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**ASSESSING THE DRIVERS OF
TANZANIA'S FERTILIZER SUBSIDY PROGRAMS FROM 2003-2016:
AN APPLICATION OF THE KALEIDOSCOPE MODEL OF POLICY CHANGE**

By

David Mather and Daniel Ndyetabula

Food Security Policy *Research Papers*

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AUTHORS

David Mather is Assistant Professor of International Development, Department of Agricultural, Food and Resource Economics, Michigan State University.

Daniel Ndyetabula is Lecturer, Department of Agricultural Economics & Agribusiness, Sokoine University of Agriculture.

Michigan State University (MSU). Established in 1855, MSU is the oldest of the U.S. Land Grant universities and has a long history of agricultural and food policy research in Africa, Asia and Latin America.

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EXECUTIVE SUMMARY

In this paper we study fertilizer subsidy schemes in Tanzania from 2003/04 through 2015/16 to better understand the key factors that led to the design and reform of various fertilizer subsidy programs in Tanzania over time and to serve as a case study to test the hypotheses from the Kaleidoscope Model of the key drivers of agricultural policy change. The analysis is based on a combination of key informant interviews and secondary literature.

Focusing events played a key role in getting fertilizer subsidies on the policy agenda in Tanzania: a drought in 2002/03 was a key factor in the return of fertilizer subsidies to Tanzania in 2003/04, while the international food price crisis of 2007/08 was a key factor in Tanzania scaling up an existing pilot fertilizer voucher scheme into the large-scale National Agricultural Input Voucher Scheme (NAIVS) in 2008/09. A second key factor that put a large-scale subsidy approach on the agenda (NAIVS) was the support of powerful advocates including the President.

The choice of a fertilizer/seed subsidy rather than other options was due to the cost-benefit (political, economic, social) of the need to react quickly to the focusing events. The private sector-friendly design of programs from 2002/03 onward was driven by Tanzania's market-led development approach (ideology/beliefs) was rooted in a 1999 national economic development strategy document. The specific design element of the use of vouchers in NAIVS was due to diffusion of ideas and experience from Malawi's targeted input voucher program. The programs were adopted (and continued) due to the support of key government veto players and a lack of strong opposition.

Implementation of the large-scale NAIVS was possible due to sufficient budget support from both the government and from the World Bank. In addition, because the government decided to channel subsidized fertilizer through existing the private sector fertilizer supply chain, this made supply chain actors like private sector fertilizer importers, distributors and agro-dealers key implementing veto players. These actors agreed to participate as they believed that such programs would increase their sales in the short-term and had the potential to increase the longer-term smallholder farmer demand for market-priced fertilizer.

Significant reforms to program design came from changing information about the programs' performance, which came from both evaluations as well as feedback from key participating actors such as fertilizer importers and local think tanks. Changes in the scale of NAIVS were largely linked to changes in available funding (both external and domestic). NAIVS was stopped in 2014/15 due in part to the perception that material conditions had changed enough to merit a different approach (i.e. focus of subsidies on credit for fertilizer), yet when the follow-on approach was not successful, the government returned to NAIVS in 2015/16.

ACRONYMS

| | |
|---------|--|
| ACT | Agricultural Council of Tanzania |
| AFSP | Accelerated Food Security Project |
| AGMARK | Agricultural Market Development Trust |
| AGRA | Alliance for a Green Revolution in Africa |
| AIS | Agricultural Inputs Section of the Directorate of Crop Development, MAFC |
| AMCOs | Agricultural Marketing Cooperative Organizations |
| ASDP | Agricultural Sector Development Program |
| CNFA | Citizens Network for Foreign Affairs |
| CSOs | Civil Society Organizations |
| DALDO | District Agriculture and Livestock Officer |
| DAP | Di-ammonium Phosphate |
| ESRF | Economic and Social Research Foundation |
| FSDT | Finance Sector Deepening Trust |
| GDP | Gross Domestic Product |
| LGA | Local Government Authority |
| MAFC | Ministry of Agriculture, Food Security and Cooperatives (2003 to 2015) |
| MALF | Ministry of Agriculture, Livestock, and Fisheries (2016-present) |
| MKUKUTA | National Strategy for Growth and Reduction of Poverty |
| MoF | Ministry of Finance (2003 to 2015) |
| MFP | Ministry of Finance and Planning (2016-present) |
| MRP | Minjungu Rock Phosphate |
| NAIVS | National Agricultural Input Voucher Scheme |
| NBS | National Bureau of Statistics |
| NMB | National Microfinance Bank |
| NVSC | National Voucher Steering Committee |
| OPV | Open Pollinated Variety |
| SACCOs | Savings and Credit Cooperative Organizations |
| TAFSIP | Tanzania Agriculture and Food Security Investment Plan |
| TASAF | Tanzania Social Action Fund |
| URT | Government of the United Republic of Tanzania |
| VVC | Village Voucher Committee |

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1. INTRODUCTION

As has been recognized by donors and African governments alike in recent years, one of the keys to reducing rural poverty and improving the nutritional status of rural households in Tanzania will be to achieve wide-spread improvements in food crop productivity among smallholder farmers. Prior to the international food price crisis of 2007/08, maize yields in Tanzania remained low, averaging between 800-900 tons/ha nation-wide, despite Tanzania's favorable agro-ecological potential (NBS, 2004). Subsequently, maize production stagnated during the 2000s and did not keep pace with population growth (World Bank, 2009). While there are likely to be a range of factors which contribute to low maize yields in Tanzania, an obvious constraint is the fact that as of 2007/08 (NBS, 2008), few smallholders outside of the Southern Highlands region used inorganic fertilizer on maize or improved maize seed.

In 2008/09, with financial and technical support from the World Bank, the government of the United Republic of Tanzania (URT) dramatically scaled up their existing pilot targeted agricultural input voucher scheme, which was thereafter called the National Agricultural Input Voucher Scheme (NAIVS). NAIVS had two main goals: (1) to improve farmer access to inorganic fertilizer for use on maize/rice and improved maize/rice seed; (2) to provide a rapid, sustained and predictable increase in smallholder farmers' effective demand for inorganic fertilizer and improved maize/rice seed so as to promote longer-term investment by the private sector fertilizer and seed supply chains (World Bank, 2009).

The initiation of NAIVS in 2008/09 coincided with a resurgence of government-led fertilizer subsidy programs during this time period across a growing number of SSA countries including Ghana, Kenya, Malawi, Nigeria, Rwanda, and Zambia. The publically-stated goal of many of these programs is to induce higher levels of smallholder fertilizer use, which are assumed to lead to improvements in food crop productivity and thus higher household incomes and improved food security. However, the degree to which an input subsidy program raises total smallholder fertilizer use depends on the extent to which receipt of subsidized fertilizer crowds-out (or crowds-in) the quantity of commercial fertilizer that a subsidy recipient smallholder theoretically would have purchased at the market rate in the absence of a subsidy (Ricker-Gilbert, Jayne, and Chirwa 2011).

According to a review of similar programs, NAIVS was the most private-sector friendly of the various large-scale input subsidy schemes recently implemented between 2000 and 2014 in countries such as Ghana, Kenya, Malawi, Nigeria, Rwanda, and Zambia (Wanzala et al, 2013). Given that the design, scale and outcomes of 'large-scale' fertilizer subsidy programs differ considerably across countries and particularly over time (Jayne and Shahid, 2013), this begs the question of how Tanzania designed and implemented a 'smarter' and more efficient large-scale subsidy scheme relative to other countries. As is now well recognized, sound technical analysis – in this case, use of the 'smart' criteria of Morris et al (2007) for input subsidy programs – is usually a necessary but not a sufficient condition for the adoption and implementation of better-designed policies, let alone improved policy outcomes. Instead, there is an increasing recognition that a more in-depth and refined understanding of how policy change occurs, as well as bottlenecks to achieving better policy implementation and outcomes, is a prerequisite for strengthening agricultural and food security policy.

In order to provide a framework for better understanding agricultural and nutritional policy processes, a team of colleagues from the Food Security Policy (FSP) Innovation Lab¹ developed a model of policy change that builds upon existing operational hypotheses within the international donor community and draws on academic scholarship from public administration and political science. The resulting Kaleidoscope Model (KM) offers testable hypotheses covering the five key stages of the policy cycle: agenda setting, design, adoption, implementation, and evaluation and reform (Resnick et al. 2015).

In this paper, we apply the KM for agricultural and food security policy change to the case of fertilizer subsidy schemes in Tanzania from 2003/04 through 2015/16 to achieve several goals.

First, we aim to better understand the policy process history of the design of NAIVS (and earlier subsidy programs in Tanzania) and reforms of the initial design over time, so as to highlight the key factors that led Tanzania to design and implement a relatively ‘smarter’ large-scale fertilizer subsidy program relative to the programs in other countries during that same time period (Wanzala et al, 2013). Second, this case is one of six conducted by the FSP team in order to assess the extent to which the operational hypotheses of the KM are robust to a range of applied case studies.²

Third, this case study is one of three that will be used to compare the national policymaking processes and identify key drivers of policy change related to large-scale fertilizer subsidy programs in Ghana, Tanzania, and Zambia (FSP, 2015). The FSP team will use this three-country cluster to produce a separate paper that compares differences in policy processes (also termed ‘institutional architecture’) and fertilizer subsidy program outcomes across the three countries. The goal of this comparison will be to gain a clearer understanding of the factors driving policy change in fertilizer subsidy programs across these countries, which may help to provide insights into how policy processes can help such programs become more effective.

The analysis presented in this paper is based on two main sources: first, secondary literature, and second, semi-structured interviews predominantly conducted in July/Aug 2013, March 2014, November/December 2014, March & September 2015, and February/March 2016 with knowledgeable stakeholders including the government, donor, civil society, and research communities.³ Section 2 below provides further details on the analytical methods used. Section 3 discusses the return of fertilizer subsidies in 2003/04, while Section 4 addresses the continuation of this first program type through 2006/07. Section 5 describes the initiation of a pilot targeted agricultural input voucher scheme in 2007/08, while Section 6 describes its scaling up from 2008/09 – 2014/15. Section 7 then describes how MAFC sought to implement an alternative fertilizer subsidy program while also continuing NAIVS. Section 8 provides conclusions.

¹ The FSP partner institutions include Michigan State University (MSU), the International Food Policy Research Institute (IFPRI) and the University of Pretoria (UP).

² Three studies are on large-scale fertilizer subsidy schemes, and three are on micronutrient interventions.

³ Some interviewees requested not to be personally identified. Where relevant, we have only listed their institutional affiliation or their stakeholder category, e.g. “importer” or “donor.”

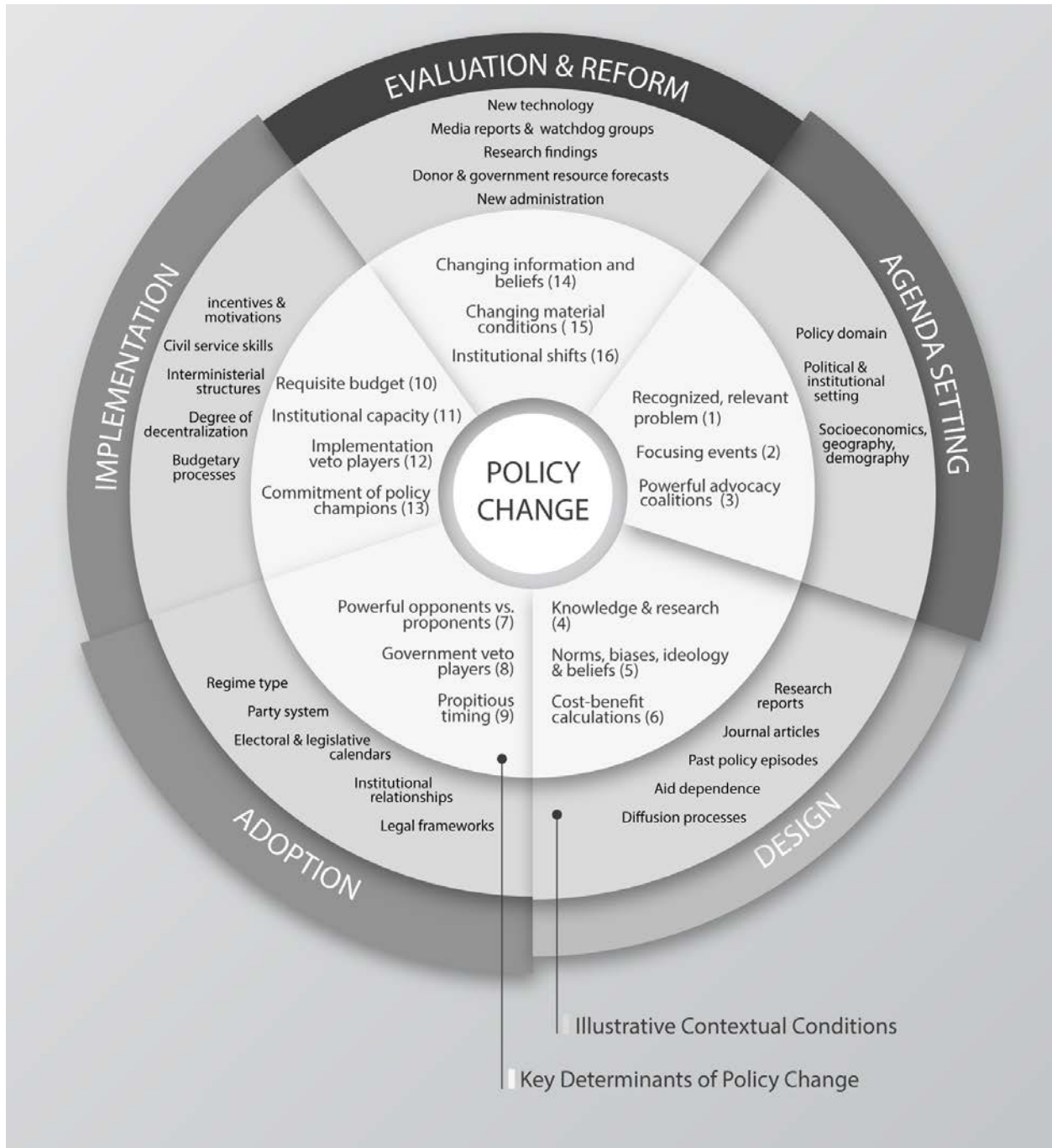
2. METHODS: THE KALEIDOSCOPE MODEL AND POLICY PROCESS TOOLS

The KM framework is intended to help answer the question of why a policy change occurs in one geographic locale and not another, in one policy arena but not another, or at one time period but not another. It also helps answer the question of why policy modalities intended to address the same underlying problem (in this case, low smallholder food crop productivity) may differ significantly in their design and scale both across countries and over time. As Hall (1993) highlights, policy change is rarely one overarching outcome but rather consists of smaller policy changes related to design, adoption, and implementation over time. By looking at all key stages of the policy process, the KM offers more nuanced understandings of when and why smaller changes sometimes cumulate and result in larger outcomes while others do not. In doing so, the KM can help pinpoint bottlenecks to policy change and identify whether improved policies are hindered by limited access to relevant evidence, low government and/or private sector capacity, insufficient political support, inadequate financial resources, etc.

While many factors ultimately influence policy change, the KM identifies a subset of 15 variables that are necessary and sufficient for policy change to occur. These are labeled as “key determinants of policy change” in the figure presented in Figure 1. That said, it is important to note that not every variable in a given policy process stage is hypothesized to be necessary and sufficient – only one or more of them (results of hypothesis testing are found in Appendix Table 3 and 4). Applications of the KM are bolstered by a practical toolkit that centers around five, mutually reinforcing tools:

- **Policy chronologies:** Help identify key actions, actors, and dates for each stage of a policy during a specified time frame; Facilitate process tracing and causal analysis by indicating whether certain events precipitated or not subsequent policy changes (Appendix Table 1).
- **Agricultural policy mapping:** Identifies key institutions and frameworks, regulations, norms, communication conduits, protocols, financial and administrative procedures within the agricultural sector (see Appendix A for annual budget process).
- **Policy-specific mapping:** Focuses on a specific policy domain or modality (e.g. fertilizer subsidies, seed safety, land reform) and distinguishes the roles of key actors (policy formulation, administration, oversight, or knowledge sharing) and the nature of the relationships among them and with respect to the policy (see Figure 2 in Appendix).
- **Stakeholder mapping:** Identifies perceived winners and losers of specific policies and their preferences related to the design and implementation of those policies (Appendix Table 2).
- **Circle of influence graphics:** Aligns stakeholders in a two dimensional space to map their preferences vis-à-vis a policy with their degree of power and influence to make decisions; the main government veto players, key implementing veto players and other policy actors are placed in the center of the circle. Other stakeholders are aligned closer (further) from the center based on how much (little) influence they have (see Figure 3 in Appendix).

Figure 1: The Kaleidoscope Model of Policy Change

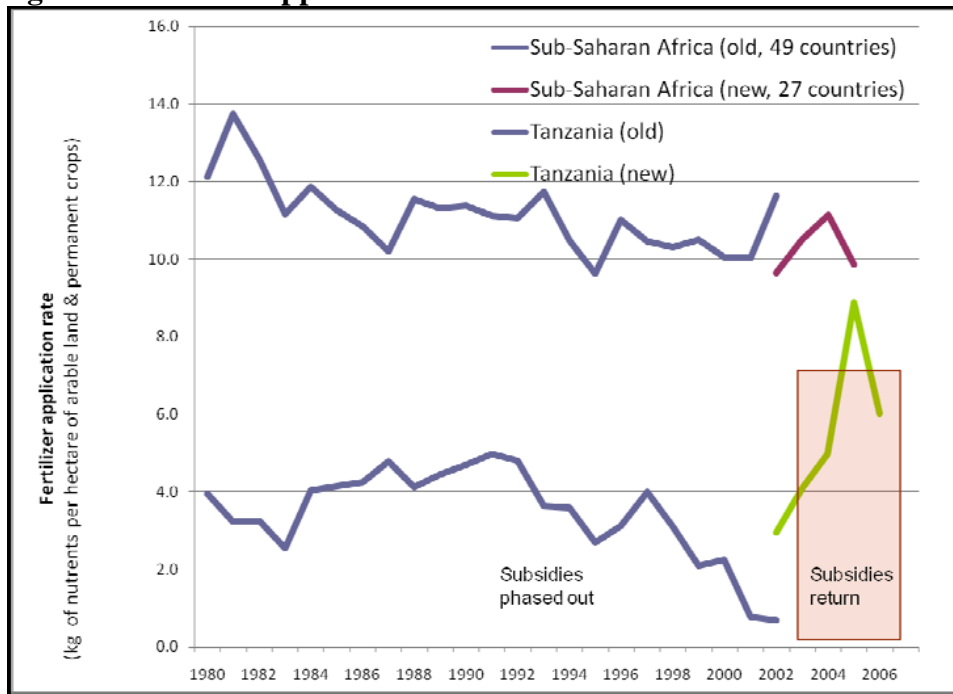


3. RETURN OF FERTILIZER SUBSIDIES IN 2003/04

3.1 Agenda Setting: URT's return to fertilizer subsidies

Agricultural input subsidies first began in Tanzania in 1967 as part of President Julius Nyerere's ujamaa "African socialism" model of economic development, which consisted of a villagization policy, collectivization of all productive activities and state control of the provision of education, health and infrastructure (Coulson, 1982). As in many other sub-Saharan African (SSA) countries, a Tanzanian government parastatal maintained a monopoly on the importation and distribution of fertilizer and seed, and both were highly subsidized. The economic crisis of the mid-1980s led to a structural adjustment (SA) programs in 1986 that implemented a wide range of economic reforms. This began with liberalization of agricultural and other markets, removal of domestic price controls, and reform of state monopolies. However, input subsidies were not phased out completely until 1994 (Putterman, 1995). After the state had phased out subsidies, overall fertilizer use and use on food crops declined significantly. For example, in the early 1990s (prior to the end of fertilizer subsidies), 70% of fertilizer was used for food crops, but by the end of the decade (when subsidies had been phased out) it had fallen to 32% (MAFC, 2006). In addition, before the withdrawal of subsidies, Tanzania's average fertilizer application rate hovered around 4 kg per hectare of area cultivated to annual or perennial crops, which was less than half the SSA average, yet it fell quickly after subsidies were phased out (Figure 2). Thus, unfortunately, the goal of structural adjustment of 'getting the prices right' was not sufficient by itself to stimulate wide-spread market-led smallholder demand for commercial fertilizer use on staple crops.

Figure 2. Fertilizer application rates for Sub-Saharan Africa and Tanzania, 1980-2006.



Source: Minot (2009), from FAO.

That said, after fertilizer subsidies ended in 1994, several private firms quickly entered the market, importing stocks from international fertilizer manufacturers and selling from wholesale depots in Dar es Salaam or through their own depots further inland (ACT 2012). Some even began developing their own retail networks, and by 1998 there were 13 private sector fertilizer importers in Tanzania (ibid, 2012). These supply chains developed due in part to the use of market-priced fertilizer on maize in the higher potential southern highlands and northern regions, though most fertilizer was used on cash crops such as tobacco and horticultural crops like carrots, onions, potatoes, etc (NBS, 2004). As of the late 2000s, the majority of farm input supply companies remained concentrated in urban areas or in rural zones with significant concentrations of commercially-oriented farmers (ACT, 2012). Thus, there were millions of smallholder farmers in rural areas that lacked cash crops that did not have access to quality, affordable and timely agricultural inputs such as inorganic fertilizer, improved seed and other agro-chemicals with which to raise their crop productivity (ibid, 2012). Subsequently, during the immediate post-SA period, food crop productivity was very low, and maize and rice yields remained stagnant due to limited to no use of improved input such as fertilizer and improved seed (World Bank, 2014). Food crop production only kept pace with population growth by area expansion (ibid, 2014), though continued cultivation of a crop like maize over time without proper fertilization and/or appropriate crop/soil management practices can result in not only stagnant but falling yields over time as soils become mined of macro and micro nutrients (Marenja and Barrett, 2009; Snapp et al, 2015).

However, due to a number of factors, in 2003/04, URT decided to begin subsidizing fertilizer again. First, low food crop productivity, caused in part by limited to no use of fertilizer on food crops⁴, by that time had officially become a highly relevant problem for maintaining food security for both rural and urban households and generating economic growth. For example, in 1999, the URT adopted the Tanzania Development Vision 2025, in which the URT highlighted the role of agriculture sector in national development and identified agriculture as the key driver of economic growth (URT, 1999). This commitment to agricultural sector was reconfirmed in the 2001 National Strategy for Growth and Reduction of Poverty (URT, 2001) – its acronym is MKUKUTA in Swahili -- which also added reducing household food insecurity as a key policy goal. Thus, in the early 2000s, the URT was publicly committed to addressing key constraints to food insecurity and agricultural sector growth.

Second, Tanzanian food crop production fell dramatically in 2002/03 due to a long drought that hit most of the country's uni-modal rainfall areas from January to March 2003 (FEWSNET, 2003a). Given that these areas produce 80% or more of the country's maize, it was not surprising that the governments Food Security Information Team found in August 2003 that 47 of the country's 52 districts were likely to experience severe food shortages, which would affect approximately 2 million people between October 2003 and March 2004 (FEWSNET, 2003b). In addition, the return of the large grain borer (*Prostephanus truncatus*) resulted in the destruction

⁴ It is important to note while inorganic fertilizer can be an effective means by which to improve smallholder grain productivity (depending on agroecological conditions and appropriate use), it is well known that fertilizer is but one of many inputs and/or soil/plot management practices that can raise grain productivity – such as use of improved seed and plot-level crop and soil fertility management practices, as found empirically by recent research (Mather et al, 2016a). It is also important to note that access to such other complementary inputs and/or access to knowledge of appropriate soil/plot management practices via extension agents were also adversely affected by structural adjustment in Tanzania.

of significant quantities of stored maize in recent years and infested un-harvested maize in 2003 (ibid, 2003b). The combination of drought and insect damage thus created a focusing event that pushed the issue of low smallholder maize productivity squarely onto the URT agricultural policy agenda.

3.2 Design

In response to this imminent national food security crisis, the URT released stocks from its national grain reserve to try to reduce domestic maize prices (FEWSNET, 2003b). However, the shortfall between the 2002/03 production and consumption needs was large enough that the URT decided late in 2003 that additional action needed to be taken. During a Parliamentary session in November 2003, the URT announced that it would implement a fertilizer subsidy program for the 2003/04 season, noting that the removal of fertilizer subsidies had resulted in fertilizer becoming unaffordable for many farmers in the higher-potential interior regions of the country.⁵ The goal of the subsidy program was to increase fertilizer use in the southern highlands region so as to better ensure increased national maize production in 2003/04.

Although there are various strategies that a government can use to promote increased staple crop productivity, there are several reasons why implementing a subsidy program was perhaps the only option URT had given the urgency to do something to help farmers improve their yields. First, while evidence from southeast Asia is clear that the returns to expenditure (in terms of economic growth and poverty reduction) on investments like rural roads, agricultural research and development, and extension are considerably higher than those of agricultural subsidies (Fan et al, 2008; EIU, 2008), there is a considerable lag between when those investments are made and when benefits are realized. By contrast, subsidizing agricultural inputs provides a way to make such technologies affordable to smallholder farmers for their immediate use. That is, if smallholder staple food production needs to be raised as soon as possible, the political and economic cost/benefit of a fertilizer subsidy was much preferable to more traditional public goods given that subsidies could conceivably raise farmer staple crop productivity much more quickly in the short-term.

Second, with respect to distribution of fertilizer, at this point in time, there was somewhat limited knowledge and information available to URT that could inform the design of a program intended to dramatically increase smallholder fertilizer use. For example, in 2003/04, there were primarily only three active (or previously used) models of fertilizer distribution in SSA for staple food crops:

- i. Government monopoly over input distribution;
- ii. Complete liberalization of input distribution (i.e. rely on the private sector to supply fertilizer, and on farmers to be able to purchase it);

⁵ From Parliamentary Hansard of speech by the Minister of Agriculture to Parliament in 2012 to present the 2012/13 MAFC budget, p.15.

- iii. Dual-channel systems where the government continued to operate a parastatal, even after structural adjustment, albeit on a small scale, while allowing the private sector to import and distribute fertilizer with no restrictions.⁶

Given URT's public commitment to pursue market-led development (i.e. beliefs and ideology), as described in the Tanzanian Development Visions 2025 (URT, 1999), Tanzania had completely dismantled their agricultural input parastatal during structural adjustment. Thus, option (i) was not feasible, as URT no longer had the institutional capacity to handle the physical importation, wholesaling and retailing of subsidized fertilizer. This was an especially acute constraint given that the fertilizer that would be subsidized for the coming main season in the uni-modal rainfall zones needed to already be in the country already in order for it to reach farmers for November-February planting. Option (ii) is what Tanzania was already using -- complete liberalization of agricultural input markets. However, the post-SA period in Tanzania did not result in a significant supply response by smallholders and increased demand for technologies such as fertilizer. This is seen in the dramatic decline in total fertilizer use after subsidies were withdrawn (Figure 1), and the fact that as of the Agricultural Census of 2002/03, only 13% of smallholder maize producers applied inorganic fertilizer to maize (Mather et al, 2016b).

The design that MAFC ended up using was generated quickly by the Agricultural Inputs Section (AIS) of the Directorate of Crop Development of MAFC given the very limited time available between the announcement of the subsidy (mid-November) and when farmers would normally plant maize or rice in the southern highlands (Nov-Feb). What MAFC decided to do was as follows.⁷ First, they continued to allow the private sector to import, wholesale and retail fertilizer at market rates without restrictions. Second, MAFC negotiated with several of the larger fertilizer importers, who had been supplying fertilizer to distributors located in interior regional capital since liberalization of agricultural input markets. MAFC and the importers and distributors agreed that URT would reimburse the distributors for their cost of transporting a limited quantity of fertilizer from the port to regional capitals in the southern highlands region, and add a limited amount such that the subsidy received by farmers would be approximately 30% of the market price in that region. Participating distributors and agro-dealers then promised to pass on the cost savings to farmers, for the specified quantity of fertilizer whose transportation costs had been covered by the government (as well as an additional though small subsidy). Participation was clearly in the interests of importers, distributors and agro-dealers, as this program widened their market and thus would increase their volume of sales. The subsidized fertilizer had no targeting criteria apart from the geographic targeting of the southern highlands regions, which is where the majority of the country's maize is produced. This private-sector friendly design thus reflected URT's beliefs and ideology, cost/benefit reality at the time, and lack of institutional capacity to import and distribute inputs (the latter a function of beliefs and ideology).

⁶ For example, although neighboring Zambia went through structural adjustment programs like many other SSA countries, they only partially liberalized their agricultural input and output markets (Jayne et al, 2002). Although they did remove restrictions on private sector importation and delivery of fertilizer, the parastatal was not completely shut down (as in Tanzania), though its operations were scaled down significantly.

⁷ Program description based on interviews with Dr. Susan Masagasi, and Mr. Frank Kamhabwa, both of who were within AIS/MAFC when this program was begun, and they were among the group that designed the 2003/04 fertilizer subsidy scheme.

3.3 Adoption

Official adoption of the program was aided by the fact that there were several strong proponents for the program, including the Minister of MAFC and Parliament, and few if any opponents. There were also no government veto players who were against the program.

3.4 Implementation

The fiscal year of the URT runs from July to June, thus the 2003/04 budget had already been approved by Parliament earlier in 2003. Thus, the government's response to the rapidly deteriorating food security situation in the country in late 2003 meant that there was not much funding available for this program in 2003/04. In 2003/04, only 2 billion Tsh was spent on the program the first year – approximately 1-2% of the total MAFC budget. Thus, obtaining sufficient budget resources to implement the program that year was not a constraint. As noted above, the government opted for the private sector to physically handle the subsidized fertilizer, as the government did not have the institutional capacity to do this while the private sector did. Thus, institutional capacity for implementation was not a constraint. In addition, the primary implementing veto players – MAFC and fertilizer supply chain actors participating in the program – were supporters of the program as well as committed policy champions.

4. CONTINUATION OF UNTARGETED FERTILIZER SUBSIDIES (2004/05 to 2006/07)

4.1 Agenda Setting: Continuation of fertilizer subsidies

In 2004/05, although the concern about spiking food staple prices had subsided following a reasonable harvest in 2003/04, the problem of low food crop productivity and very low fertilizer use on food crops remained a relevant policy problem. In addition, it is clear from MAFC Minister speeches to Parliament that this program remained an important policy tool for the Ministry in the following years,⁸ and private sector fertilizer supply chain actors remained committed to the program (as it expanded their market and thus sales). In addition, MPs from regions outside the southern highlands requested that the program be expanded to cover other regions.⁹ Thus, the program continued to enjoy support from a powerful advocacy coalition of MAFC, Parliament and private sector fertilizer importers.

4.2 Design

The design of this program remained the same from 2004/05 through 2006/07. Although the political and economic costs of 'not acting' in the face of an impending food price spike had dissipated by 2004, the underlying cost/benefit facing the government in terms of trying to achieve a rapid increase in fertilizer use by smallholder staple crop producers remained the same. That is, the government minimized its costs by allowing the private sector to physically handle and distribute the fertilizer, with the government role limited to coordinating how much fertilizer would be subsidized and where, and re-paying distributors for their transport cost.

⁸ Hansards of MAFC Minister budget presentations to Parliament from 2004/05 to 2006/07, available at <http://www.kilimo.go.tz/speeches/budget%20speeches/budget%20speeches.htm>

⁹ Interviews with various key informants.

This arrangement thus addressed URT institutional capacity limitations of fertilizer distribution and the URT commitment to pursue market-led development (i.e. beliefs & ideology). In addition, the program design remained the same through 2006/07, as there appears to have not been new knowledge or information of either problems with the design or alternative designs until 2007.

4.3 Adoption

From the second year of this program through 2006/07, the program had to be approved through the regular budget process that MAFC and other ministries use (see Appendix A for details on the annual budget process). While the Minister of MAFC must contend with those of other ministers for budget resources, we noted above that agricultural sector had become a priority sector for economic growth since the Tanzanian Development Vision 2025 (1999) and also a key towards the reduction of poverty and household food insecurity in the National Strategy for Growth and Reduction of Poverty (URT, 2001). That said, it is perhaps difficult to find a government opponent against a program as small as this, which was not even 5% of the MAFC budget for the first few years, then approximately 17% of the MAFC budget in its final year (2006/07). Secondly, although the agricultural sector employs the vast majority of Tanzanians, the share of the national budget going to the agricultural sector was never higher than 7% in these years.

Second, the program was accepted by key government veto players, including the implementing Minister, the Minister of Finance, the Cabinet, President, and Parliament. As in many SSA countries, the Tanzanian executive branch is considered to be relatively stronger than the Tanzanian national legislative body (Parliament) (Tripp, 2000; Chang, 2005). However, recent changes in Parliament's role in the budget process have made Parliament a stronger check on the power of the executive branch. For example, Parliament provides input at various stages of the annual budget process (Appendix A), is able to request funding shifts within and across ministries, and votes to approve the budget. In addition, as is noted below, Parliament's influence led to significant changes in the design of input subsidy programs on several occasions.

The only opponents to the untargeted fertilizer subsidy program from 2003/04 to 2006/07 of which we are aware were donors (Cagley et al, 2009), who simply voiced their opposition by not providing funding for the program. In summary, given the absence of government veto players who opposed the subsidy program, and with no powerful opponents, the program continued to be approved by the cabinet and Parliament through 2006/07.

4.4 Implementation

The program scaled up over time (Table 1) and included additional regions, and by 2006/07 represented approximately 17% of the MAFC budget (MAFC, 2007). Subsidized seeds were also added to the program in 2006/07. Until 2006/07 the program remained quite small, thus funding availability was not an issue, and the main policy champions MAFC and private sector fertilizer actors remained committed to the program. Likewise, with no design change apart from a gradual scaling up, for the first four years of the program, there appeared to be no

institutional capacity constraints from the government or private sector perspective for the delivery of the subsidized fertilizer.

Table 1. Quantity of fertilizer subsidized and cost of subsidy to government by year, 2003/04 to 2006/07

| Agricultural year | Quantity of fertilizer subsidized (MT) | Cost to GoT of subsidy (Billion Tsh) |
|-------------------|--|--------------------------------------|
| 2003/04 | 39,387 | 2.0 |
| 2004/05 | 81,766 | 7.2 |
| 2005/06 | 63,000 | 7.0 |
| 2006/07 | 108,703 | 21.0 |

Source: Hansards of MAFC Minister budget presentation to Parliament.

4.5 Evaluation & Reform

After several years of program implementation, several institutional flaws began to be noticed by MAFC and CSOs such as the Agricultural Council of Tanzania (ACT)¹⁰. First, the program was not succeeding in providing smallholders with access to subsidized fertilizer in large part because there was no institutional constraint to enforce the participating agro-dealers to pass on the full (or any) of the subsidy of the limited quantity of subsidized fertilizer to farmers.¹¹ Second, there were some institutional constraints at the agro-dealer level as some many agro-dealers lacked sufficient financial resources to acquire an inventory of subsidized fertilizer and seeds, and they also had limited information and knowledge to guide farmers on how to make profitable and productive use of these subsidized inputs (ACT, 2012).

Dissemination of farmer discontent with hearing about a subsidy program but not themselves gaining access to subsidized prices was aided by an annual stakeholder forum at the end of the most seasons, where farmer groups, agro-dealers, distributors, importers, MAFC officials discussed the program.¹² In response to such complaints, the Directorate of Policy & Planning (DPP) of MAFC assessed the situation in 2007 and the ensuing report (MAFC, 2007a) recognized that the farmers' complaints were valid: many agro-dealers were not in fact passing on subsidies to smallholder farmers. This report represented new information about the program's performance that resulted in changing the previous views of government veto players and champions regarding this approach to subsidizing fertilizer. MAFC thus concluded that the program was not cost-effective as it was not reaching a large number of farmers or improving their access to fertilizer (World Bank, 2009).

¹⁰ ACT is an umbrella association that acts as a representative for a large number of farmer and agri-business associations. ACT initiates, facilitates, and participates in stakeholder-government dialogue and provides independent research.

¹¹ According to study done by MAFC (2007b) and interviews with Susan Masagasi (ACT) and Janet Bitegeko (ACT). This view is also cited in a Hansard of the Minister of Agriculture's (Stephen Wasira) speech to Parliament regarding the 2008/09 budget, p.59.

¹² Interview with Susan Masagasi, who worked within the MAFC Directorate of Ag Inputs Directorate during this program.

5. PILOT TARGETED AGRICULTURAL INPUT VOUCHER SCHEME (2007/08)

5.1 Agenda Setting

Planning for the 2007/08 MAFC budget preceded the 2007/08 international food price crisis. Nevertheless, the problem of low food crop productivity and very low fertilizer use on food crops remained a relevant policy problem, especially considering that in 2007 MAFC learned that their untargeted subsidy program had largely not reached the intended recipients. Second, by this point in time, the 2006 Africa Fertilizer Summit in Abuja had re-focused African policymakers on the role of fertilizer in facilitating a ‘Green Revolution’ for Africa. However, neither of these factors necessitate that a government use a subsidy scheme to promote increased fertilizer use on food crops. Nevertheless, by this point in time, MAFC and now the primary non-state actor (ACT) representing the agricultural sector were strong advocates of continuing with a fertilizer subsidy program, albeit with a different design.

5.2 Design of pilot targeted voucher scheme

As noted above, new information provided in 2007 about problems with the untargeted subsidy scheme from 2003/04 to 2006/07 led MAFC and other actors to seek an alternative program design. Additional new information came in the form of the diffusion of new ideas from Malawi’s targeted fertilizer subsidy program to Tanzania, which at that point in time was claimed to be quite successful. After learning about this program, ACT obtained funding from NORAD to organize a study tour for MAFC officials to visit Malawi in 2007 to study the Malawi voucher scheme up close, as ACT believed that the voucher approach would help solve the problem of how to ensure that smallholders actually receive a subsidized price for fertilizer.¹³

Upon returning from this trip, MAFC and ACT together took the new information regarding Malawi’s targeted voucher approach for delivering fertilizer subsidies and adapted it to Tanzania’s context. For example, while the Malawi program used a government parastatal to physically handle the importation, wholesaling and retailing of subsidized fertilizer as well as the distribution of subsidy vouchers (to farmers who met targeting criteria), the Tanzanian government preferred a more private-sector friendly approach, for several reasons. First, the URT remained officially committed to market-led agricultural sector development (ideology), which as noted above were made official in the TDV 2025 (URT, 2009) and MKUKUTA (URT, 2001) URT development strategy documents. This commitment was further strengthened by two more recent strategy documents: the Agricultural Sector Development Program (URT, 2006)¹⁴ and the Kilimo Kwanza (Agriculture First) Resolution of 2009,¹⁵ the latter of which was a joint URT and private sector commitment to a public-private partnership to facilitate market-led

¹³ Interviews with Susan Masagasi (ACT) and Janet Bitegeko (ACT).

¹⁴ Three of the key goals of ASDP were to create a favorable environment for commercial activities, enhance public-private roles in strengthening support services, and facilitate market efficiency for inputs and outputs.

¹⁵ For the ‘Kilimo Kwanza Resolution’. See:

http://www.gafspfund.org/sites/gafspfund.org/files/Documents/KILIMO_KWANZA_RESOLUTION_-_FINAL%5B1%5D.pdf The 10 pillars of Kilimo Kwanza can be found at:

<http://www.tzonline.org/pdf/tenpillarsofkilimokwanza.pdf>

agricultural sector growth. Second, Tanzania's private sector fertilizer supply chains were reasonably developed already in key maize producing regions, thanks to demand from both cash crops like coffee and Irish potatoes as well as from some maize farmers. In addition, MAFC did not have the institutional capacity or budget to re-form a parastatal to implement a targeted voucher scheme via a government supply chain approach. Thus, as with the untargeted approach, the costs/benefits of a government supply chain approach were simply too high for MAFC to consider.

Thus, under the Tanzania pilot targeted voucher scheme, the role of the private sector was to import, wholesale, and retail fertilizer that would be obtained at a subsidized price by farmers who received a voucher, from participating agro-dealers. The role of the government was limited to distributing vouchers to farmers who met the target criteria, coordinating with private sector actors to ensure that the appropriate supply and types of fertilizer would arrive at the same villages where vouchers would be distributed, and re-paying agro-dealers for the 50% of the market price of a limited quantity of fertilizer (two 50 kg bags) that a voucher recipient could obtain. This program design was developed by MAFC along with ACT, Alliance for a Green Revolution in Africa (AGRA) and Citizens' Network for Foreign Affairs (CNFA) (MAFC, 2007c; ACT, 2012).

5.3 Implementation of pilot targeted voucher scheme

In 2007/08, the voucher based subsidy was piloted in two districts (W.Bank, 2014). Fiscal requirements of the program were not difficult to meet as the program was very small at this point and was funded by MAFC.¹⁶ Institutional capacity for implementation was also deemed sufficient on both the government and private sector sides. An indicator of MAFC's capacity to plan the program is evidenced by the fact that they convened an agricultural input stakeholders' meeting in 2008 in order to review the guidelines for the new targeted voucher scheme.¹⁷ The key implementing veto players – MAFC and private sector fertilizer supply chain actors – both had strong incentive for the program to be successful, and those two groups plus non-state actors such as ACT made for a number of committed policy champions.

6. NATIONAL AGRICULTURAL INPUT VOUCHER SCHEME (2008/09 – 2013/14)

6.1 Agenda Setting for NAIVS: Why continue with fertilizer subsidies?

The international food-price crisis occurred during the roll-out of Tanzania's small pilot targeted voucher scheme (2007/08).¹⁸ Although international food prices declined somewhat in 2008, maize prices were still high in Tanzania and Kenya due to a poor short season maize harvest in both Tanzania and Kenya (World Bank, 2009). Given the continuation of high prices, the URT

¹⁶ MAFC (2008) and interview with Dr. Andrew Msolla, Tanzania country manager of AFAP (African Fertilizer and Agribusiness Partnership). In 2007/08, he served as the Assistant Director of the Ag Inputs Section of MAFC.

¹⁷ MAFC (2007a).

¹⁸ The World Bank Food Price Index rose by 60 percent in the course of just a few months of 2008, and international prices of maize, rice, and wheat increased by 70 percent, 180 percent, and 120 percent, respectively, compared to the mid-2007. These price spikes were unexpected, and the impact on developing countries was large, as the World Bank estimated that they kept or pushed 105 million people into poverty in low-income countries.

<http://www.worldbank.org/en/results/2013/04/11/global-food-crisis-response-program-results-profile>

approached the World Bank in 2008 to request funding to scale-up the URT's existing pilot targeted voucher scheme in order to avoid potentially widespread food insecurity in various parts of the country (ibid, 2009). The international food price crisis, followed by continued high maize prices in Tanzania thus served as a critical focusing event that led URT to seek to rapidly scale-up the size of their existing targeted voucher scheme.

The World Bank responded by negotiating the Accelerated Food Security Program (AFSP) with the URT, which consisted of a three components, each designed to help improve short-and/or longer-term food security in Tanzania. The largest component was the National Agricultural Input Voucher Scheme (NAIVS), which took the existing Tanzanian private-sector friendly targeted voucher scheme, made some slight modifications, and scaled it up rapidly beginning in 2008/09.

Another factor that led to NAIVS was that as of 2008/09, low staple crop productivity remained a serious and increasingly relevant policy problem. For example, average yields of major staple food crops such as maize and rice had remained mostly stagnant over the last 20 years, and staple crop production has managed to keep pace with population growth primarily through continued expansion of planted area (World Bank, 2014). However, this continuing underlying problem became a much higher-profile policy issue following the Abuja Declaration of 2006 and the 2007/08 international food price crisis, for not only URT but also for donors such as the World Bank, FAO, etc. As of 2007/08, the percentage of smallholders using fertilizer on maize/rice had not risen above the level (13%) observed in the 2002/03 Agricultural Census (Mather et al, 2016b), and much of this fertilizer use on maize was concentrated the higher potential southern highlands and northern zones, where population densities and rainfall are higher.

A third factor that put the issue of low staple crop productivity at the top of the MAFC agenda was the role of powerful advocates of large-scale fertilizer subsidy schemes, which included President Jakaya Kikwete of Tanzania. While high-level URT officials such as President Kikwete, the Minister of Finance and Minister of MAFC were the primary advocates of scaling-up a fertilizer subsidy scheme in Tanzania in response to the international food price crisis, it is important to note that the World Bank also played a role in putting large-scale fertilizer subsidy programs back on the policy agenda of various countries during that time period.¹⁹ Although the World Bank was known since the structural adjustment era for its strong resistance to funding subsidy schemes, the Bank actually changed its position on agricultural input subsidies *prior* to the international food price crisis. For example, in early 2007, the World Bank moved away from a blanket opposition to subsidy schemes, noting that short-term support for 'smart' subsidies were an appropriate intervention to help promote adoption of new technologies (such as fertilizer and improved seed in cereal production) (Morris et al, 2007).

Once the international food crisis price spike hit, the World Bank and other donors sought strategies to fund interventions that could provide a quick response to improve crop productivity, such as through subsidizing targeted fertilizer/seed voucher schemes, irrigation system rehabilitation, etc. For example, in 2008, the World Bank (IBRD & IDA) created the Global Food Crises Response Program (GFCRP), a fast-track source of funding to provide financial

¹⁹ Interview with Dr. Karen Brooks, currently with IFPRI, but who was the Agricultural Sector Manager for the World Bank Tanzania office from 2004-2012.

support for social protection programs, technical and financial assistance with food price policy and market stabilization actions/investments to mitigate the adverse impacts of high and volatile food prices on the poor, and support for programs to facilitate domestic food production and marketing response. After learning about the GFCRP, President Kikwete asked the URT Minister of Finance to approach the World Bank to request financial assistance to respond to the continuing challenge of high maize prices in Tanzania by scaling-up URT's existing pilot targeted fertilizer voucher program.²⁰

6.2 Design of NAIVS

The most obvious difference between the URT pilot targeted voucher scheme and NAIVS is that NAIVS was designed to be scaled-up rapidly to reach as many as 2 million smallholder farm households. The reason for this was because URT and World Bank believed that the economic costs of not proceeding with a program that could rapidly improve smallholder maize/rice producer access to fertilizer and improved seed would be quite large (World Bank, 2014).

While the basic design of the pilot voucher scheme of 2007/08 and NAIVS were the same, the World Bank insisted on clarifying several aspects of the design of NAIVS to try to ensure that it use new information about subsidy schemes (from Morris et al, 2007) so that the program would be as private-sector friendly as possible.²¹ The two main design features clarified by the World Bank included the household-level targeting criteria to be used to determine a household's eligibility to receive subsidized fertilizer for up to three years, and the composition of a 'village voucher committee' that would determine which farmers met the criteria and would be offered the chance to participate in the program.²² According to the NAIVS household targeting criteria, to be eligible for receipt of 3 years of fertilizer and seed vouchers, a farmer had to: (a) be a full-time farmer who resides in the village; (b) not cultivate more than one hectare of maize or rice; (c) be willing and able to co-finance the purchase of the subsidized input package at planting time; (d) be willing to follow the recommendations for fertilizer/seed use given by URT extension agents; (e) have used little to no fertilizer and/or improved seed for maize or rice over the last five years. Preference was to be given to female-headed households (World Bank, 2009).

As noted above, the combination of the ideological commitment of URT to market-led development and thus the lack of URT institutional capacity to distribute fertilizer themselves led to a private-sector friendly pilot targeted voucher scheme. On paper, NAIVS was clearly the most private-sector friendly large-scale agricultural input voucher program that was implemented in SSA before or soon after the international food price crisis (Wanzala et al., 2013), as it embodies considerably more criteria of a 'smart' subsidy program (Morris et al., 2007) than programs during the same time period implemented in Ghana, Malawi, Kenya, Zambia, Nigeria, Senegal, etc.

²⁰ Interview with Dr. Madhur Gautam, World Bank, who was the World Bank Tanzania office Team Leader of AFSP during its first few years.

²¹ Interview with Dr. Madhur Gautam.

²² See Appendix B for details

6.3 Adoption of NAIVS

Perhaps the strongest factor facilitating the adoption of NAIVS was the propitious timing of the international food price crisis, which made rapid response to the problem of low food crop productivity an urgent issue for URT. In addition, the URT fiscal year begins in July, which in theory provides sufficient time for MAFC and private sector fertilizer importers to deliver vouchers and fertilizer to the main maize-growing regions of the country, whose planting period is from November to January. Second, the power of proponents was considerably more than that of any opponents, as the President, Minister of Finance and Minister of MAFC were strongly in favor of the program, and any other potential government veto players (Cabinet, Parliament) approved it. In addition, we are not aware of opponents to NAIVS with the exception of donors who decided not to contribute funding (such as USAID, DFID).

6.4 Implementation of NAIVS

6.4.1 Factors enabling successful implementation

In 2008/09, NAIVS scaled up the 2007/08 pilot (that had reached two districts) and expanded the targeted voucher scheme to 58 districts distributed across 11 Regions, reaching approximately 780,000 farmers (World Bank, 2014). By 2012/13, approximately US\$300 million was invested in providing more than 2.5 million smallholder farmers with a 50 percent subsidy on one package of maize or rice seed, and 2-3 bags of fertilizer, enough seed and fertilizer to meet a blanket recommendation application rate for one acre of maize or rice (ibid, 2014). The magnitude of this scale-up resulted in NAIVS becoming the largest line-item in the MAFC budget, where it accounted for as much as 35-40% of the annual MAFC budget. Adequate funding for a program of this size was enabled by a combination of local and international donor commitments. Local commitment by the URT to fund a program of this size was aided by aforementioned Tanzania Development Vision 2025 (1999) and the National Strategy for Growth and Reduction of Poverty (2004) each of which made improving household food security and/or agricultural sector growth key development goals (World Bank, 2014). URT's signing of the Maputo Declaration on Agriculture and Food Security (July 2003) also helped MAFC advocate for a larger share of the URT budget. While URT received considerable funding for the Agricultural Sector Development Program from donors beginning in 2006/07 (project support as well as a basket fund), NAIVS was not funded by ASDP.²³

Donor financial commitment to NAIVS came primarily from the World Bank, as the AFSP provided \$160 million, and a few other international donors²⁴ contributed \$30 million (World Bank, 2009). Contributions from two organizations within what is generally called the “World Bank” - the International Development and Reconstruction Bank (IRDB) and the International Development Assistance (IDA) -- contributed a little more than 50% of the costs of NAIVS from 2008/09 to 2012/13, with URT providing the remainder.

²³ Nevertheless, it is possible that MAFC budget support from ASDP helped indirectly provide MAFC with funding for NAIVS.

²⁴ The other donors included the Japan (JICA), and Irish Aid (World Bank, 2009).

Because the government role within NAIVS was to distribute vouchers from the national to the village level across most regions of the country²⁵, the program's success required sufficient district-level government administrative capacity. This appears to have been sufficient, given Tanzania's long history of decentralizing/devolving decision-making to the district level, which had most recently been received attention via the Local Government Reform Program (LGRP) of 1998 (Mollel and Tollenaar, 2013). Evidence of district-level administrative capacity is seen in the fact that the program not only relied upon districts to over-see ward and village-level voucher distribution, but to also negotiate district-specific subsidy rates with fertilizer supply chain actors who had been selected to deliver the subsidized fertilizer to a given district.²⁶

Given the lack of institutional capacity of the government to import/distribute/retail fertilizer, and the URT and World Bank preference for a private-sector friendly program, implementation of NAIVS required the support of key implementing veto players – the commitment to participate by enough existing private sector fertilizer and seed importers, distributors, and agro-dealers. It is not surprising that both the largest fertilizer importers and smaller ones (and the distributors and agro-dealers they worked with at the time) participated in NAIVS, as it represented an opportunity to not only greatly expand their sales during the years of NAIVS. In addition, the private sector-friendly program design was expected to grow the market for commercially-priced fertilizer and seed demanded by smallholder maize/rice farmers.²⁷

As noted above, private sector fertilizer supply chains had already penetrated some areas of the higher potential regions of the southern highlands and northern zone due to smallholder demand for commercial fertilizer from both cash crops and maize. Thus, the private sector already had the institutional capacity to service areas for NAIVS in which they were already working. They also were willing to expand into other areas, given the opportunity it presented for them to increase sales volume not only during NAIVS but potentially beyond the life of fertilizer subsidies. That said, URT, World Bank and other non-state partners helping to design NAIVS (ACT, AGRA, CNFA) recognized before NAIVS began that there were not enough existing agro-dealers in business as NAIVS to distribute the quantity of subsidized fertilizer (and improved seed) envisioned, both to areas already reached by the private sector and areas unreached at the time. They also recognized that new agro-dealers would require training in proper fertilizer and seed storage and use, as well as to ensure they had sufficient business/financial skills needed to process the vouchers and repay the distributors or importers who gave them fertilizer and seed on credit (for both subsidized and commercial fertilizer and seed) (World Bank, 2009; ACT, 2012; World Bank, 2014). Thus, one component of AFSP was designed to fund training of existing and new agro-dealers, which was implemented by CNFA working with the Agricultural Market Development Trust (AGMARK), AGRA, ACT and the Finance Sector Deepening Trust (FSDT) (World Bank, 2009; ACT 2012). Thus, AFSP provided

²⁵ Vouchers went from the national/central level to regions, then to districts, wards, and villages.

²⁶ That is, the objective was for eligible and selected farmers across the regions targeted by NAIVS to all receive a 50% subsidy on two bags of fertilizer, yet because the costs of transporting fertilizer vary considerably across the country, the actual subsidy paid to agro-dealers (later, importers) who received vouchers from participating farmers needed to be adjusted from district to district based on transportation costs from the port.

²⁷ Interviews with fertilizer importers.

funds to increase the institutional capacity of existing and new agro-dealers needed to expand the spatial reach of NAIVS.²⁸

6.4.2 NAIVS implementation process²⁹

6.4.2.1 Introduction

The policy process for the approval of the budget required for NAIVS each year is described in Appendix A below. The policy process of NAIVS implementation from 2012/13 to 2013/14 is shown in Figure 1 in the Appendices (this is slightly different from the original process given changes noted in section 6.5.2 below).

6.4.2.2 National Voucher Steering Committee

No independent Project Implementation Unit was established to manage NAIVS. Instead, the management and implementation of NAIVS used already existing structures within MAFC. However, given the scope of coordination required, the National Voucher Steering Committee (NVSC) was formed to provide coordination policy guidance, oversight, and coordination functions required for successful NAIVS implementation, M&E and potential reform over time (Figure 1). The NVSC meets at least once per quarter, and is chaired by the Permanent Secretary (PS) of MAFC. It includes representatives from government (MoF, PMO-RALG, directors of relevant MAFC departments, the National Micro-Finance Bank (NMB)), CSOs (representatives of national farmer organizations, NGOs, etc), and the private sector fertilizer and seed supply chains. The last group includes the Tanzanian Fertilizer Society (TFS), which represents all fertilizer importers and many fertilizer wholesalers, the Tanzania National Agro-Dealer Association (TANADA, formed in 2010), and Tanzanian Seed Trade Association (TASTA).

The NVSC takes the general geographic and household-level targeting criteria agreed upon by MAFC and the World Bank, and applies this to guidelines for allocation of vouchers at all levels, from national to village level. It also regularly reviews the integrity of the voucher system, approves annual work plans and budgets as well as quarterly Interim Financial Reports, and address all implementation issues. The NVSC meets quarterly and applies this to the distribution of vouchers at all levels (from national to regional, district, ward and village levels). NVCS also reviews the integrity of the voucher system, approves annual work plans, and addresses all management and implementation issues.

6.4.2.2 NAIVS-National Forum

To further ensure transparency and legitimacy, all key decisions of the NVSC are reviewed by the National NAIVS Stakeholder Forum, composed of all key stakeholders (includes those in the NVSC plus regional and district level government officials). This forum meets annually to review the program's performance in the previous year and discuss and endorse decisions affecting the implementation and effectiveness of NAIVS for the following year. These issues include the criteria for geographical allocation of vouchers, the technical design of the vouchers (including the level of subsidy), assessments of progress in implementing NAIVS, and endorsement of the annual work plan and budget. The forum's broad membership is intended to

²⁸ URT also made a Memorandum of Understanding with the National Microfinance Bank (NMB) for the redemption of NAIVS vouchers, given that NMB was the only commercial bank with a branch in most districts of the country (ACT, 2012).

²⁹ This section draws heavily from World Bank (2009) and World Bank (2014).

encourage the participation of all concerned groups and to ensure transparency in implementing the voucher system.

6.4.2.3 Agricultural Inputs Section, Directorate of Crop Development, MAFC

AIS coordinates day-to-day implementation of NAIVS and assigned qualified staff for to work closely with relevant departments/sections of MAFC for planning, fertilizer and soil nutrition management, seed, accounts, procurement, communications and M&E.³⁰

6.4.2.4 Regional, District, Ward and Village Voucher Committees

NAIVS is implemented at the Local Government Authority (LGA) level, with the involvement and participation of numerous institutions at all stages. The principal institutions include: **Regional Voucher Committees (RVCs)**, which support districts and monitors the implementation of the voucher scheme in the region. Each RVC is chaired by the Regional Commissioner (RC) and includes members from the Regional Secretariat, farmer groups & 2 CSOs, fertilizer/seed supply chain actors, and a representative from the National Microfinance Bank (NMB) located in the respective region. The RVCs allocate vouchers to districts based on established criteria and estimates of demand for agricultural inputs (based on historical data). It also compiles NAIVS progress reports from the districts to submit to the NVSC Secretariat.

District Voucher Committees (DVCs) are made up of representatives of farmer groups, importers/wholesalers/agro-dealers, community based groups from that district, district MPs, a representative from the local branch of NMB, the district agricultural and livestock officer (DALDO), and the District Commissioner in each participating district (LGA). The DVCs allocate vouchers to Wards and Villages based on established criteria, and informs Village Governments about their respective voucher allocation, monitors implementation at the village level, and prepares and submits implementation progress reports to their RVC for transmittal to AIS at the national level.

Ward Voucher Committees (WVCs) are responsible for distributing the vouchers to selected villages (as decided by DVCs). They also monitor implementation of the input voucher scheme in wards targeted by NAIVS. The membership of WVCs includes the Ward Executive Officer (Chairperson), Ward Extension Officer (Secretary), Ward Community Development officer, and one farmer group representative.

The Village Council in consultation with the Village Assembly organizes the election of a **Village Voucher Committee (VVC) for each village** targeted by NAIVS. Each VVC consists of three men and three women who are charged with recommending eligible farmers and submitting the list to the Village Assembly for approval. After approval, VVC issues vouchers to the approved farmers and also monitors the use of inputs by voucher recipients. It reports regularly to the Village Council and Village Assembly. Eligibility criteria for VVC membership, roles and responsibility of VVC are clearly described elsewhere (World Bank, 2009).

6.4.2.5 Role of smallholders who are eligible and selected for voucher receipt

After vouchers are issued to farmers, it is the responsibility of each farmer to find a participating agro-dealer (who is either in or will visit the village during the planting period) who can supply

³⁰ Please see World Bank (2009) section 57 for more details.

the desired input at an agreed time and place. The farmer ‘redeems’ the voucher and pays a ‘top-up’ fee to the agro-dealer (approximately 50% of the market price of the fertilizer type) for each of two fertilizer vouchers, and receives a bag of seed at 100% subsidy.

6.4.2.5 Role of fertilizer and seed supply chain actors and NMB

Agro-dealers send redeemed vouchers (signed by farmers and village officials) and the farmer financial contribution (top-up payments) to the wholesaler from whom they received their fertilizer and/or seed. Wholesalers then send vouchers and farmer contributions to the importer(s) from which they received fertilizer (or seed companies for seed). Importers then take the vouchers to NMB. NMB verifies the authenticity of the vouchers, records the transaction, and informs MAFC that the transaction has been completed. They then repay the importers the value of the vouchers once sufficient funds are released to them from the MoF.

Several months prior to the planting period, importers and wholesalers discuss the fertilizer/seed required for NAIVS with AIS, so that they can import what is required in time, and plan with wholesalers and agro-dealers they choose to work with when/where the inputs are to be delivered for use in NAIVS (through established or new private sector channels). Agro-dealers are then informed by wholesalers or importers of their responsibilities to redeem vouchers and sell subsidized (and commercial) fertilizer and seed during the season.

6.4.2.6 Summary of NAIVS implementation process

As noted in the sections above, a key aspect of NAIVS implementation is that decisions regarding voucher distribution from the national to the household level involve not simply government officials, but representatives from farmer groups, CSOs, local community groups, private sector fertilizer/seed supply chain actors, and local representatives from NMB (Figure 1). Second, there are quarterly meetings of the NVSC at which issues or problems may be raised by any stakeholder. This implies that the NVSC meets well before the forthcoming year of the program, which has helped enable stakeholders to provide feedback that has influenced the design and implementation of the program over time.

6.5 Evaluation and Reform

6.5.1 Shift from targeting only high potential zones to also targeting medium/lower potential zones

When NAIVS began in 2008/09, the original plan was to target 65 high potential districts (in 12 regions) (World Bank, 2009). However, in implementation, NAIVS expanded to 74 districts in 2009/10 (World Bank, 2010) and 87 districts (in 24 regions) in 2010/11, including districts with medium/lower potential (World Bank, 2014). Although the predominant share of vouchers continued to be distributed to the original 12 regions, every other rural region in the country began to receive at least small numbers of vouchers (*ibid*, 2014). The Ministry recognized that the level of productivity gain achieved by distributing improved inputs in drier regions of the country would likely be lower than in the higher rainfall zones³¹, but they were under political pressure from Members of Parliament (MPs) in non-targeted regions to make the program more universal.³²

³¹ Although NAIVS was expanded to semi-arid regions such as Singida and Dodoma, it was only targeted to villages that had sufficient irrigation, as per interview with Dr. Andrew Msolla.

³² World Bank (2014), Mwajande (2014), and a number of interviews.

6.5.2 Shift in who decides which agro-dealers participate in the program (2012/13)

At the beginning of NAIVS, district-level officials had the primary discretion of which agro-dealers operating in their district could participate in NAIVS. Thus, wholesalers and importers supplying the agro-dealers with fertilizer largely had to work with agro-dealers selected by government officials each year. After several years of this arrangement, importers argued for MAFC to enable them and/or the distributor they work with in a given district be allowed to select which agro-dealers they would work with in that district, for a number of reasons.³³ In short, importers needed to be able to trust agro-dealers to both provide proper information to farmers about the fertilizer (so that farmers would more likely have a good experience using the fertilizer and perhaps decide to buy it at the commercial price in the future) and to repay both the top-up and subsidy amounts of all the fertilizer they received from wholesalers and importers. While there were agro-dealers who performed as expected, there were enough ‘bad apples’ that importers wanted more control over which agro-dealers they would work with to distribute fertilizer via NAIVS. For example, after several years of NAIVS, importers had gained enough information via repeated transactions with both wholesalers and agro-dealers to know which they trusted and which they did not.³⁴

In summary, faced with a demand for an institutional change in the program design from a key implementing partner (private sector fertilizer importers), MAFC agreed that beginning with the 2012/13 season, importers participating in NAIVS would (a) have primary discretion in selecting which agro-dealers they would work with in a given district; (b) that agro-dealers would send both the top-up fees and NAIVS vouchers to wholesalers, who would send them to importers, and importers would redeem the value of the vouchers directly from the government.

6.5.3 Scale of program declines in 2012/13 and program extended beyond initial exit year

As noted above, the NAIVS program began in 2008/09, with a plan to provide 2.5 million smallholder farm households each with three consecutive years of assistance (vouchers providing them with subsidized fertilizer and improved seed for maize/rice production). Thus, the plan was for the 730,667 households receiving vouchers in the first season to then receive vouchers for two consecutive years after that season (Table 2). After receiving vouchers for three years, households were to then ‘graduate’ from NAIVS (i.e. no longer receive vouchers). As the program scaled up (and as the 2008/09 voucher recipients ‘graduated’ from the program), other eligible households willing and able to pay the 50% top-up fee for 2-3 50kg bags of fertilizer would then begin to receive vouchers. The number of vouchers distributed was scheduled to peak in 2010/11. Thereafter, the number of recipients would decline as the remaining targeted recipients graduated from the program. The World Bank had planned for their financial commitment to NAIVS to be completed during the 2013/14 cropping season.

³³ Importers and distributors prefer to select the agro-dealers through which they sell their products because they typically have to provide the inputs on credit and they rely on agro-dealers to be effective representatives of their products – both of which imply that the importers can trust the agro-dealers in these areas.

³⁴ This section based on World Bank (2014), interviews with fertilizer importers, Mr. Salum Mkumba (chairperson of the Tanzania Fertilizer Society), and Dr. Andrew Msolla.

Table 2. Number of households that received NAIVS vouchers (planned vs. actual)

| Agricultural Year | # of smallholder households intended to receive a NAIVS voucher | |
|----------------------|---|-----------|
| | Planned | Actual |
| 2008/09 | 740,000 | 730,667 |
| 2009/10 | 1,500,000 | 1,511,900 |
| 2010/11 | 2,040,000 | 2,011,000 |
| 2011/12 | 1,800,000 | 1,779,867 |
| 2012/13 | 1,000,000 | 940,783 |
| 2013/14 | 500,000 | 932,100 |

Source: World Bank (2014)

However, there were two main diversions from that original plan.³⁵ First, as noted above, URT expanded the program beyond the original focus of 12 higher-potential regions to include some vouchers for 12 additional regions. While the majority of vouchers continued to be targeted toward the high potential zones originally selected, by 2012/13, roughly 40 percent of the vouchers were being distributed to other zones. Second, a significant number of VVCs did not adhere to the policy of ‘graduating’ voucher recipients after three years: in some villages, farmers received vouchers for four or even five years (World Bank, 2014).³⁶

As scheduled, the number of vouchers distributed in 2012/13 fell dramatically from the number distributed in 2011/12 (Table 2). However, in 2013/14, MAFC distributed twice as many vouchers in 2012/13 relative to the quantity originally planned and budgeted for (ibid, 2014). Yet, World Bank funding had largely been spent by 2012/13, and other donors who had provided some minimal funding towards NAIVS such as JICA did not offer to continue funding for NAIVS beyond 2013/14. In addition, the amount of funding that MAFC received from the Ministry of Finance of URT relative to the amount that had been approved for MAFC’s budget at the beginning of the 2012/13 and 2013/14 fiscal years was significantly reduced (Table 3). For example, the percentage of MAFC’s recurrent budget received relative to the amount that had been approved by Parliament fell from 93.8% in 2011/12 to 82.6% in 2012/13, and then to 69.8% in 2013/14.³⁷ Perhaps due to reductions in the budget that MAFC actually received in those two years, by the end of 2014, private sector fertilizer importers had not yet been fully repaid on time for the fertilizer they had imported (at full cost) for distribution as subsidized fertilizer (via NAIVS) in the 2012/13 and 2013/14 seasons.³⁸

³⁵ This paragraph based on World Bank (2014).

³⁶ We have heard that some VVCs claim that they did not graduate farmers because other eligible farmers were not able to pay the 50% top-up, but there is no evidence we are aware of to assess to what extent this was the case.

³⁷ The budget for NAIVS each year was within ‘recurrent’ spending of MAFC’s annual budget (not the ‘development budget’), which contains a number of ‘ring-fenced’ expenditure items such as continuing to pay to train extension agents (each year), grain purchases made by the National Food Reserve Agency (NFRA), NAIVS, etc.

³⁸ Interviews with fertilizer importers.

Table 3. MAFC budgeted amount approved and received by fiscal year, 2008/09 to 2014/15

| | 2008/09 ¹ | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 |
|---|---|----------------|----------------|----------------|----------------|----------------|
| Budgeted/Approved | ----- Billion Tanzanian Shillings ----- | | | | | |
| Recurrent | 143.49 | 190.333 | 190.333 | 176.555 | 271.469 | 291.737 |
| Development-Local funds | 2.51 | 3.416 | 3.416 | 13.978 | 92.458 | 62.317 |
| Development-Donor funds | 17.35 | 100.535 | 100.535 | 106.135 | | |
| Total | 163.53 | 294.284 | 294.286 | 296.668 | 363.927 | 354.054 |
| Received | | | | | | |
| Recurrent | 141.6 | 179.761 | 178.588 | 145.810 | 189.523 | 243.193 |
| Development (local & donor) | 19.11 | 100.473 | 90.426 | 57.054 | 68.466 | 40.241 |
| Total | 160.71 | 280.234 | 269.014 | 202.864 | 257.989 | 283.434 |
| % received relative to amount approved | | | | | | |
| Recurrent | 98.7% | 94.4% | 93.8% | 82.6% | 69.8% | 83.4% |
| Development (local & donor) | 96.2% | 96.7% | 87.0% | 47.5% | 74.1% | 64.6% |
| Total | 98.3% | 95.2% | 91.4% | 68.4% | 70.9% | 80.1% |

Source: MAFC annual reports from 2008/09 to 2014/15 at <http://www.kilimo.gov.tz>

7. MAFC PILOTS AN ALTERNATIVE FERTILIZER SUBSIDY PROGRAM WHILE CONTINUING NAIVS

7.1 MAFC begins training component of Agricultural Credit Subsidy Program in 2012/13

The Agricultural Inputs Section (AIS) of MAFC generated the initial design for an Agricultural Credit Subsidy Program (ACSP) in 2012/13, which was viewed by some within MAFC as the ‘eventual follow-on program’ to NAIVS for several reasons.³⁹ First, as noted above, when NAIVS was launched in 2008/09, one of the program’s main goals was to provide maize/rice smallholder farmers who had not purchased these inputs in the last five years to have better physical access to these inputs and a subsidized price for fertilizer so as to have a relatively lower-risk opportunity to experiment with the net returns⁴⁰ to use of these inputs – for a limited amount of time. By 2012/13, NAIVS had already reached hundreds of thousands of smallholder maize and rice farmers, most of whom had not used inorganic fertilizer or improved seed before in maize or rice production (World Bank, 2014). Thus, NAIVS had appeared to have largely fulfilled its primary goal of introducing smallholder maize/rice producers to inorganic fertilizer and improved seed, reducing the riskiness of using these inputs due to farmers’ inexperience with observing the net returns to fertilizer and improved seed on their own fields.

Second, MAFC believed that NAIVS had enabled enough smallholders to gain experience with fertilizer use on maize/rice, but that they still faced difficulties in purchasing fertilizer at market prices due to credit constraints (insufficient collateral and very high interest rates) as well as

³⁹ Interview with Dr. Andrew Msolla, one of the chief architects of the initial ACSP design.

⁴⁰ In economic/financial terms, the net returns to an input such as fertilizer are measured as the change in maize/rice quantity produced per acre*price of that grain, less the price of fertilizer per acre. If the net returns are positive, this implies that fertilizer use by that farmer is profitable.

smallholder insufficient availability of cash during the planting period.⁴¹ Given these credit constraints faced by smallholder maize/rice producers, MAFC believed that smallholders could benefit from a few years of subsidized interest rates for group loans for the purchase of fertilizer/seed for use on maize/rice.⁴² ACSP was designed for the following reasons:

- 1) To provide smallholder maize/rice producer groups with subsidized interest rates for ag input loans that they could continue to access fertilizer, build their savings (from the higher average net returns that are generated when using improved ag inputs), and enable farmer groups to gain experience in obtaining and repaying loans for ag inputs.
- 2) This program would also give community and/or larger commercial banks experience in discovering which farmer groups they could trust to repay loans.
- 3) MAFC thought that if ACSP functioned as planned, MAFC/URT could spend less money subsidizing ag inputs and actually help more smallholders acquire fertilizer and improved seed for use on maize/rice.

The solution to smallholder credit constraints proposed by the initial design of ACSP was to ensure that farmer groups known as AMCOs (Agricultural Marketing Cooperative Organizations) SACCOs (Savings and Credit Cooperative Organizations), who agree to use improved inputs (fertilizer, improved seed, etc) for maize/rice production receive a loan for a limited quantity of such inputs through existing private sector financial sector institutions (i.e. large commercial banks or small community banks), through multiple forms of guarantees.⁴³ These guarantees, as well as large government subsidy of the interest rate paid by AMCOs (who would pay 4% instead of the market interest rate of 20%), were assumed to reduce the risks faced by banks of lending to small and medium-holder farmers, and to thus improve access to capital needed by farmers to gain access to improved inputs such as fertilizer and improved seed that can improve crop productivity.

Although MAFC implemented NAIVS in 2012/13, in that year, they also began preparatory training needed to implement a pilot of the ACSP. This training was targeted to executives, leaders, and members of AMCOs to enable them to successfully obtain and manage loans under ACSP.⁴⁴

7.2 First attempt to pilot ACSP (2013/14)

Implementation: In 2013/14, MAFC met with a number of large commercial banks to explain the proposed design of ACSP to them and see if they would be willing to participate. Some of these banks agreed to participate, but only if URT paid them the 50% loan guarantee up-front as collateral (i.e. before loans were made to AMCOs).⁴⁵ That did not happen, thus the commercial

⁴¹ See Appendix C for more details

⁴² The remainder of this section is based on based on the ACSP design document (AIS/MAFC, 2013), and ex ante assessment of the ACSP design by Mather et al (2015), and discussions with Dr. Andrew Msolla.

⁴³ See Appendix C for more details

⁴⁴ Hansard of speech to Parliament by Minister of MAFC, Honorable Christopher Chiza April 2013 (p.29-30) regarding the 2013/14 MAFC budget. MAFC budget speech hansards available at www.kilimo.gov.tz

⁴⁵ Hansard of speech to Parliament by Minister of MAFC, Honorable Christopher Chiza May 2014 (p.24) regarding the 2014/15 MAFC budget.

banks (key implementing veto players) pulled out of the program that year. For 2014/15, the Ministry planned to continue to negotiate with commercial banks to see if they would agree to participate in ACSP.

7.3 NAIVS not continued in 2014/15

Reform: MAFC decided to not continue NAIVS in 2014/15 for several reasons. First, by the end of 2013/14, MAFC felt as though the subsidy had accomplished one of its main original goals of introducing millions of smallholder maize/rice producers to inorganic fertilizer and improved seed.⁴⁶ Thus, changes in material conditions also contributed to NAIVS not continuing in 2014/15. For example, prior to NAIVS, there was assumed to be a large knowledge constraint to smallholder use of fertilizer and improved seed in smallholder maize/rice production, which created significant farmer risk of purchasing such inputs at market rates for use on maize/rice. That is, farmers in many areas had not used these inputs on maize/rice or seen neighbors or demonstration plots using them, thus they were not confident that the financial net returns to fertilizer use on maize/rice would be sufficiently positive. Second, as noted above, MAFC had insufficient funds to fully repay fertilizer importers after the 2012/13 and 2013/14 main seasons.

7.4 Second attempt to pilot ACSP (in 2014/15)

In 2014/15, MAFC again tried to implement a pilot ACSP. In the process, they identified 4,990 legally registered AMCOs that contained 974,030 members.⁴⁷ However, out of these households, only a small number of cooperatives (712 coops representing 56,715 households) were deemed creditworthy by NMB bank, CRDB, and community banks. Thus, in 2014/15 ACSP only managed to reach a little over 10% of the number of households that NAIVS was originally intended to reach in its last year (its lowest scale). In his 2015/16 MAFC budget speech to Parliament, the Minister of MAFC noted that a low number of loans had been made by ACSP, in part due to lack of farmer groups.

There are a number of reasons why the ACSP pilot in 2014/15 reached so few households. First, as in 2013/14, most commercial banks were not willing to take the risk of making ag input loans to smallholder maize/rice producers belonging to an AMCO without the 50% URT 'loan guarantee' being delivered up-front in cash before the main cropping season began.⁴⁸ This left small community banks and SACCOs as other potential lenders, yet only some areas even have community banks, and such banks generally do not have enough capital to make significant loans for an extended period of time (as is required for an ag input loan, which the farmer cannot repay until after maize/rice harvest). For example, the National Panel Survey (NPS) of 2010/11 (NBS, 2012) shows that only 0.5% (0.7%) of Tanzanian maize (rice) growers in that year received a loan for agricultural inputs from their local SACCO.⁴⁹ Second, although a large number of AMCOs were created prior to structural adjustment to help smallholder farmers

⁴⁶ Interview with Dr. Andrew Msolla.

⁴⁷ This paragraph based on Hansard of speech by Minister of MAFC Hon. Stephen Wasira to Parliament regarding the proposed 2015/16 MAFC budget, p.21-22.

⁴⁸ Mather et al (2015)

⁴⁹ Like most micro-finance institutions, SACCOs generally are only able to make loans that last a month or two given low levels of liquidity. See section 5.2 of Mather et al (2015) for more details.

obtain services like extension, agricultural inputs, and access to output markets, many of those AMCOs that are not concentrated on staple crop production (and not production/sale of cash crops like tobacco, coffee, horticultural crops, etc) appear to be cooperatives on paper yet are not actually enabling members to access those services (post-SA).⁵⁰

7.5 NAIVS returns in 2015/16

7.5.1 Agenda setting & design

MAFC M&E and independent reports (World Bank, 2014) noted that average maize yields had improved during the years of NAIVS, and this improvement was largely attributed to NAIVS.⁵¹ Thus, by 2015/16, low food crop productivity was still a highly relevant policy problem. MAFC decided to return to NAIVS in 2015/16 as a key way to address that policy problem for a number of reasons. First, by early 2015, MAFC had updated information on ACSP, their intended ‘follow-on’ program to NAIVS, which strongly suggested that ACSP could not be implemented at anywhere near the intended scale if commercial and community banks were expected to make the loans to farmer groups. This left MAFC in the position of having one type of fertilizer subsidy program type (NAIVS) that they trusted to be able to reach a relatively large number of smallholders in 2015/16.

Second, although the implementation of NAIVS from 2008/09 to 2013/14 had improved the material conditions regarding ‘smallholder maize/rice producer *experience* with improved inputs’, smallholder access to credit for ag inputs to be used on maize/rice was still a significant constraint. Thus, bringing back NAIVS was more likely to address the remaining and highly relevant policy problem of very limited credit access for smallholder maize/rice growers than ACSP. Third, MAFC championed the return of NAIVS as being “in line with strategic goals identified in Tanzania’s Kilimo Kwanza Resolution (2009) and the Abuja Fertilizer Summit Declaration (2006).”

7.5.2 Adoption & Implementation

In addition to support from MAFC, the Cabinet and Parliament supported the return of NAIVS in 2015/16. Thus, there were no government veto players opposed to the return of NAIVS that year. While no international donors were willing to provide financial support for NAIVS after 2013/14, MAFC proposed to implement NAIVS again, and the MFP and Parliament approved the request to spend 78 billion Tsh on NAIVS in 2015/16. This provided sufficient budgetary allocation for NAIVS to reach 999,926 maize and rice farmers throughout the country (except Dar es Salaam Region) that year. In addition, the major private sector fertilizer importers involved in NAIVS in previous years (key implementing veto players) agreed to participate again.

It remains to be seen whether the financial short-falls in the funding actually received by MAFC from 2012/13 to 2014/15 continue in 2015/16 (i.e. requisite budget resources), as that could constrain MAFC options for continuing a program like NAIVS, at least at the same scale.

⁵⁰ This paragraph based on section 5.2 of Mather et al (2015).

⁵¹ Hansard of speech to Parliament on MAFC 2014/15 budget by Minister of MAFC, Honorable Christopher Chiza May 2014 (p.21-22); World Bank (2014).

7.5.3 Evaluation & Reform

In 2015, MAFC asked the Policy Analysis Group⁵² for guidance on how a program like NAIVS compares with alternative policies and expenditures to stimulate smallholder productivity and agricultural sector growth. IFPRI & MSU has recently begun an empirical study to address this specific question, so as to provide new information as requested by MAFC leadership.

8. CONCLUSIONS

The first and main goal of this paper is to better understand the policy process history of fertilizer subsidy programs in Tanzania since 2003 so as to highlight key factors that led Tanzania to design and implement a relatively ‘smarter’ large-scale fertilizer subsidy program relative to the programs in other countries during that same time period (Wanzala et al, 2013). To do this, we apply the conceptual framework of the Kaleidoscope Model of policy change (Resnick et al, 2015), which provides testable hypotheses covering the five key stages of the policy cycle: agenda setting, design, adoption, implementation, and evaluation and reform. Our findings of the key drivers of policy change at each stage are as follows.

Agenda setting: With respect to getting the problem of low food crop productivity on the policy agenda of URT, focusing events have been instrumental to bringing URT to consider swift action to improve maize/rice food crop productivity. For example, the return of URT fertilizer subsidies in 2003/04 was in response to a serious drought the year before, and the rapid scaling up of NAIVS in 2008/09 was in response to the 2007/08 international food price crisis as well as a continuing high maize prices in 2008/09 in Tanzania and Kenya. In the case of NAIVS, there was a very powerful advocacy coalition putting this issue and the design choice of fertilizer subsidies on the agenda. This included the President of Tanzania and donors such as the World Bank who had signaled to developing country governments even before the food price crisis that they had shifted their position on funding programs that contained subsidies intended to promote adoption of new technologies.

Design: The initial return of URT to untargeted fertilizer subsidies in 2003/04 was due to a number of factors. First, the cost-benefit calculation (in economic and political terms) of longer-term methods of improving food crop productivity (ag research, extension, improved road and marketing infrastructure) were clearly not favorable relative to something like a fertilizer and seed subsidy program, which could theoretically improve subsidy recipients’ staple crop yields that same season. In addition, subsidizing fertilizer had been a key strategy to address this policy problem in the pre-structural adjustment era in Tanzania (and many other countries), thus it did not require a change in ideology or beliefs to bring back input subsidies.

The movement by MAFC in 2007/08 towards targeted subsidies was the result of both changes in information regarding untargeted subsidies as well as a diffusion of ideas and experience from Malawi’s targeted input voucher program.

Adoption: URT’s fertilizer subsidy programs since 2003/04 have all had the support of key government veto players. While the relatively small untargeted scheme beginning in 2003/04

⁵² This group is composed of donor-funded ag policy-related research projects, local think tanks and local university faculty who work on ag policy, as well as representatives from MAFC and donors.

was championed by MALF, a key proponent of the initiation of a large-scale subsidy scheme (NAIVS) was the President. Thus, these programs enjoyed the support of strong proponents and did not face strong opposition.

Implementation: Although the untargeted fertilizer subsidy programs from 2003 to 2007 did not receive any financial support from international donors, it was small enough that URT had sufficient budgetary resources to implement it. Because URT decided in 2003 to channel subsidized fertilizer through existing the private sector fertilizer supply chain, this made supply chain actors like private sector fertilizer importers, distributors and agro-dealers key implementing veto players. These actors participated in this and later subsidy programs as they believed that such programs would increase their sales in the short-term and had the potential to increase the longer-term smallholder farmer demand for market-priced fertilizer.

The much larger NAIVS program that began in 2008/09 not surprisingly required a much larger budget, which was made possible from sufficient budget support by the World Bank, which funded a little more than half of the program through 2013/14. As with the smaller and untargeted subsidy programs from 2003-2007, the much larger NAIVS program was also supported by private sector supply chain actors (key implementing veto players). Because NAIVS covered a wide number of regions and districts, district-level government capacity was required in order to ensure proper implementation at the district, ward and village levels. This capacity appears to have been sufficient due to URT's previous capacity building efforts towards decentralization.

Evaluation and Reform: From the return of fertilizer subsidies in 2003 through 2013/14, local research/advocacy groups, government M&E, independent research and regular stakeholder meetings contributed new information and/or diffusion of ideas that contributed to changes in the design of fertilizer subsidy programs in Tanzania over time. For example, the untargeted subsidy scheme of 2003-2007 was abandoned for a 'smarter' targeted voucher approach based on a combination of new knowledge and information from stakeholder feedback, local research and government M&E that together concluded that the untargeted design was not achieving its goals of increasing fertilizer use efficiently. Second, the targeted voucher approach that followed was based on a modification of Malawi's voucher scheme, thus was due to diffusion of knowledge from a neighboring country's experience. Third, by 2012/13, fertilizer importers had gained new information from several years of implementing NAIVS that led them to request (and obtain) a change in the program to enable them to choose the agro-dealers in each district that would sell their fertilizer through NAIVS, rather than district officials.

NAIVS was then stopped in 2014/15 for two reasons: firstly, due to the perception that material conditions had changed enough to merit a different approach (i.e. focus of subsidies on credit for fertilizer). Second, MAFC had faced insufficient funding in the two years prior (2012/13 and 2013/14). However, when the intended 'follow-on' subsidy program to NAIVS was not able to be implemented at a desirable scale, this resulted in changing knowledge and information, that led MAFC to return to NAIVS in 2015/16, although at a smaller scale than before given that international donor financial support was no longer available.

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APPENDIX TABLE 1. POLICY CHRONOLOGY OF FERTILIZER SUBSIDY PROGRAMS IN TANZANIA FROM 2003/04 to 2015/16

| Date | Event / report / policy action | Policy process stage | Determinants of policy change | External/ Domestic | Economic, Political, |
|----------|---|----------------------|--|------------------------|-------------------------|
| 1998 | Local Government Reform Program (LGRP) begins | Implementation | Improves district-level government's institutional capacity | Domestic | Institutional |
| 1999 | URT Tanzania Development Vision 2025 | Agenda setting | officially made ag sector growth a key to economic growth (i.e. achieving sector growth officially becomes a highly <u>relevant policy problem</u>) | Domestic | Economic |
| 2001 | URT National Growth & Poverty Reduction Strategy (2001) | Agenda setting | reiterates importance of ag sector growth & officially adds food insecurity as a relevant policy problem; provides support for MAFC share of URT budget | Domestic | Economic |
| 2002/03 | Severe drought in Tanzania | Agenda setting | Focusing event | Domestic | Economic |
| 2002/03 | MoA estimates of fertilizer importation & maize production; continued low and stagnant grain yields since end of SA | Agenda setting | This evidence made household food insecurity a <u>relevant policy problem</u> | Domestic | Economic |
| 2003 | URT signs Maputo Declaration | Agenda setting | Declaration notes that ag sector growth is a <u>relevant policy problem</u> & lends support to MAFC efforts for a larger share of URT budget | Domestic / External | Political / Economic |
| Nov 2003 | Program design devised by MAFC in discussions with private sector fertilizer supply chain | Design | Limited new <u>information</u> in 2003 with which to design a fertilizer subsidy program; URT <u>ideological commitment</u> to market-led development results in MAFC designing a private-sector friendly approach to fertilizer subsidies | Domestic | Economic |

| Date | Event / report / policy action | Policy process stage | Determinants of policy change | External/ Domestic | Economic, Political, etc |
|--------------------------|--|------------------------|---|------------------------|-----------------------------|
| Nov 2003 | Government & Parliamentary resolution to begin an untargeted subsidy scheme | Adoption | <u>Proponents</u> (MAFC, fertilizer importers); no strong opponents. <u>Government veto players</u> did not oppose | Domestic | Political |
| Nov 2003- Feb 2003 | Implementation of untargeted fertilizer subsidy program for 2003/04 main season | Implementation | <u>budget</u> for program is very small & funded by URT; <u>implementing veto players</u> (priv sector fertilizer supply chain) support program | Domestic | Economic / Political |
| 2003/04 to 2006/07 | Continued implementation of untargeted fertilizer subsidy program | Adoption | MPs from regions not targeted in 2003/04 request subsidies (<u>Government veto players</u>) | Domestic | Political |
| 2003/04 to 2006/07 | Program scale increases over time | Implementation | Program still relatively small in MAFC budget so <u>sufficient funding</u> from URT | Domestic | Economic |
| 2007 | MAFC M&E release report on program / ACT members voice concerns over program performance | Evaluation & Reform | MAFC & ACT conclude that program has a number of problems, such as subsidized price not being passed on to farmers (<u>changing knowledge & information</u>) | Domestic | Economic |
| 2007 | ACT initiates study tour for MAFC & ACT staff to visit Malawi to study GoG targeted fertilizer voucher program | Evaluation & Reform | MAFC & ACT conclude that Malawi voucher scheme can be modified for Tanzania context and help ensure subsidies reach targeted farmers (i.e. <u>changing knowledge/info</u>) | External / Domestic | Economic |

| Date | Event / report / policy action | Policy process stage | Determinants of policy change | External/ Domestic | Economic, Political, etc |
|------------|---|----------------------|---|-----------------------|-----------------------------|
| 2007 | Pilot of URT targeted fertilizer voucher program | Agenda setting | Low food crop productivity (linked to low fertilizer use) still a relevant policy problem | Domestic | Economic |
| 2007 | | Agenda setting | <u>Powerful advocates</u> (MAFC & leading CSO, ACT) | Domestic | Political |
| 2007 | | Design | Program is still private sector friendly due to government ideology; cost-benefit suggests that targeted vouchers will be much more efficient than untargeted program | Domestic | Political / Economic |
| May 2007 | | Adoption | Initiated by MAFC, approved by <u>government veto players</u> | Domestic | Political |
| 2007/08 | | Implementation | <u>Budget allocation</u> is sufficient as pilot is small | Domestic | Economic |
| 2007/08 | | Implementation | <u>Implementing veto players</u> (private sector fertilizer supply chain) support program | Domestic | Economic |
| Early 2007 | World Bank, FAO, etc modify their position on ag input subsidies | Agenda setting | World Bank indicates that they are now willing to consider funding ag sector subsidy programs if certain conditions are met (<u>changes funding options</u> for initiating subsidy programs) | External | Economic |
| June 2007 | International food price crisis begins | Agenda setting | Focusing event | External | Economic |
| 2008 | President Kikwete initiates official MoF approach to W.Bank to request funding to scale-up URT's targeted voucher program | Agenda setting | Powerful advocates (President Kikwete, MoF, MAFC) | Domestic | Political |

| Date | Event / report / policy action | Policy process stage | Determinants of policy change | External/ Domestic | Economic, Political, etc |
|----------|--|----------------------|---|---------------------|--------------------------|
| 2008/09 | grain prices remain high in Tanzania & Kenya due to short season drought | Agenda setting | Focusing event | Domestic / External | Economic |
| 2008/09 | MAFC, ACT, AGRA & World Bank coordinate on design of NAIVS | Design | W.Bank <u>knowledge</u> & <u>ideology</u> regarding what makes a 'smart' subsidy incorporated into the already private-sector friendly URT targeted voucher scheme design | External / Domestic | Economic / Institutional |
| May 2008 | NAIVS 2008/09 | Adoption | Powerful proponents (President, MAFC), support of government veto players | Domestic | Political |
| 2008/09 | | Implementation | Sufficient budget resources given strong URT commitment & W.Bank funding | Domestic / External | Economic |
| 2008/09 | | Implementation | Implementing veto players (private sector fertilizer supply chain) support program | Domestic | Economic |
| 2008/09 | | Implementation | <u>Required district-level government institutional capacity is adequate</u> given capacity building efforts to aid decentralization begun in 1998 | Domestic | Economic |
| 2010/11 | Expansion of NAIVS from 12 regions to 24 | Adoption | MPs from regions not targeted in 2008/09 request NAIVS vouchers for their region (<u>Government veto players</u>) | Domestic | Political / Economic |

| Date | Event / report / policy action | Policy process stage | Determinants of policy change | External/ Domestic | Economic, Political, etc |
|---------|---|----------------------|---|-----------------------|-----------------------------|
| 2012/13 | NAIVS 2012/13 -- Shift in who selects agro-dealers in a district that will work with a participating importer | Evaluation & Reform | After four years of NAIVS, private sector importers (implementing veto player) learn that they cannot sufficiently trust agro-dealers selected by district-level government officials in repayment of what they owe importers and in appropriately representing the importers' product to smallholders (i.e. <u>changing knowledge & info</u>). They voice this concern to MAFC. | Domestic | Economic |
| | | Implementation | From 2012/13 onward, fertilizer importers (<u>implementing veto players</u>) given primary say in which agro-dealers they work with in a given district | Domestic | Economic |
| | | Implementation | By end of FY, MoF has released only 82.6% (47.5%) of the approved recurrent (development) budget for MAFC. NAIVS is in the recurrent budget, and fertilizer importers are not repaid in full on time | Domestic | Economic |
| 2012/13 | Agricultural Credit Subsidy Program (ACSP) | Agenda setting | NAIVS original ending year is 2013/14, and MAFC feels that NAIVS is achieving its main goals (smallholders gain valuable knowledge about the net returns to fertilizer use on maize/rice), but that access to credit for an ag input loan remains a key constraint to sustained smallholder fertilizer use on maize/rice (i.e. <u>relevant policy problem</u> even after several years of NAIVS). | Domestic | Economic |
| | MAFC designs ACSP as a 'follow-on' program to NAIVS | Design | MAFC design for ACSP assumes private sector bank participation (<u>ideology</u>), and their <u>cost-benefit</u> assumptions of continuing NAIVS is perceived to be lower than piloting & scaling up ACSP. | Domestic | Economic |
| | ACSP -- MAFC begins initial capacity building needed for ACSP | Implementation | <u>Institutional capacity</u> already exists for trainees in that farmer coops exist (on paper at least); MAFC provides training to coop leaders on how to interact with banks to negotiate an ag input loan | Domestic | Institutional |

| Date | Event / report / policy action | Policy process stage | Determinants of policy change | External/ Domestic | Economic, Political, etc |
|---------|---|----------------------|--|-----------------------|-----------------------------|
| 2013/14 | NAIVS continues, but at a scale double the size originally budgeted for this year | Implementation | By end of FY (June 2014, MoF has released only 69.8% (74.1, 70.9%) of the approved recurrent (development, total) MAFC budget. NAIVS is in the recurrent budget, and fertilizer importers are again not repaid in full on time | Domestic | Economic |
| 2013/14 | MAFC tries to pilot ACSP | Implementation | Large commercial banks (implementing veto players) do not agree to participate in ACSP unless URT provides its 50% loan guarantee up-front, which URT does not do | Domestic | Economic / Institutional |
| 2014/15 | NAIVS not implemented | Implementation | As of May 2014, MAFC feels that NAIVS has already achieved its main goals, it still owes fertilizer importers a significant amount from the 2012/13 & 2013/14 NAIVS years, donor funding ended in 2013/14, & they believe that ACSP can reach more smallholders with less URT funds than NAIVS | Domestic / External | Economic |
| 2014/15 | MAFC pilots ACSP | Implementation | Most commercial banks (implementing veto players) again do not agree to participate in ACSP; those that do only find a small number of farmer cooperatives that are credit-worthy, and only about 10% of households receive loans relative to the # that received a NAIVS voucher in 2013/14 | Domestic | Economic / Institutional |
| | | Evaluation & Reform | MAFC realizes that as currently designed, ACSP cannot reach anywhere near as many farmers as NAIVS (i.e. <u>changing knowledge</u>) | Domestic | Economic |
| 2015/16 | NAIVS returns | Implementation | Largest fertilizer importers (<u>key implementing veto players</u>) agree to participate again in NAIVS | Domestic | Economic |

APPENDIX TABLE 2. STAKEHOLDER INVENTORY for NAIVS, 2015/16

| Category | Stakeholder group / institution | General position on fertilizer subsidies | Position on NAIVS in 2015/16 | Desired changes in design or implementation |
|---------------------------|---|--|---|---|
| Government veto players | President | support | support | -- |
| | Cabinet | support | support | -- |
| | Ministry of Finance | conditional support ¹ | support | -- |
| | Ministry of Agriculture (MAFC) | support | support | Willing to pilot e-vouchers if donors will provide support |
| | Parliament | support | A majority of MPs support | Some MPs are concerned about alleged corruption, delays in voucher and/or input delivery, and want end of program or new design to address these concerns |
| Implementing veto players | Fertilizer importers | support | support | More timely payment by URT of the subsidized portion of program fertilizer |
| | Fertilizer wholesalers | support | support | -- |
| | Tanzania Agro-Dealer Association (TANADA) | support | support | -- |
| Policy opponents | Agricultural Non-State Actors Forum (ANSAF) | does not support | does not support | Prefers for URT to instead invest more in public goods like ag research, extension, capacity building, etc |
| | USAID, DFID | did not support ag input subsidies during this time period | does not support | -- |
| | W.Bank, JICA, etc | supported NAIVS from 2008/09-2013/14 but wanted NAIVS to be a limited term subsidy, and believes that NAIVS has already largely fulfilled its original goals | stopped financial support in 2013/14 as scheduled | -- |

APPENDIX TABLE 2. STAKEHOLDER INVENTORY for NAIVS, 2015/16, cont.

| Category | Stakeholder group / institution | General position on fertilizer subsidies | Position on NAIVS in 2015/16 | Desired changes in design or implementation |
|----------------|--|--|--|--|
| Policy neutral | Agricultural Council of Tanzania | support | conditional support | If NAIVS is to continue, e-vouchers should be used to help reduce potential for corruption |
| | Some local researchers | support | conditional support | Aloyce et al (2014), Malhotra (2013), & Mwaijande (2014) suggest design changes to reduce delays in voucher delivery, and a need for better extension access and appropriate fertilizer recommendations for recipient villages, and e-vouchers to help reduce cases of corruption. Also suggest need for improved farmer awareness of eligibility criteria & eventual URT exit plan. |
| | Other local researchers & international researchers ² | Support but agree with local researchers and the original designers of NAIVS that it should be a limited term subsidy program and that NAIVS has already largely fulfilled its original goals. | advise spending shift from NAIVS to a number of complementary public goods (Mather et al, 2016b), but conditional support for NAIVS if URT continues with it | If URT decides to continue NAIVS, there are a number of ways to potentially improve its efficiency, based on innovative approaches recently implemented in Nigeria and Burundi, as described in Mather et al, 2016a. |

Notes: 1) MoF has approved NAIVS since 2008/09 when it has been proposed by MAFC, though actual release of 'recurrent' funding by MoF to MAFC depends on overall URT revenue & actual donor funds available. 2) Pan & Christaenson (2012) offer conditional support (in 2012), though they note that the program goals of increasing grain production and reducing household-level food insecurity would not logically use the same targeting criteria. They also report some level of elite capture of vouchers based on a survey in Kilimanjaro region in 2009, and they offer some recommendations for improving scrutiny of village voucher committee distribution of vouchers.

Appendix Table 3. Kaleidoscope model hypothesis testing

| Element of Policy Process | Determinants of Policy Change | Hypotheses | Untargeted fertilizer subsidies 2003-2007 | Pilot targeted voucher program (2007/08) | NAIVS 2008/09 to 2011/12 | NAIVS 2012/13 to 2013/14 | pilot ACSP 2013/14 | NAIVS 2015/16 |
|---------------------------|-------------------------------|---|--|--|--|--|--|--|
| Agenda setting | Recognized, relevant problem | Empirical conditions, backed by credible documentation, interpreted by policymakers as problems | URT -- Tanzania Development Vision 2025 (1999) lists ag sector growth as objective; and National Strategy for Growth & Poverty Reduction (MKUKUTA, 2004) adds household food insecurity as a challenge Evidence -- consistently low smallholder maize yields (main staple food crop) (MoA annual M&E of crop production) and declining fertilizer use since SA ended subsidies in 1994 (FAO), as of 2002/03 | Same as before | Same as before | Same as before | low fertilizer use on food crops was constrained not only by farmer inexperience with using it, but also by limited access to credit for most smallholders | Same as before |
| Agenda setting | Focusing event | A well-defined event that prompts public attention to a problem or that creates a window of opportunity for policy change | Drought in 2002/03 | | •International food price crisis (2007/08) followed by poor harvests in 2008 in TZ and Kenya | | | |
| Agenda setting | Powerful advocates | Strong individuals, organizations, or companies were supporting a new or changed policy to key decision makers. | Ministry of Ag (MoA), fertilizer importers | • Domestic: MoA, CSO representing farmers & agribusiness (ACT) | •Domestic: President's office; MoA, fertilizer importers; CSOs •International -- World Bank: | •Domestic: President's office; MoA, fertilizer importers; CSOs •International -- World Bank: | Domestic: MoA | •Domestic: MoA, some fertilizer importers; |
| Design | Knowledge, research and ideas | Evidence-based knowledge shapes feasible design (new, existing, local, international). | • Limited ideas with which to design the program in 2003: MoA officials designed it on very short notice and recognized that the the largest single domestic price component of fertilizer was transport from port to regional capitals, thus they decided to subsidize transportation for limited quantities of fertilizer per region | •Based on the MoA study tour of the Malawi targeted voucher scheme, they took the basic voucher concept but used private sector fertilizer/seed supply chain to import, wholesale and retail the subsidized fertilizer | • Wbank took the basic MoA pilot scheme design; modified the targeting administration procedures | •Fertilizer importers began to select the agro-dealers with which they worked in each district | | same design as in 2013/14 |

Appendix Table 3. Kaleidoscope model hypothesis testing, continued

| Element of Policy Process | Determinants of Policy Change | Hypotheses | Untargeted fertilizer subsidies 2003-2007 | Pilot targeted voucher program (2007/08) | NAIVS 2008/09 to 2011/12 | NAIVS 2012/13 to 2013/14 | pilot ACSP 2013/14 | NAIVS 2015/16 |
|---------------------------|------------------------------------|---|---|---|--|---|--|---|
| Design | Norms, biases, ideology, beliefs | Widespread beliefs shape feasible designs (not based on evidence, no proof but widely felt) | •GoT was committed since SA to market-led ag sector development, thus it worked with the private sector fertilizer supply chain rather than creating a separate government supply chain | Same as before | Same as before, although the Wbank ideology of 'smart' (market-friendly) subsidies was more thoroughly included in design | | Idea was to leverage more resources and reach more farmers with less government funding by convincing commercial banks to lend to farmer groups if the banks were backed up by a credit guarantee by GoT | |
| Design | Cost-benefit and risk calculations | Known costs and expected benefits (political, economic, social) determine preferred design. | | • Targeted voucher scheme was perceived by GoT and CSOs to be a more effective way to ensure that smallholder farmers actually received subsidized fertilizer prices compared with the untargeted approach. | | Fertilizer importers wanted lower risk in lending fertilizer to agro-dealers on credit -- they lowered this risk by selecting agro-dealers themselves | Farmer groups required to pay 20% upfront in order to reduce possibility of moral hazard; commercial banks backed up by 50% credit guarantee from government to shield banks from risk (in theory) | After perceived failure of ACSP, NAIVS design looked relatively better again for MoA |
| Adoption | Powerful opponents vs. proponents | •For a policy to be adopted, supporters must be relatively more powerful than opponents. •For a policy to not be adopted, opponents must be relatively more powerful than supporters. | •Proponents: GoT, private sector fertilizer supply chain actors; •Opponents: Donors | •Proponents: GoT, private sector fertilizer supply chain actors; | •Proponents: GoT, private sector fertilizer supply chain actors; •Opponents: Some donors; some CSOs and MPs that point to implementation problems | •Proponents: GoT, private sector fertilizer supply chain actors; •Opponents: Some donors; some CSOs and MPs that point to implementation problems; ANSAF | Proponents: GoT | •Proponents: GoT, private sector fertilizer supply chain actors; •Opponents: Some donors; some CSOs and MPs that point to implementation problems; ANSAF |
| Adoption | Government veto players | •For adoption, government agents with ultimate decision-making power must be supportive or neutral. •For a policy to be vetoed, government agents with ultimate decision-making power must be an opponent. | Government veto players supportive or neutral | Government veto players supportive or neutral | Government veto players supportive or neutral | Government veto players supportive or neutral | Government veto players supportive or neutral | Government veto players supportive or neutral |
| Adoption | Propitious timing | Supporters wait for opportune moments (political, economic, social) to push policy change. What was it? (i.e election) | | | | | | |

Appendix Table 3. Kaleidoscope model hypothesis testing, continued

| Element of Policy Process | Determinants of Policy Change | Hypotheses | Untargeted fertilizer subsidies 2003-2007 | Pilot targeted voucher program (2007/08) | NAIVS 2008/09 to 2011/12 | NAIVS 2012/13 to 2013/14 | pilot ACSP 2013/14 | NAIVS 2015/16 |
|---------------------------|--------------------------------|--|--|---|---|--|---|---|
| Implementation | Institutional capacity | Government, organizations, or companies were available and able to implement and manage the new policy or program as it was intended | Insufficient capacity: There was no design element that would enforce the goal for fertilizer retailers to pass on the savings from subsidized transport in the price that farmers paid for 'subsidized' fertilizer (program relied upon agro-dealer honesty to do this). | <ul style="list-style-type: none"> Public sector had capacity at central and district level (decentralization) to distribute vouchers and coordinate with private sector fertilizer suppliers Private sector fertilizer supply chain was fairly well-developed in some regions due to fertilizer demand from cash crops (coffee, tobacco, horticulture) and some demand from maize/rice | Same as with pilot | same as before | Insufficient capacity: Few farmer groups reached because few farmer coops focused on maize or rice are credit-worthy and/or active | Same as before |
| Implementation | Requisite budget | Government or donors provide fund sufficient to carry out the new policy or program as intended | Funding sufficient as program not very large | Pilot was very small | W.Bank provided approximately 50% of the funding; GoT the remainder | W.Bank funding was lower as planned in these years, but MoA budget share actually received relative to approved fell; importers not fully repaid on time in both years | | No donor support. GoT was able to fund the program at about half of the scale reached previously. |
| Implementation | Key implementing veto players | Private sector actors have both incentives and willingness to implement the policy program | Private sector fertilizer supply chain actor participate | Private sector fertilizer supply chain actor participate | Private sector fertilizer supply chain actor participate | by late 2014, importers had still not been fully paid from 2012/13 and 2013/14, thus they demanded to be repaid before proceeding with another round of NAIVS | key implementing actors (commercial banks) refused to participate on a significant scale due to perceived risks of farmer default and lack of up-front URT credit guarantee | Private sector fertilizer supply chain actor participate |
| Implementation | Commitment of policy champions | Strong individuals, organizations, or companies continued to publicly support the program | MoA, fertilizer companies | MoA, fertilizer companies, ACT | President, MoA, fertilizer companies, ACT, W.Bank | President, MoA, fertilizer companies, ACT | MoA | President, MoA, fertilizer companies |

Appendix Table 3. Kaleidoscope model hypothesis testing, continued

| Element of Policy Process | Determinants of Policy Change | Hypotheses | Untargeted fertilizer subsidies 2003-2007 | Pilot targeted voucher program (2007/08) | NAIVS 2008/09 to 2011/12 | NAIVS 2012/13 to 2013/14 | pilot ACSP 2013/14 | NAIVS 2015/16 |
|--------------------------------|---|--|--|---|--|--|--|---------------|
| Evaluation & reform | Changing info and beliefs | New learning emerges that impacts how decisionmakers believe the policy/program should be structured (social or evidence-based learning) | <ul style="list-style-type: none"> Studies in 2006/07 by both ACT and MoA found that the untargeted subsidies were not being passed on to farmers in the form of lower prices for 'subsidized fertilizer' ACT organized study tour of the Malawi targeted voucher program for MoA officials as a potential solution for the challenge of ensuring that subsidies are received by the intended recipients (smallholder farmers) | | | <ul style="list-style-type: none"> <u>Change in institutional arrangement</u> -- importers demanded that they be given the right (and received it) to select the agro-dealers with which they would work in a given district (instead of district officials selecting the agro-dealers) | Outcome of pilot shows MoA that the design is not feasible (few farmer groups focused on food crops exist; commercial banks not willing to participate on significant scale) | |
| Evaluation & reform | Institutional changes | Changes in institutional architecture or staffing bring new players, new ideas, new priorities to the policy arena. | | | | | | |
| Evaluation & reform | Changing conditions (resources, institutional architecture, problem status) | Something about the environment has changed in a way that influences the need or functioning of the policy | | <ul style="list-style-type: none"> <u>Change in problem status:</u> International Food Price Crisis (2007/08) combined with poor rains in TZ and Kenya in late 2008 and early 2009 <u>Change in donor resources -</u> in response to the food price crisis, the World Bank dropped their resistance to supporting fertilizer subsidies, and created a special fund for 'smart' input subsidy schemes (and other safety net schemes) | <ul style="list-style-type: none"> <u>Change in donor resources --</u> World Bank indicated at beginning of NAIVS that it would only provide funding for limited number of years. MoA scaled down program | <ul style="list-style-type: none"> <u>2013/14 was the end of donor resources; in both years, MoA budget actually received fell--</u> by the end of 2013/14, URT had not been able to fully repay debts to importers from previous two seasons. | | |

Appendix Table 4. Summary of Kaleidoscope model hypothesis testing

| Element of Policy Process | Determinants of Policy Change | Untargeted fertilizer subsidies 2003-2007 | Pilot targeted voucher program (2007/08) | NAIVS 2008/09 to 2011/12 | NAIVS 2012/13 to 2013/14 | pilot ACSP 2014/15 | NAIVS 2015/16 |
|---------------------------|---|---|--|--------------------------|--------------------------|--------------------|---------------|
| Agenda setting | Powerful advocates | + | + | + | + | + | + |
| | Focusing event | ++ | | ++ | | | |
| | Recognized, relevant problem | + | + | + | + | + | + |
| Design | Knowledge, research and ideas | | ++ | + | + | | |
| | Norms, biases, ideology, beliefs | + | + | + | + | + | + |
| | Cost-benefit and risk calculations | | + | | | + | + |
| Adoption | Powerful opponents vs. proponents | + | + | + | + | + | + |
| | Government veto players | + | + | + | + | + | + |
| | Propitious timing | | | | | | |
| Implementation | Institutional capacity | - | + | + | + | - | + |
| | Requisite budget | + | + | ++ | - | | |
| | Key implementing veto players | + | + | + | - | - | + |
| | Commitment of policy champions | + | + | + | + | | + |
| Evaluation & reform | Changing info and beliefs | ++ | + | + | + | ++ | |
| | Institutional shifts | | | | | | |
| | Changing conditions (resources, institutional architecture, problem status) | | + | + | ++ | | + |

FIGURE 2. POLICY PROCESS MAPPING of NAIVS (2013/14)

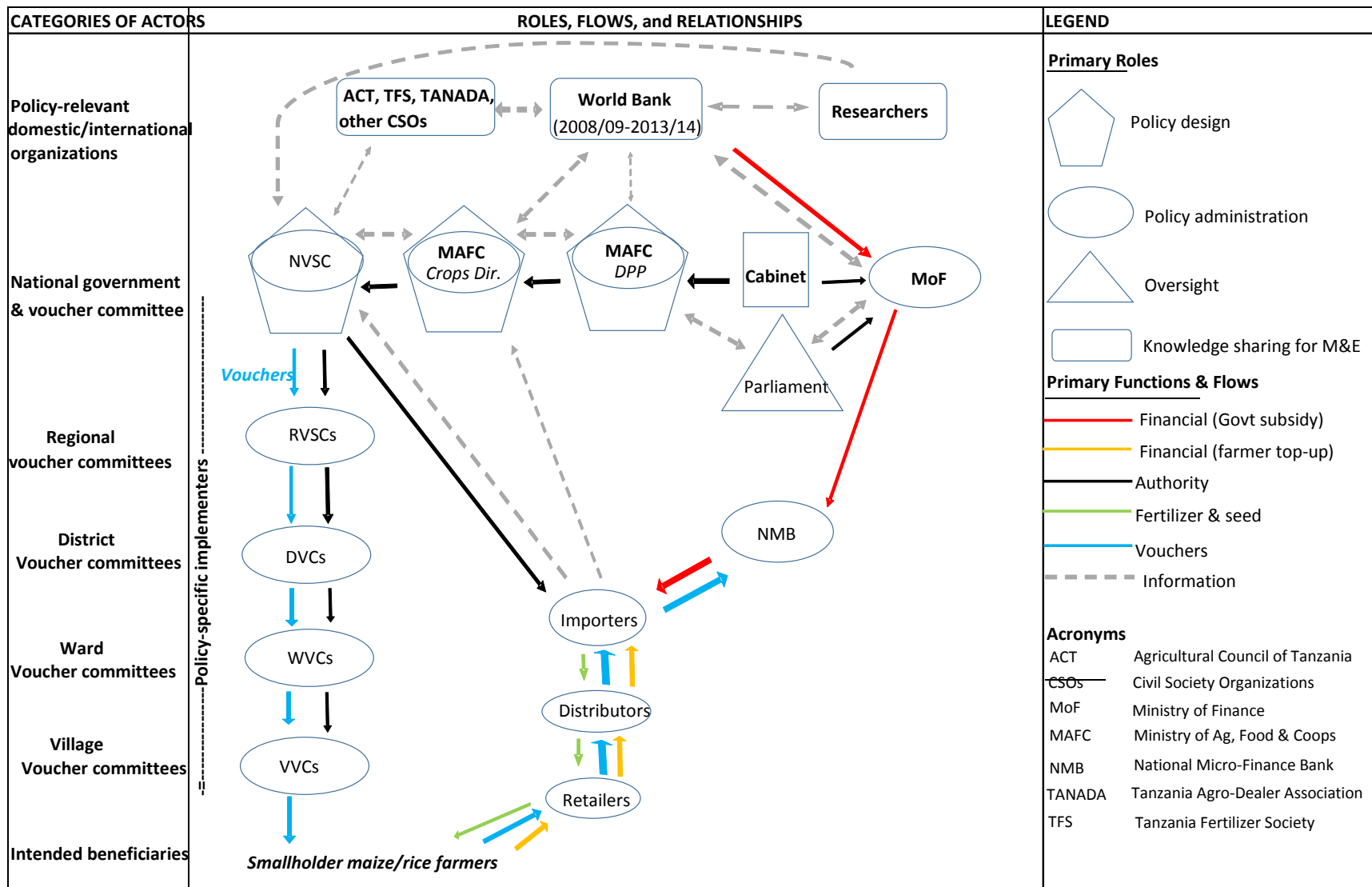
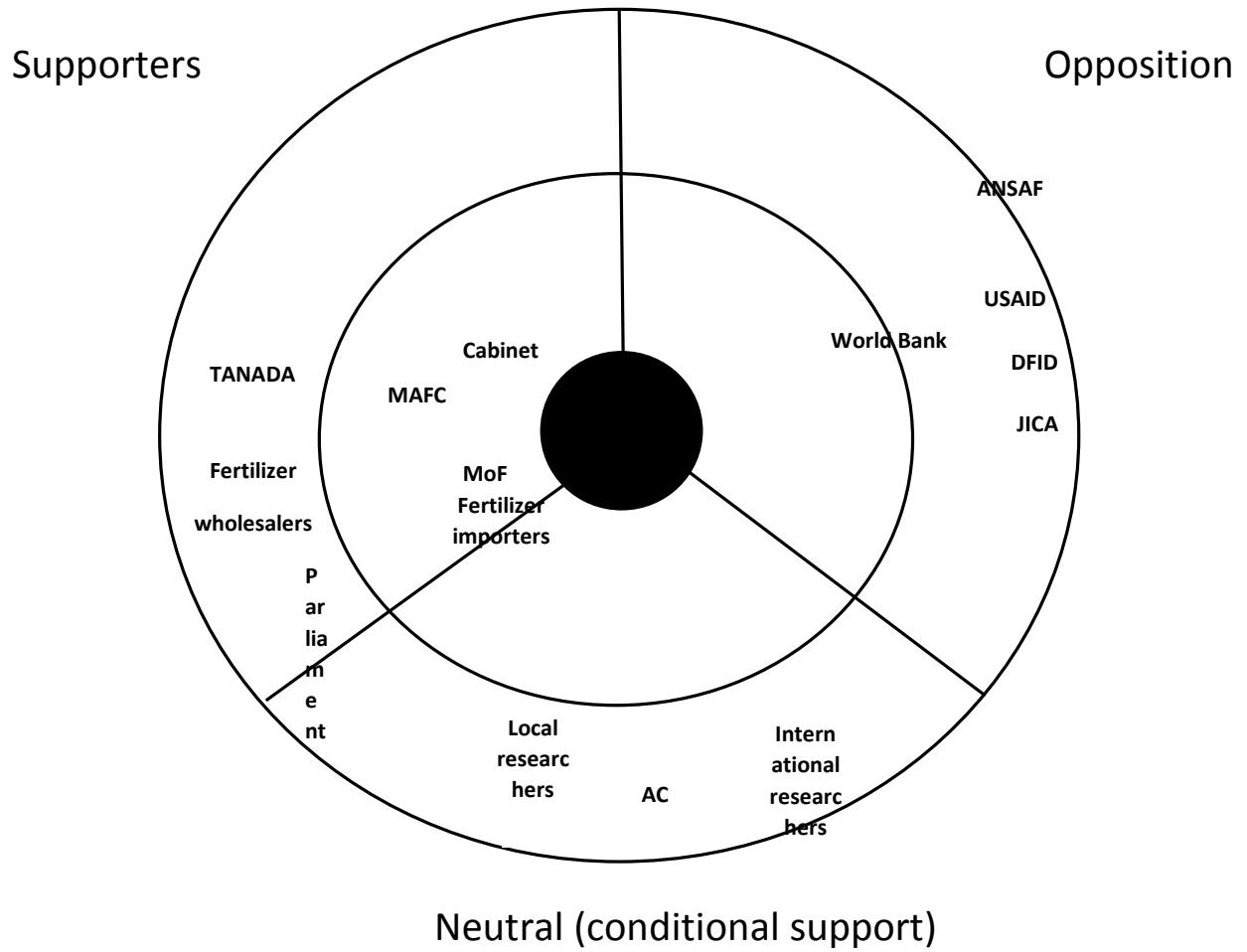


Figure 3. Circle of Influence, NAIVS 2015/16



APPENDIX A. ANNUAL BUDGET PROCESS⁵³

1). URT formulates budget guidelines (Nov-Jan)

- MoF makes macroeconomic forecasts of future growth, inflation, and export/import trends
- Government and donor consultations confirm donor financial commitments to budget support and/or sectoral support
- URT then formulates goals, objectives and budget priorities, based on the National Development Strategy (Development Vision 2025) and the 5-year Growth and Poverty Reduction Strategy (MKUKUTA 2); allocation across ministries is based on those PRS priorities and progress reports.
- Budget guidelines are then prepared by a committee comprised of reps from MoF, Planning Commission, Prime Minister's Office (PMO), Civil Service Dept and PMO-RALG (Prime Minister's Office for Regional and Local Government). This contains:
 - Overview of macroeconomic performance and projections
 - Priority sector Medium Term Expenditure Framework, prepared by sector working groups and the Public Expenditure Review process, consistent with PRS targets, progress towards the targets, and costing
 - Expenditure ceilings by sector
 - Procedures for preparation and submission of draft budget to MoF

2). MOF then provides budget guidelines to each Ministry (Jan-Feb)

- MOF gives MDA (Ministries, Departments and Agencies) a budget ceiling

3). MDA (MAFC) meets internally to generate their priorities and a proposed budget (Feb-March)

- In the case of MAFC, the Directorate of Policy & Planning (DPP) coordinates the budget process within MAFC and liaises with MoF and the Cabinet.
- Directorates within MAFC consult with key private sector and CSO stakeholders
- MAFC Permanent Secretary (PS) calls meetings of department directors (all together)
 - Begins with top priority expenditures known as 'ring-fenced areas', such as current MAFC staff (including extension); training agricultural college students to serve as extension officers in the future; NAIVS; National Food Reserve Agency (NFRA); etc.
 - Every director has to defend what they have to offer to be financed, based on how they are linked to the national growth and poverty reduction strategy (MKUKUTA 2), the sector-level strategy (Agricultural Sector Development

⁵³ Based on materials on the MoF website, interviews with David Biswalo of the Budgeting Division of DPP/MAFC and Dr. Peniel Lyimo, former PS of MAFC, and a newsletter from Parliament on budget cycle changes made beginning in 2013/14 http://www.tanzania.go.tz/egov_uploads/documents/newsletter_june_2013_sw.pdf.

Strategies, or ASDP), and other strategies such as the Tanzania Agricultural and Food Security Investment Plan (TAFSIP; Tanzania's CAADP agreement), and Ministry initiatives (such as NAIVS).

- The group tries to come to a consensus on the budget for each department
- This is based on performance reports every year of Ministry, generated by the MES (Monitoring, Evaluation & Statistics) division within DPP), lessons learned from previous years, and input from the Joint Annual Sector Review
- PS tries to reach a broad consensus among department directors, which often occurs, but either way, the PS takes the budget to the Minister
- PS meets with the Minister of MAFC to discuss the MAFC budget proposal
 - They then send the MAFC budget proposal to MOF

5). MOF and MAFC discuss the MAFC proposal (Feb-March)

- MAFC leadership are often called to discuss their proposal with MOF, and MOF may ask MAFC to defend and/or explain their budget proposal
- MOF may or may not adjust the original ceiling given to MAFC (up or down)
- MOF looks to see if MAFC complied to ceilings and priorities last year; if not, MOF is likely to ask MAFC to make modifications to their budget proposal
- MOF puts an advertisement in newspapers to announce that the annual URT budget process is starting, thus whomever wants to provide input on the process should contact a committee that sits with different groups (some of which may have their own proposals, in addition to requesting modifications to programs/policies from the previous years)
- As of 3-4 years ago, a significant change in the process was made that allows the Parliamentary Budget Committee to consult with MOF before the MOF sends the full budget proposal to IMTC. This enables Parliament to have more input into the budget levels across Ministries earlier in the process. This change was made to minimize differences between the executive branch and Parliament when the budget reaches Parliament
- MOF compiles proposals for each Ministry into a full URT government proposal, and sends this to the Inter-Ministerial Technical Committee

5). IMTC reviews the full URT budget and the budgets of each Ministry (March)

- IMTC chaired by the Chief Secretary of PMO (the 'head' PS among all PSs from each ministry)
- They discuss guidelines from MoF, each Ministry's budget, etc in relation to previous performance and the National and Sectoral Development Strategies.

6). IMTC sends budget to the Cabinet (March-April)

- The Cabinet consists of the President, all Ministers, and the Prime Minister (PM)
- The Cabinet may ask for modifications to Ministry budgets
- Once the cabinet approves the overall budget, IMTC sends each Ministry budget to appropriate Parliamentary committees for their review

7). MAFC presents their budget to the Agricultural Committee of Parliament (April)

- MAFC leadership makes a presentation to the Agricultural Committee, which then engages MAFC leadership in discussion about the content, budget levels, etc.
- The Chairman of the Agricultural Committee combines the ACs comments and suggested revisions and may ask MAFC to make revisions to their budget proposal
- These comments are also submitted to the full Parliament

8) MAFC presents budget to full Parliament (May-June)

- MAFC leadership makes a presentation of their budget proposal to the full Parliament
- MPs often asks for clarification about the budget proposal after the presentation
- Afterward, MPs may also ask for non-governmental stakeholders to come to Parliament to clarify MP questions
- Parliament may request the executive branch to shift funding within a Ministry or across ministries; the executive branch may or may not make all the suggested modifications
- Parliament then votes to approve (or not) the budget, though in practice, it is approved

9). President signs the full URT budget (June)

- The URT budget process is completed when the President signs (approves) the full URT budget

10). Fiscal year begins 1 July

- MoF releases funding to ministries, based on their approved amounts that FY and other factors
- Depending on URT revenues and expenditure throughout the FY, and other factors, MAFC (or any other ministry or agency) may receive the amount that was approved for them to spend, or in some years less

APPENDIX B: MODIFICATIONS MADE TO THE URT PILOT FERTILIZER SUBSIDY VOUCHER SCHEME

There were two main modifications of URT's pilot fertilizer subsidy voucher scheme to which the World Bank and MAFC agreed. First, to avoid either 'elite capture' of vouchers at the village level and/or receipt of vouchers by farmers who could already afford market-priced fertilizer, the household-level targeting criteria was clarified such that vouchers would be targeted to farmers who: (a) cultivated no more than one hectare of maize or rice; (b) had not used commercial fertilizer in the last five years on maize or rice; and (c) could afford to pay 50% of the market price for two bags of fertilizer (enough for one acre of maize or rice). Program designers did not want subsidized fertilizer to displace or 'crowd-out' existing smallholder demand for commercially-priced fertilizer for use on maize or rice. Thus, conditions (a) and (b) were intended to ensure that vouchers did not go to farmers who were already capable of self-financing fertilizer for use on maize/rice. The reason for condition (c) is that both the World Bank and MAFC technocrats who designed NAIVS intended for it not to be an un-ending subsidy scheme, but rather an opportunity to provide a lower-risk environment for smallholders who could potentially afford market-priced fertilizer to have a three-year period during which to experiment with it on their own maize or rice plot (and to provide the private sector with a surge in demand for fertilizer that would ideally enable them to 'learn' in which areas they could make longer-term investments in infrastructure so as to lower fertilizer costs and improve fertilizer access in the longer-term). Thus, the NAIVS household-level targeting criteria was not specifically intended to reach the 'poorest of the poor', as those households⁵⁴ would not likely be able to afford fertilizer and/or improved seed once subsidies were phased out.

Second, the World Bank insisted that the village voucher committee for each participating village include not only elected village leaders, but also the extension agent serving the village as well as a number of farmers who would be elected to serve on the VVC.⁵⁵ Ideally, the extension agent and non-leader farmers would help have sufficient knowledge of their neighbors (and client farmers) so as to ensure that the eligibility criteria on paper would be implemented in practice. Third, both the World Bank and MAFC technocrats recognized that an exit strategy was needed so as to avoid the political economy challenge of phasing out such a large (and potentially popular) subsidy scheme.⁵⁶ The exit strategy was built into the project design and World Bank funding commitment, given that each farmer could obtain vouchers for a maximum of three years; IDA support through this Project will end after Year Three, though

⁵⁴ AFSP included additional funding to existing URT safety net programs to reach households that would not be eligible for fertilizer subsidies due to their inability to pay 50% of the market price of two bags of fertilizer (World Bank, 2014).

⁵⁵ Interview with Dr. Madhur Gautam.

⁵⁶ World Bank (2009), World Bank (2014), and interview with Dr. Andrew Msolla, who was within the Ag Inputs Section of MAFC from the beginning of NAIVS through mid-2013, and who served as the key MAFC official coordinating MAFC's input into the design of NAIVS and its implementation.

Government support would be needed for an additional 2-3 years to complete the three-year cycle for late entrants into the scheme (World Bank, 2009). Thus, NAIVS was originally intended to be implemented from 2008/09 through 2013/14 (W.Bank, 2014).

APPENDIX C: ASSUMPTIONS UNDERLYING THE DESIGN OF ACSP⁵⁷

MAFC believed that NAIVS had enabled enough smallholders to gain experience with fertilizer use on maize/rice, but that they still faced difficulties in purchasing fertilizer at market prices for several reasons:

- 1) Very few Tanzanian smallholders have sufficient collateral to obtain a loan for ag inputs, with the exception of those who grow a non-storable cash crop that provides inter-linked credit tied to the sale of that cash crop to a nearby processor.⁵⁸
- 2) As in most other SSA countries, interest rates for loans made to Tanzanian smallholder agricultural or non-agricultural activities are 20% or more (very high), as explained elsewhere.⁵⁹
- 3) Many farmers lack sufficient cash during the main season planting period, but cannot get credit given lack of collateral and high interest rates.

Given these credit constraints faced by smallholder maize/rice producers, MAFC believed that smallholders could benefit from a few years of subsidized interest rates for group loans for the purchase of fertilizer/seed for use on maize/rice.⁶⁰ The solution to smallholder credit constraints proposed by the initial design of ACSP was to ensure that farmer groups known as AMCOs (Agricultural Marketing Cooperative Organizations) SACCOs (Savings and Credit Cooperative Organizations), who agree to use improved inputs (fertilizer, improved seed, etc) for maize/rice production receive a loan for a limited quantity of such inputs through existing private sector financial sector institutions (i.e. large commercial banks or small community banks), through multiple forms of guarantees:

- 1) AMCOs (and/or SACCOs) seeking credit would first be vetted for risk of loan default by MAFC and the financial institution considering to make a loan to the AMCO.
- 2) Qualified AMCOs would provide an upfront payment of 20% of the total value of their group loan to the bank who agrees to lend to them
- 3) The participating bank would then cover the other 80% of the value of the loan, and pay participating private sector agro-dealers 100% of the cost of the inputs requested the AMCO via the loan. Banks would be protected from AMCO loan default in two main ways:
 - a. Each AMCO would a contract with a pre-specified buyer (NFRA, Bak(i.e. National Food Reserve Authority (NFRA), Export Trading Group, Bakresa, World Food Program, contract farming, processing companies, etc). This contract would also be co-signed by the output buyer and the bank. The contract would be intended to ensure that enough of the AMCO's maize/rice production that season was marketed through the pre-specified buyer, who

⁵⁷ For a more detailed explanation of the initial design of ACSP, please see Mather et al (2015) and/or AIS/MAFC (2013).

⁵⁸ See Poulton et al, 1998 and/or section 5.3 of Mather et al, 2015.

⁵⁹ See section 5.2 in Mather et al, 2015.

⁶⁰ The remainder of this section is based on based on the ACSP design document (AIS/MAFC, 2013), and ex ante assessment of the ACSP design by Mather et al (2015), and discussions with Dr. Andrew Msolla.

would deduct the value of the AMCO's group loan in order to repay the lenders (banks) for the 80% of the loan outstanding.

- b. URT would provide a guarantee of 50% of the 80% of each loan covered by a participating bank.
- c. The document also assumes that when necessary, banks would receive assistance from regional, district, ward, division and/or village leadership to help enforce AMCO re-payment of their ag input loan to the bank.

