution of input subsidies.
Cameroon	Cocoa and Coffee Sector Development Fund (FODECC)	2020	Targeted	Subsidies for export crops.
Central African Republic	Project for Reviving Food Crops and Small Livestock Production in the Savannah Project to Revitalize Crop and Livestock Production in the Savannah (PREFAS)	2011	Targeted	Small pilot program.
		2018	Targeted	Replaced previous program, geographic targeting.
Chad	Strengthening Productivity and Resilience of Agropastoral Family Farms Project (RePER)	2018	Targeted	Geographic targeting. Exists alongside ad-hoc subsidies.
D.R. Congo	None			
Republic of the Congo	None			
Côte d'Ivoire	Programme National d'Investissement Agricole (PNIA I/II) Climate Smart Agriculture Investment Plan	2010	Targeted	
		2019	Targeted	
Djibouti	None			
Equatorial Guinea	None			
Eritrea	No Name		Universal	Limited information, universal subsidies historically.
Eswatini	Farm Input Subsidy Program (FISP)	2014	Targeted	
Ethiopia	Agricultural Growth Program (AGP-I/II)	2010	Targeted	Geographic targeting.
Gabon	None			
The Gambia	No Name			Government allocates subsidies on ad-hoc basis.
Ghana	Fertilizer Support Program Planting for Food and Jobs (PFJ)	2008	Universal	Described in more detail above
		2020	Targeted	
Guinea	West Africa Agriculture Productivity Program (WAAPP)	2017	Targeted	
Guinea-Bissau	Agricultural Diversification, Integrated Markets, Nutrition and Climate Resilience Project (REDE)	2019	Targeted	
Kenya	National Accelerated Agricultural Inputs Access Program ("Kilimo Plus" Initiative) National Cereals and Produce Board (NCPB)	2007	Targeted	
		2008	Targeted	
Lesotho	Lesotho National Fertiliser and Input Subsidy Programme	2009	Universal	
Liberia	Smallholder Agriculture Productivity Enhancement and Commercialization (SAPEC) Project	2012	Targeted	

Country	Project	Year	Type	Notes
Madagascar	None			
Malawi	Agricultural Input Subsidy Program (AISP)/Farm Input Subsidy Program (AISP)	2005	Targeted	
Mali	Programme de développement stratégique de la filière coton Rice Initiative West Africa Agriculture Productivity Program (WAAPP)	2013	Targeted	Targets cotton farmers
		2005	Targeted	Targeted rice farmers initially
		2015	Targeted	Targets vulnerable households
Mauritania	None			
Mozambique	Farm Input Subsidy Program	2009	Targeted	
Namibia	Dry Land Crop Production Programme (DCPP) Comprehensive Conservation Agriculture Program Drought Relief Subsidies	2012	Targeted	Targeted geographically
		2015	Targeted	
		2016	Targeted	Tied to drought-relief
Niger	Fertilizer Reform Plan West Africa Agriculture Productivity Program (WAAPP)	2019	Targeted	
		2017	Targeted	
Nigeria	Growth Enhancement Support Scheme (GESS) Presidential Fertilizer Initiative (PFI)	2012	Targeted	
		2016	Universal	
Rwanda	Crop Intensification Program (CIP)	2007	Targeted	Targets high-yield food crops
Senegal	Agriculture, Forestry, and Livestock Act (LOASP) Great Push Forward for Agriculture, Food and Abundance (GOANA)	2004	Universal	
		2007	Universal	
Sierra Leone	Sierra Leone Opportunities for Business Action (SOBA) Smart Subsidy Program	2017	Targeted	Replaced ad-hoc programs by Ministry of Agriculture, Forestry, and Food Security (MAFFS)
Somalia	None			
South Africa	Integrated Food Security and Nutrition Programme (IFSNP) South Africa's Massive Food Production Programme	2006	Targeted	
		2002	Targeted	
South Sudan	NA			
Sudan	NA			
Tanzania	National Agricultural Input Voucher Scheme (NAIVS)	2008	Targeted	
Togo	Fertilizer Support Program (FSP) Farmer Input Support Program (FISP) AgriPME Electronic Wallet Program AgriPME Electronic Wallet Program	2002	Targeted	
		2005	Targeted	
		2016	Targeted	
		2020	Universal	Expanded due to Covid-19
Uganda	National Rice Development Strategy Agricultural Cluster Development Project (ACDP) Banana Livelihood Diversification Project National Oil Palm Project (NOPP)	2009	Targeted	
		2015	Targeted	
		2015	Targeted	
		2018	Targeted	
Zambia	Fertilizer Support Pack Farmer Input Support Program (FISP)	2002	Targeted	Recipients must be RPO members
		2009	Targeted	Replaced prior program
Zimbabwe	Presidential Input Support Program (PISP) Agricultural Input Support Program Command Agriculture	2009	Targeted	
		2012	Targeted	
		2016	Targeted	