



Income Intervention Quick Scan: Agricultural Input Subsidies

Farmer Income Lab Intervention Quick Scan

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Abstract UK This quick scan, commissioned by the Farmer Income Lab, is part of a wider research effort looking at, "What are the most effective actions that lead buyers can take to enable smallholder farmers in global supply chains to meaningfully increase their incomes?". The quick scan provides an overview of the publicly available evidence on the impact of agricultural input subsidies have had on raising farmer income. Such subsidies have had little positive effect on farmer income, are not notably beneficial for women nor is this effect long-term. They have been applied at large scale. This quick scan is part of a series of 16, contributing to a synthesis report "What Works to Raise Farmer's Income: a Landscape Review".

Keywords: farmers' income, intervention, agriculture, input subsidies, universal subsidy programs, market-smart subsidies, targeted subsidies, crop yield, profitability

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List of abbreviations and acronyms

WCDI	Wageningen Centre for Development Innovation, Wageningen University & Research
WUR	Wageningen University & Research

1 Introduction

1.1 Definition

Agricultural input subsidies are a way of incentivizing farmers to purchase inputs that they are unable or unwilling to obtain at market rates (Dorward et al., 2014). For example, smallholder farmers usually have a small land area, and they cultivate the same plants, such as maize, over consecutive years, which leads to low yield. Low yields result in low income and thus the inability to purchase costly inputs, and usually do not have access to credit (Dorward et al., 2008).

We can distinguish between two main categories of programs, i.e., **universal** and **targeted** subsidy programs (Jayne and Rashid, 2013). Universal subsidies are untargeted, pan-national price support for specific crops (Druilhe and Barreiro-Hurlé, 2012). Targeted programs, as the name suggests, targets a specific group of farmers, e.g. vulnerable or poor farmers. **Market-smart subsidies**, which can be categorized as targeted programs, have been a popular policy tool in recent years. These subsidies are characterized by the following:

- a. They target farmers for whom inputs may be otherwise unaffordable;
- b. They work with the market to help develop commercially viable supply chains;
- c. They are limited in time until the market failures that justified the subsidy have been overcome (Wiggins and Brooks, 2010).

Such programs use vouchers because ‘vouchers have proven more effective and less apt to distort the market than methods used commonly in the past, such as direct subsidies and centralized control of fertilizer procurement and distribution’ (Wiggins and Brooks, 2010).

1.2 Theory of change

Dorward et al. (2014) presents a detailed theory of change for agricultural input subsidies (Figure 1). The intention is to stimulate a ‘virtuous cycle’ of effective use of inputs. In short, the use of input subsidies can increase the quantity and quality of inputs used at the farm. This can positively impact production, for example can lead to increased crop yields and output, and farm income. The long term impacts of input subsidies can be increased welfare and income of farm households and consumers, improved food security and increased economic growth. The theory of change can be somewhat different depending on the specific characteristics of the input subsidy program. For example, Figure 2 presents the theory of change of a fertilizer subsidy program (Benin et al., 2013).

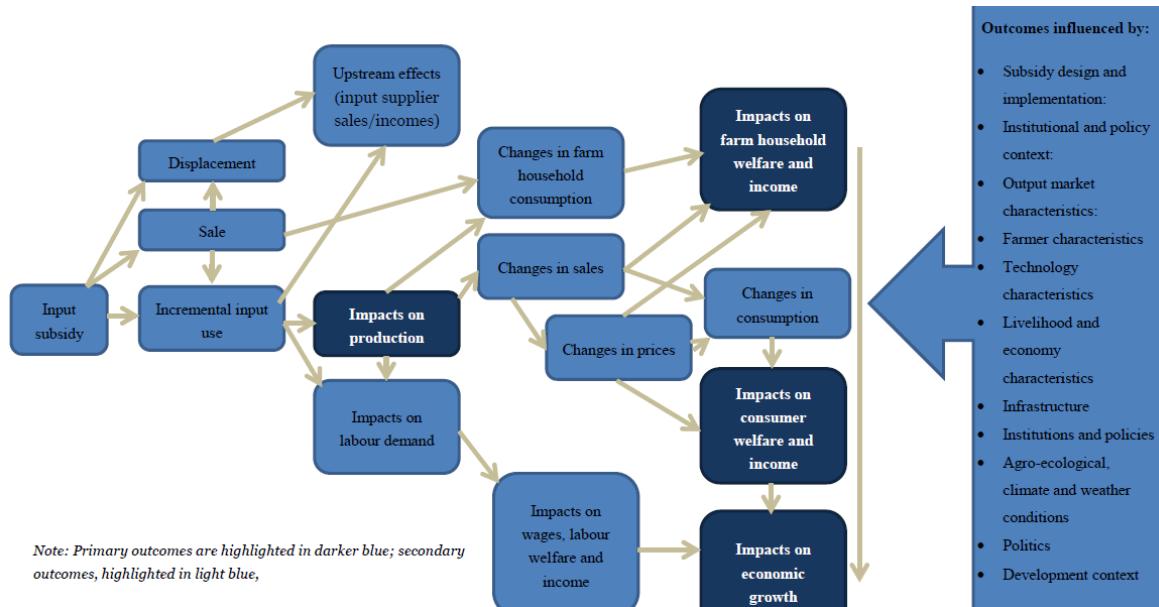


Figure 1 Impact pathways of Agricultural Input Subsidies (Dorward et al., 2014).

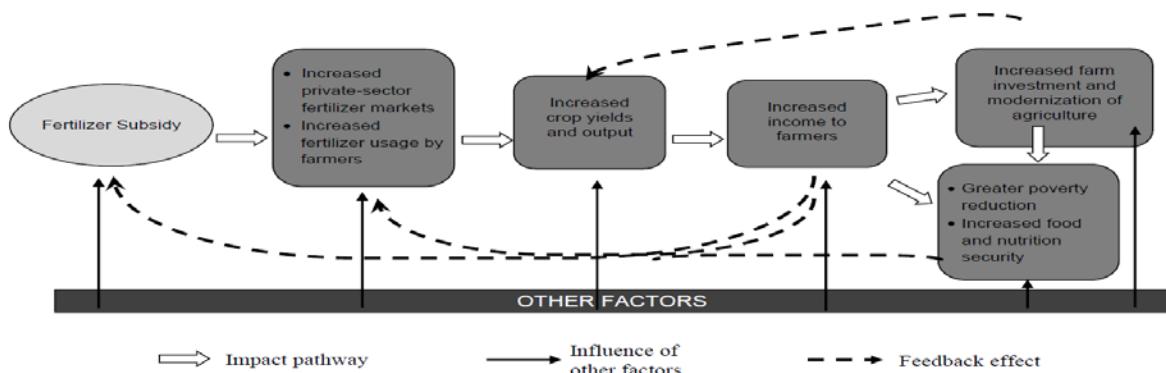


Figure 2 Theory of change of fertilizer subsidy program (Benin et al., 2013).

1.3 Geography

Agricultural input subsidy programs are implemented worldwide. Literature was dominated by studies focusing on African countries. Universal subsidy programs were implemented in Mali, Burkina Faso, Ghana, Senegal, Nigeria in the period of 2008-2011. Targeted market smart subsidies were introduced in Malawi, Kenya, Tanzania, Zambia between 2009-2011 (Jayne and Rashid, 2013). The majority of reviewed studies focus on the evaluation of farm input subsidy programs in Malawi. Further, studies addressed subsidy programs in countries, such as Nigeria, Ghana, Kenya, and Tanzania.

1.4 Role of actors

Most commonly, governments implement input subsidy programs. The role of private sector, i.e., importers and retailers, are quite important, especially in the distribution and sales of inputs to farmers.

2 Summary and justification of assessment

Strength of outcome		
Assessment criterion	WUR score	Rationale for score
Scale: Size of the population intervention could impact and potential to scale to other contexts	High	<ul style="list-style-type: none"> Input subsidies reach a higher number of farmers, households, also actors in commercial distribution systems compared to the above sample sizes. For example, Malawi introduced a subsidy program in 2005/06, which targeted ca. 50% of the farmers across the country (i.e., millions of farmers/households). <ul style="list-style-type: none"> Jayne and Rashid, 2013; Dorward and Chirwa, 2009
Impact: degree of increase in incomes	Low	<ul style="list-style-type: none"> Impact shown ranged from no significant impact to an increase of ca. 4-7% in income. <ul style="list-style-type: none"> Dorward et al., 2008; Dorward and Chirwa, 2013; Odhiambo Ochola and Fengying, 2015; Ricker-Gilbert and Jayne, 2012; Ricker-Gilbert, 2011 One study showed an increase in maize income of 26%, however authors note that this change cannot be simply attributed to the subsidy program. <ul style="list-style-type: none"> Wossen et al., 2017
Sustainability: financial ability of farmer income increase to endure independent of ongoing external support	Low	<ul style="list-style-type: none"> One study found statistically significant dynamic effect on maize production of fertilizer subsidy. <ul style="list-style-type: none"> Ricker-Gilbert, 2011
Gender: Potential of intervention to positively impact women	Low	<ul style="list-style-type: none"> Woman-headed households were less likely to receive fertilizer coupons than male-headed households <ul style="list-style-type: none"> Chibwana et al., 2009; Dorward et al., 2008; Jayne and Rashid, 2013 One source suggests that farm input subsidy program has likely reduced the gender gap in adoption of modern maize. <ul style="list-style-type: none"> Fisher and Kandiwa, 2014
Strength of evidence		
Assessment criterion	WUR score	Rationale for score
Breadth: amount of rigorous literature that exists on the impact of the intervention, as defined by the minimum quality of evidence for this paper	Medium	<ul style="list-style-type: none"> Although a limited number of review studies exist on the impacts of input subsidies, these studies focus on a variety of potential impacts and income effect is often not assessed due to data limitations (i.e., consistency, reliability issues). 10 studies were included in this overview that addressed explicit income effect. Another 5 studies had data on intermediate or other impact. <ul style="list-style-type: none"> Lunduka et al., 2013; Odhiambo Ochola and Fengying, 2015; Ricker-Gilbert and Jayne, 2012; Ricker-Gilbert, 2011 Sample sizes ranged from 200-ca. 4,000 households in studies that investigated impact of input subsidies. <ul style="list-style-type: none"> Ricker-Gilbert and Jayne, 2012; Odhiambo Ochola and Fengying, 2015; Ricker-Gilbert, 2011 Lunduka et al., 2013; Mason and Tembo, 2015 Data used in studies date back to 10-15 years.
Consistency: Degree to which the studies reviewed are in agreement on the direction of impact (i.e., positive or negative)	High	<ul style="list-style-type: none"> Out of the 10 reviewed studies that addressed income effect, 6 studies showed a low positive income effect and 3 studies found no significant increase in income. In addition, the results of 1 study were mixed, i.e., households in the top 10th percentile of the crop income distribution had a significant income increase, whereas households in the bottom 10th percentile did not have any statistically significant increase in income. <ul style="list-style-type: none"> Dorward et al., 2008; Dorward and Chirwa, 2013; Odhiambo Ochola and Fengying, 2015; Ricker-Gilbert and Jayne, 2012; Ricker-Gilbert, 2011

3 Methodology

The literature search was done using Google Scholar and Google search engines. In total, 45 studies were selected to be included in the long list, as a result of the initial screening of the matches. After reviewing the 45 studies in more detail, 24 were included in the short list, which served as a basis of this write-up. More specifically, 10 direct studies were used to elaborate effects specifically on income, 5 direct studies were consulted to conclude on intermediate and other effects (such as yield and farm profitability), and together with these studies another 9 studies were used to fill in other sections in this write-up.

Studies used to determine the income effect of the intervention in this write-up as follows:.

- Ricker-Gilbert and Jayne (2012): Quantile regression analysis based on household survey data of 2968 households in 2003/04 (nationally representative for Malawi).
- Odhiambo Ochola and Fengying (2015): Multinomial logistic analysis using cross-sectional data obtained from 200 farmers in Kenya, with a particular focus on poor and vulnerable farmers in 2009/2010.
- Wossen et al. (2017): Instrumental variable regression analysis of Growth Enhancement Support Scheme in Nigeria using household data of 2,305 households in 2015.
- Ricker and Gilbert (2011): Study measures direct impacts of the subsidy program to recipient farmers, measured in terms of production, assets and income growth, based on household survey data of 1,375, that is nationally representative for Malawi.
- Chirwa and Dorward (2013): Study based on nationally representative data for Malawi.
- Dorward et al. (2008): Household survey data of 2,491 households in 2007 was considered unreliable to estimate direct impact of the subsidy program. Hence, group discussions and key informant interviews, previous reports on different types of households' access to subsidised inputs, and of reported effects of receiving subsidies were used in this study. Also, a set of household livelihood models were used to estimate direct effects.
- Dorward and Chirwa (2013): The study used informal rural economy modelling to investigate partial equilibrium effects of the subsidy program in Malawi.
- Mason and Tembo (2015): Study, based on a nationally-representative panel survey data of 4,261 households interviewed in 2001, 2004, 2008, estimated the effects of subsidized fertilizer on household incomes, poverty incidence, and poverty severity.
- Mason and Smale (2013): Study, based on a nationally-representative balanced panel of 3,231 households, estimated the effect of subsidized hybrid seeds in Zambia.
- Awotide et al. (2015): Study on the effect of seed vouchers on poverty among small holder farms in Nigeria, using a random sample of total 600 rice farming households.

Limitation of literature

Chirwa and Dorward (2013) with regard to farm input subsidy programs in Malawi outlined difficulties of subsidy program evaluations. They presented program evaluation studies on the 2006/07, 2008/09, 2010/2011 programs (based on household surveys). From this body of literature, relevant results are also mentioned in this write-up. However, it has to be noted that while the conducted surveys provided valuable information on program implementation and outputs, **data on production and yield measurement, and plot areas were often considered unreliable and inconsistent, which prevented the estimation of production impact of the programs.**

4 Impact

Income effect in the reviewed studies ranged from no significant effect to an increase of ca. 4-7% in income. Input subsidies were shown to lead to an increase in crop yield ranging from about 22 to 100%. The study that found about 100% increase in maize yield also showed an increase in farm profitability (i.e., gross margin) of ca. 200% when using subsidized fertilizer. It is important to note that this increase in farm profitability refers to an estimation of average gross margins based on a comparison of crop budgets of one year. Also, gross margin cannot be fully equated to net farm income as gross margin does not take into account all the factors that may affect net farm income, such as overhead costs and non-operating costs (e.g. interests and taxes). Regarding other impacts, a positive impact of about 8% on annual household expenditure was found. Input subsidies had limited effect on poverty reduction ranging from 0.7 to 3.6%. One study found a reduction of 24% in poverty in Nigeria, it is, however, uncertain to what extent this reduction can be attributed to the subsidy program.

4.1 Effect on income

Dorward et al. (2008) evaluated the Malawi farm input subsidy program from 2006/2007 and found a **positive net income change of 2-3%** as a result of receiving income subsidy in (both in case of poor female and male headed households) in the Shire highlands and a **change of 1-2%** in the less poor Kasungu Lilongwe Plains. As the data from household survey 2,491 households in 2007 was considered unreliable to estimate direct impact of the subsidy program, group discussions and key informant interviews, previous reports on different types of households' access to subsidized inputs, and of reported effects of receiving subsidies were used in this study. Also, a set of household livelihood models were used to estimate direct effects.

Dorward and Chirwa (2013) found using a partial equilibrium model that the receipt of subsidies (Malawi farm input subsidy program from 2005/06-2010/11) **increased the household income** of all households in the Shire highlands by **7%**, and by **4%** in the less poor Kasungu Lilongwe Plains area.

Odhiambo Ochola and Fengying (2015) evaluated the effects of fertilizer subsidy programmes on **vulnerable farmers** and found **no significant effect** of fertilizer subsidy **on income**.

Nigeria implemented the Growth Enhancement Support Scheme in 2012, which was a mobile phone-based input subsidy program that provides fertilizer and improved seed subsidies through electronic vouchers. In relation to this program, Wossen et al. (2017) found that participation in the program **increased maize income by 26%**. The **differences in income cannot simply be attributed to the program** by looking at the mean differences between participants and nonparticipants. The authors note that mean differences are only indicative of correlations and cannot be used to make causal inferences regarding the impacts of the program on maize yields and income without controlling for other confounding factors. The **probability of being poor declined by 24% points** as a result of the program. However, authors note that these results have to be interpreted with caution and in fact they may be biased since unobserved heterogeneity was not controlled for.

Ricker-Gilbert and Jayne (2012) used household-level data in Malawi, and found that households in the **top 10th percentile of the crop income distribution received a US\$1.23 increase in income** from a kg of subsidized fertilizer. At the same time, **households in the bottom 10th percentile of the crop income distribution did not have any statistically significant increase in income** from acquiring subsidized fertilizer.

Ricker-Gilbert (2011) found **no significant effect** of fertilizer subsidies in Malawi on increasing the **value of household assets**. Also, **no significant impact** was found on off-farm income or total **household income** either in the current period or over time.

Chriwa and Dorward (2013) found that the receipt of the subsidy **does not significantly affect changes in self-assessment of poverty** among beneficiaries. Hence, it indicates that the subsidy programme may **have only weak direct income effects** on beneficiary households.

Mason and Tembo (2015) found that a 200-kg increase in subsidized fertilizer **raises total household income by approximately 7.7%**.

Mason and Smale (2013) found that an additional 10 kg of subsidized hybrid maize seed **increased smallholder maize growers' incomes by 1.1%**.

Awotide et al. (2013) found that a certified improved rice seed voucher system in Nigeria (i.e., beneficiaries may receive up to 20kg of subsidized seed) **raised annual total household income by US\$464.60**.

4.2 Intermediate and other outcomes

Crop yield/production

Benin et al. (2013) show that in Ghana as a result of their governmental fertilizer subsidy program the average maize yields were significantly higher when fertilizer was applied than when it was not, i.e., the yield approximately doubled (Figure 3).

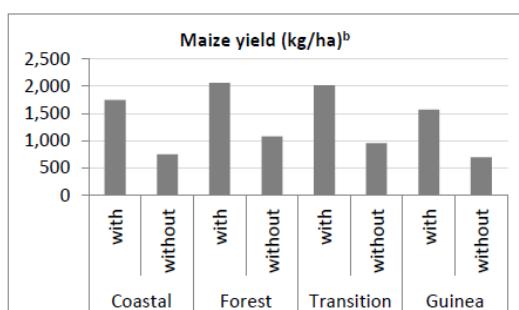


Figure 3 Maize yield (kg/ha) across different parts of Ghana (Benin et al., 2013).

Chibwana et al. (2009) evaluated the seed and fertilizer subsidy program in Malawi and found that using subsidized inputs there was an increase in fertilizer use. Households that used subsidized fertilizer had an average **increased maize output of 249 kg/household (23% increase in yield compared to output without fertilizer)**. Households that made use of fertilizer and seed input subsidies together had an average increased maize output of **447 kg/household (42% increase in yield compared to output without improved seed and fertilizer)**.

Wossen et al. (2017) found that participation in the input subsidy program of Nigeria **increased maize yield by 22%**. The differences in maize yield cannot simply be attributed to the program by looking at the mean differences between participants and nonparticipants. The authors note that mean differences are only indicative of correlations and cannot be used to make causal inferences regarding the impacts of the program on maize yields and income without controlling for other confounding factors.

Ricker-Gilbert (2011) found that each additional kg of subsidized fertilizer acquired by the household in given year led to an **increase in maize production of 1.65 kg** during that year. They also found statistically significant dynamic effect on maize production. In other words, one additional kg acquired

by households in each of the three previous years **increased production by 3.16 kg in the current year**. Further, the use of subsidized fertilizer had a significant positive contemporaneous effect on the net value of rainy-season crop production. Each kilogram of subsidized fertilizer acquired in the current year resulted in a **US \$1.16 increase in net value of rainy-season crop production during that year**.

Cargill has started to provide fertilizer as part of their credit program. In the region where they run this program, an **increase of more than 30% in cotton yields** was reported over the past three years (Flynn et al., 2016).

Jayne and Rashid (2013) suggest that **crop response rate to fertilizer use can greatly vary**. Studies included in their review showed marginal profitability or in some case unprofitability of fertilizer use. **Water control is a crucial factor** in terms of the economics of fertilizer use.

Profitability of farms

Benin et al. (2013) suggest that the use of fertilizer in maize production in Ghana led to an increased profitability of farms. The average **profit margin** was estimated (by comparing crop budgets of farmers who applied and farmers who did not apply fertilizer) **at 13% of total production costs using fertilizer**. Whereas **without fertilizer, an average loss of 22% of total production costs** was estimated (Table 1). That is, nearly an increase of 200% in profit if extra costs can be made.

Table 1 Farm profitability with and without fertilizer (Benin et al., 2013).

	With	Without
Total cost of production (GHS/ha)	658.95	432.88
Average output (kg)	1,875	845
Total revenue (GHS/ha)	744.65	335.53
Gross margin/profit (GHS/ha)	85.70	-97.38
Gross margin (%)	13.01	-22.49

Annual household expenditures

Households that received the full package of fertilizer coupons had a **higher annual expenditure per capita of 8.2%** (US\$13) compared to non-recipients (Chirwa 2010; cross-sectional data of 1,147 households in 2005/2006).

Awotide et al. (2013) found that a certified improved rice seed voucher system in Nigeria (i.e., beneficiaries may receive up to 20kg of subsidized seed) **increased the per capita consumption by US\$46.92**.

Poverty

Arndt et al. (2015) found that Malawi's 2006/07 Farm Input Subsidy Program **reduced** the national, rural, and urban **poverty rates by 1.5-3.0%**.

Awotide et al. (2013) found that a certified improved rice seed voucher system in Nigeria (i.e., beneficiaries may receive up to 20kg of subsidized seed) led to a **reduction of 24% in poverty**. Although it is uncertain to what extent the subsidy program contributed to this poverty since other factors that have not been controlled for could be responsible for the observed poverty reduction.

Mason and Tembo (2015) found that subsidized fertilizer **reduced poverty severity** (relative to the US\$1.25/capita/day poverty line) by **3.6%**, but had **no statistically significant effect on poverty incidence** among smallholder farm households in Zambia.

Mason and Smale (2013) found that an additional 10 kg of subsidized hybrid maize seed **reduced poverty severity by 0.7%** among smallholders in Zambia.

4.3 Applicability of impact

Gender

Fisher and Kandiwa (2014) concludes based on nationally representative data in Malawi (i.e., Malawi Integrated Household Survey (IHS3)) that the **probability of adopting modern maize was 12% lower for wives in maleheaded households, and 11% lower for female household heads, than for male farmers.** Further, simulation modeling reveals that receiving a subsidy for both seed and fertilizer increased the probability of modern maize cultivation by 222% for female household heads, suggesting the farm input **subsidy program has likely reduced the gender gap** in adoption of modern maize in Malawi.

Women-headed households were less likely to get fertilizer coupons in the Malawi fertilizer subsidy program than men-headed households (Dorward et al., 2008, Chibwana et al., 2009).

Sustainability

Jayne and Rashid (2013) underlies that benefits of input subsidy programs last only over a number of years, whereas public expenditures on crop R&D and physical infrastructure induce greater benefits to society.

Chirwa and Dorward (2013) evaluates programs in terms of fiscal, political and agro-ecological sustainability. With regard to **fiscal sustainability**, striving for reduction in program costs is a paramount issue. In order to reduce costs, it is suggested to increase program effectiveness and efficiency, for example by the following ways:

- better use of private suppliers,
- control of fraud,
- improvements in input purchasing and distribution systems,
- more effective agronomic practices,
- budgeting and cost control, improved timing of input distribution,
- better targeting,
- increased farmer contributions,
- and judicious complementary investments, with constant adjustments to match changing circumstances

Regarding political sustainability, **political commitment** is important. These large scale input programs are politically attractive as they can generate political support. However, the authors outline that balancing long-term and short-term interests may be challenging. In terms of **agro-ecological sustainability**, continuous cultivation without fertilizer leads to soil quality problems and erosion, therefore it is not sustainable. Over-fertilizing or not proper use of fertilizer can also have deteriorating effect. Hence, a subsidy programs that promotes a combination of organic and inorganic fertilizer with an integrated soil fertility managements are preferred.

Farmer segments

Market-smart subsidies are targeted to farmers, generally **smallholders**, that are otherwise cannot afford inputs, such **poor farmers and farmers in remote areas** (Wiggins and Brooks 2010). In practice, however, the impacts are often not realized at the level of these target groups. For example, the study of Ricker-Gilbert and Jayne (2012) points out that poorest households were the least able to use fertilizer effectively, due to limited landholding, poor soil quality, and lack of management knowledge. Whereas better-off households gained substantially more than poorer households when they participated in the program. Lunduka et al., 2013 underlies that this finding would be consistent with the Malawi National Statistical Office's result that income inequality has increased substantially in Malawi over the last seven years.

Kilic, Whitney and Winters (2013) found that households that are **relatively well-off, connected to community leadership and reside in agro-ecologically favourable locations are more likely to be beneficiaries** of farm input subsidies and to receive more input coupons. Jayne and Rashid 2013 in their review on input subsidies in Sub-Saharan Africa drew similar conclusions (Table 2). They suggest that in **general larger landholding households** get more of fertilizer subsidies even though

subsidies are targeted to poor smallholders. Also, the study points out that **political factors may play a role in acquiring subsidies**.

Table 2 Characteristics of households receiving fertilizer subsidies (Jayne and Rashid, 2013).

Household (HH) or village characteristic	Malawi	Zambia	Kenya
HH total landholding	HHs with larger landholding and asset wealth get more; less of an issue in recent years	HHs with larger landholding get more	HHs with larger landholding get more
Gender of HH head	Female-headed HHs less likely to receive subsidized fertilizer; not the case in the most recent survey	Female-headed HHs equally likely to receive subsidized fertilizer	Female-headed HHs equally likely to receive subsidized fertilizer
Market access	Households farther from main district market get more	HHs farther from main district market and/or feeder road get less	HHs farther from motorable road get more
Political economy factors (electoral results)	Districts where ruling party won last presidential election get more	Constituencies where ruling party won last presidential election get more (and more so the larger the ruling party's margin of victory)	Constituencies with more electoral support for challenger in the last presidential election get more

Input subsidy programs may have positive effect on **commercial distribution systems** if subsidy vouchers are redeemable at their locations. Jayne and Rashid, 2013 in his review made reference to several studies in this regard. For example, Dorward et al., 2008 pointed out that importers and distributors who were allowed to distribute fertilizer on behalf of the government increased their sales as a result of the Malawi subsidy program. Similarly, private retailers experienced an increase in sales due to farmers' redeeming their vouchers at their store in Kenya and Nigeria (Dorward et al., 2008; Liverpool-Tasie and Takashima, 2013). Retail agro-dealers that were excluded from participating in programs in Zambia were worse-off where subsidy programs were active.

4.4 Enhancing the intervention

Dorward and Chirwa (2009) elaborates on complementary policies that may strengthen the effectiveness of subsidy programs (Table 3). In this regard, Daidone et al. 2017 examined the potential **synergies** between the **Social Cash Transfer Program**, part of a social protection policy, and **Farm Input Subsidy Program** in Malawi. The study found positive synergies in terms of increasing total household expenditure and increasing the value of production, production activities and livestock. More specifically, their analysis shows that when households benefited from both programmes simultaneously their **joint impact on total expenditure** (i.e., total household expenditure and expenditure on food, health and education) was **15 percent larger** than the sum of the stand-alone impacts. Similarly, the **joint impact** of the programmes **on the value of production** was **22 percent larger** than the sum of the stand-alone impacts, when households benefited from both simultaneously. The authors mentioned two potential reasons for positive synergies. First, the two programs, by working together, addressed more of the constraints faced by poor rural households. Second, the potential unintended negative effects of one program may have been offset by the other program and vice versa. Furthermore, the **combination of input subsidy with providing cash resulted in a more effective working** of the input subsidy program in increasing productive activities **for the most disadvantaged households**.

Table 3 Complementary policies affecting subsidy program outcomes (Dorward and Chirwa, 2009).

			IMPACTS							
			Main	Other National Level						
Policies	Options	Considerations	Household food security	Agricultural productivity	Input market development	Social protection	Poverty reduction	Nutrition	Rural incomes	Soil fertility replenishment
Maize markets	Floor & ceiling prices; private & public roles & relations	Programme objectives; policy objectives, trade-offs and complementarities; stakeholder interests	++	+	+	++	++	++	++	+
Infrastructure	Road access for input & output markets & wider development	Investment trade-offs & complementarities: costs, returns & time scales; stakeholder interests	+	+	++	+	+	+	++	+
Research & Extension	Investments to maintain & raise soil, crop & input productivity	Investment trade-offs & complementarities: costs, returns & time scales; stakeholder interests; MoAFS policies	++	++	+	+	+	+	+	++
Organic soil fertility	Complementary investments raise return to inorganic fertiliser	Investment trade-offs & complementarities: costs, returns & time scales; stakeholder interests; MoAFS policies	+	++	+	+	+	+	+	++
Social protection	integrated / separate policies of food & cash transfers	Investment trade-offs & complementarities: costs, returns & time scales; stakeholder interests; GoM policies & coordination	++	+	+	++	++	++	+	?

5 Key success factors

Targeting vulnerable farmers and poorer households

- **Market access** plays an essential role in assuring better income and welfare levels **for smallholder producers**, and thus contributes to poverty alleviation (Odhiambo Ochola and Fengying, 2015). The majority of the smallholders in Kenya are subsistence farmers and very little of this production gets to the market.
- **Market linkages, support infrastructure and structures that are friendly to the poor** and vulnerable are essential (Odhiambo Ochola and Fengying, 2015).
- **Targeting** of subsidized inputs **in terms of geographical** (between regions, districts and different geographically defined communities) and **intra-community characteristics** (between different categories of people or households within communities) is critical to realize impacts where it is needed/desired (Dorward et al., 2008).
 - Households with less assets were more likely to receive no coupon than better-off households (Chibwana et al., 2009).
 - Older households were more likely to receive complete subsidy package than younger households. This can probably be explained by the fact that they were established full time farmers (Chibwana et al., 2009).
 - Level of education has also been shown to positively influence the likelihood of receiving coupons. These farmers probably had better bargaining power with village chiefs who were responsible for coupon allocation (Chibwana et al., 2009).
 - Poorest households were the least able to use fertilizer effectively, due to limited landholding, poor soil quality, and lack of management knowledge (Ricker-Gilbert and Jayne, 2012).

Good agricultural practices

- **Provision of extension support to farmers** (and support research) on **best agronomic and soil fertility management practices** to promote sustainable intensification and improve crop yield response to fertilizer (Mason and Tembo, 2015).
- **Quality of other production factors, and availability of land and labor** can enhance the effect of input subsidies. Ellis and Maliro (2013) suggest that fertilizer subsidies are more effective in improving food security among farmers who are able to combine fertilizers with land, labour and improved seeds.
- **Irrigation and water control**, can considerably affect the crop response rate and economics of fertilizer use (Jayne and Rashid, 2013). Returns to subsidies under rainfed conditions were lower than those in irrigated areas. In irrigated areas, the combination of water control, improved seed varieties, and fertilizer raised yields dramatically (Jayne and Rashid, 2013).

Infrastructure

- **Logistical and organizational issues** have to be managed well, for example:
 - Large scale registration and targeting system has to be in place.
 - Development of systems using vouchers.
 - Coordination across different governmental, parastatal, private sector, donor, and community stakeholders (Dorward and Chirwa, 2009).

Engagement of private sector and development of input markets

- **Engagement of private sector** (Dorward et al., 2008):
 - Uncertainties about subsidy program procedures often delay program implementation and reduce its effectiveness. Also, such uncertainties make farmers and the private sector reluctant to invest in unsubsidized fertilizers. Hence, timeliness in planning and consistency in program procedures are needed to address these issues.
 - Besides large agro-dealers, small agro-dealers should be included in the program as they have the best potential to reach remote areas.

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- **Lowering displacement rates** must be a major objective in future subsidy programs. Around 30-40% of subsidized fertilizer purchases displaced commercial purchases with regard to the Malawi fertilizer subsidy program. High displacement rate have a serious negative impact on program effectiveness in reaching its objectives (Dorward et al., 2008).
 - **Creating demand for production inputs and investment goods**, because the development of input markets promote economic growth (Odhiambo Ochola and Fengying, 2015).

6 Barriers addressed

Input subsidy programs aim to provide inputs to those farmers who are financially constrained to reduce the volatility of yields due to poor conditions.

7 Questions for further research

- What are good targeting methods to reach those beneficiaries that are in need of subsidies and how these can be implemented?
- What are the issues that hinders farmers to earn sufficient income in the specific context/sector, e.g. financial constraints/access to credit, lack of farm management knowledge, distance from markets ? Subsidy programs can only succeed in increasing farmers income if they address these context specific constraints.
- What are potential ways to connect farmers from remote areas to markets?

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