

Background

Agriculture represents approximately 50 percent of GDP, 80 percent of rural employment, and over 50 percent of the foreign exchange earnings in Tanzania (see Table 1).¹ Yet poor soil fertility and the resulting low productivity contribute to low economic growth and widespread poverty.²

Chemical fertilizers are the most important purchased input because of potential yield increases.³ Yet high prices and weaknesses in the fertilizer market keep fertilizer use low. In 2007, total use averaged 4.7 kg of nutrients per hectare of arable and permanently cropped land—one of the lowest rates in the world.⁴ Any serious effort to decrease poverty and increase smallholder productivity should address inefficiencies in the fertilizer supply market.

Most agriculture in Tanzania, excluding tea, is at the subsistence level,⁵ with an average plot size per farmer of 0.2 hectares.⁶ The most widely grown food crops are maize, pulses, sorghum, and rice (see Table 1). Together they account for 80 percent of total fertilizer used (see Table 3).⁷ Key export crops such as tobacco, coffee, tea, and cotton are more likely to be fertilized despite their relatively small overall acreage.⁸

History of Government Intervention

Post-Independence 1961–1989

Following independence in 1961, the new socialist regime worked to increase agricultural productivity through active government interventions and collective farming.⁹ The 1967 Arusha Declaration outlined the

Table 1. Tanzania at a Glance

Agriculture Value Added (2006)	45% of GDP
Employment in Agriculture (2006)	76% of population (30 million people)
Average Landholder per Capita (2003-2005)	0.2 hectares
Total Fertilizer Consumption (2006)	64,678 metric tons
Average Fertilizer Usage (2007)	4.7 kg/ha
Key food crops	Maize, pulses, sorghum, rice
Key export crops	Tobacco, coffee, tea, cotton

Data Source: FAOStat- Fertilizer consumption per hectare, key crops; Others- World Development Indicators

creation of “Ujamaa Villages,” self-reliant socialist cooperatives where extension services, tractors, and subsidized inputs were available.¹⁰ This component of the post-independence policy ultimately failed in part because of the high cost of inputs.¹¹ Additionally, relocation of farmers into unfamiliar and denser areas intensified cultivation patterns, which accelerated soil degradation.¹²

The Arusha Declaration established the state-owned Tanzania Fertilizer Company (TFC). The TFC and other parastatal agencies had a monopoly on all fertilizer procurement, distribution, and sales until 1992.¹³ Government marketing boards, crop authorities, and cooperatives also managed input subsidies, credit for agricultural production, crop purchases, and price-setting during this time.

Table 2. Tanzania Fertilizer Policy History

Year	Event
Post-Independence Period 1961-1989	
1967	Arusha Declaration
1970s	Fertilizer subsidy 60–75% of final price
1972	Tanzania Fertilizer Company founded
1980s	Currency devaluation, commodity price decreases
1989	Implicit subsidy of nearly 80% (highest historical level)
Liberalization Period 1990-1999	
1990–94	Fertilizer subsidy reduced from 70% to zero
1992	Private companies allowed to procure fertilizer
1996	Fertilizer markets stabilize
Post-Liberalization Period 2000-2005	
2003	Subsidized fertilizer reintroduced to select maize production areas
Current Policies	
2006	“Fast Track” pilot project
2008	Voucher program (TASP) introduced

Data Source: Kherallah, Delgado, Gabre-Madhin, Minot, & Johnson, 2002

The fertilizer subsidy during this era had two components. The first covered the difference between factory costs of domestically manufactured fertilizers and their selling prices.¹⁴ The second equalized price throughout the country by covering the full cost of transporting fertilizer between storage centers and regions of usage.¹⁵ Incorporation of widely spread regional markets was especially beneficial for the Southern Highlands, a remote region with climate well-suited for fertilizer-dependent hybrid maize. During this period, the region consumed more than 50 percent of all fertilizer in the country.¹⁶

During the 1970s, the fertilizer subsidy varied between 60–75 percent of the final price.¹⁷ The subsidy cost \$5–15 million per year, ultimately an unsustainable level.¹⁸ The 1979 worldwide oil shortage caused precipitous drops in agricultural commodity prices and Tanzanian deficits reached crisis levels, leading to devaluation of currency and an unfavorable balance of payments.¹⁹

Liberalization Period 1990–1999

Because of declining economic performance in the 1980s, pressure from donors to liberalize the fertilizer and other markets was strong. Although the Ministry of Agriculture continued to argue that subsidies were crucial for food security,²⁰ Tanzania had little choice but to accept structural adjustment programs designed

by the IMF and World Bank.²¹ This resulted in a reduction of the subsidy in 1990 and its full elimination by 1994.²² Additionally, TFC lost its monopoly over fertilizer distribution and procurement as private companies were allowed to compete.²³

Table 3. Fertilizer Use by Crop (1997)

Commodity	% of Total Consumption	% of Area Using Fertilizer
Maize	37.4%	10.0
Pulses	22.1%	10.0
Sorghum	10.1%	10.0
Rice	10.1%	20.0
Millet	6.2%	10.0
Sweet Potato	4.8%	5.0
Cotton	2.7%	30.0
Vegetables	2.1%	--
Coffee	2.0%	20.0
Other	1.3%	10.0
Tobacco	0.9%	95.0
Tea	0.4%	95.0

Data Source: FertiStat, www.fao.org/ag/agl/fertistat/

Unfortunately, the policy change had negative consequences. The real price of fertilizer increased by a factor of 2.5–3.9 from 1991 to 1997²⁴ and consumption decreased 84 percent between 1991 and 2001 (see Figure 1).²⁵ A survey of 1997/98 reported that 89.5 percent of agricultural holdings were not using fertilizer. Of the non-users, 39.1 percent reported that fertilizer was too expensive.²⁶ Other reasons for non-use included lack of availability (35.9 percent) and “other” including lack of credit (25 percent).

Removing the subsidy disproportionately affected the Southern Highlands, which had so greatly benefited from it. After removal, fertilizer was more expensive and less widely available.²⁷ Farmers in this region more frequently reported fertilizer price as a constraint than the national average.²⁸ Fertilizer became so costly that its use on maize was no longer profitable.²⁹

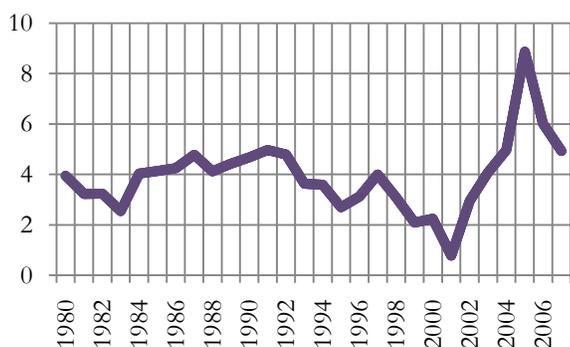
The growth of total agricultural output began to slow after liberalization.³⁰ Because relative fertilizer usage rates were so low on subsistence crops, maize yields were relatively unaffected.³¹

Post-Liberalization Period 2001–2005

In 2001, Tanzania released the new Agricultural Sector Development Strategy. This strategy used a public-

private partnership model and emphasized the need to improve input market efficiency, access to credit, provision of extension services, and investment in rural areas.³²

Figure 1. Fertilizer Consumption in Tanzania by Year (Kilograms of NPK nutrients applied per hectare of arable and permanent crop land)



Source: FAOStat Database (1980-2001 from Archive)

Despite continued arguments from the World Bank and other donors, the government reintroduced fertilizer subsidies in 2003/04 after a 12-year absence.³³ The Ministry of Agriculture and other government officials strongly favored reintroduction, perhaps due to their popularity. Some have also suggested that fertilizer subsidies' role in 2009 elections in neighboring Malawi as another reason for continued government support.³⁴

The subsidy (in only five regions)³⁵ covered transport costs to remote areas and a portion of the consumer price.³⁶ The subsidy was provided to wholesalers³⁷ and cost four percent of the agricultural budget in 2003. In 2005/06, the subsidy ranged from \$0.68 to \$9.80 USD per 50 kg bag depending on transportation costs.³⁸ The government also contracted with the private sector to import specified quantities of fertilizer.³⁹

Current Policies

Fast Track Pilot Project

In 2006, the government's first major attempt to strengthen the entire fertilizer value chain resulted in the "Fast Track" project, which ran from October 2006 – August 2007. The project was a five-district pilot of a Value Chain Implementation model, which addressed constraints along the value chain.⁴⁰ Project components included:

- Field based district-level training
- Capacity building
- Output marketing
- Fertilizer data management
- Value chain information flows
- Dockside handling amelioration

Besides not implementing all intended components,¹ the pilot was a success, with over 95 percent participation by 300 farmer representatives, agrodealers, and agricultural extension officers trained in the proper use of fertilizer and improved seeds.⁴¹ The project also facilitated formation of local microcredit institutions, and voluntary demonstration plots that showcased the technology and provided training opportunities. Findings from the project informed the next stage of implementation.

Tanzania Agriculture Input Partnership

The "Fast Track" project evolved into the Tanzania Agriculture Input Partnership (TAIP), another public-private partnership. The Agricultural Council of Tanzania (ACT) manages TAIP. The Council includes representatives from the national government, donors, input companies, and the University of Dar es Salaam.

National Agricultural Input Voucher Scheme (NAIVS)

In 2008, TAIP implemented the first fertilizer voucher subsidy system to replace the reimbursement system.⁴² Farmers receive vouchers for 50 percent off an input pack at any private agrodealer.⁴³ The pack, designed to increase diversification and improve maize yields, includes:

- 50 kg of Diammonium phosphate (DAP)
- 50 kg of Urea
- 10 kg of maize seed
- Agrochemicals
- Cashew, tea, or coffee seedlings and rice or sunflower seeds to encourage diversification⁴⁴

¹Other components initially envisioned (commercial bank awareness, new financial product development, environmental impact assessment, analysis of tax on fertilizer, voucher subsidy system, and farmer input promotions) were not implemented because of inadequate funding and short duration.

The stated objectives are to increase efficiency in the market, ensure smallholder farmers' access fertilizers, strengthen agrodealers' capacity to access input credits, and to increase productivity.⁴⁵ In 2008, the program targeted 700,000 smallholder farmers in 53 districts with potential for higher maize production.⁴⁶ The subsidy budget rose to \$27.0 million (28 percent of the country's agricultural budget)⁴⁷ which served 1.5 million recipients and paid for 155,000 tons of fertilizer, 6,000 tons of improved seeds, 2,000 liters of agrochemicals, 8 million tea seedlings, and 9 million coffee seedlings.⁴⁸ The project hopes to reach 1.5 million farmers with additional support granted from the World Bank.⁴⁹

To qualify for the voucher, a farmer must be a permanent resident of an eligible village, have a field smaller than one hectare producing less than its potential, be able to follow recommended practices, and be able to pay the difference between the voucher value and market price for the input pack.⁵⁰ A community-based selection committee and Village Assemblies determine eligibility. No record of problems with this system has been found thus far. The list of eligible farmers is provided to the Ministry of Agriculture for final approval and voucher issuance. Unlike Kenya's subsidy program, beneficiaries are able to receive the voucher for more than one year.

After farmers use their vouchers, agrodealers request reimbursement at local branches of the National Microfinance Bank of Tanzania (NMB).⁵¹ Some see this as an improvement on the Kenyan system, where only central banks are able to reimburse agrodealers.

Tanzania Agrodealer Strengthening Program (TASP)

TASP is designed to strengthen the input distribution system. To qualify for participation, local agrodealers must go through business and management training provided by Citizen Network for Foreign Affairs (CNFA), which results in an accreditation.⁵² CNFA is a nonprofit partner of ACT that specializes in agribusiness training and marketing. After accreditation, certified dealers can access credit through NMB. To date, 1600 agrodealers have been trained.⁵³

TASP has experienced some challenges. Agrodealers initially had problems cashing vouchers while the parliament delayed releasing funds to banks for voucher redemption.⁵⁴ Banks have had difficulty

manually entering information from thousands of vouchers.⁵⁵ Allegations of corruption arose in August 2007 when President Kikwete cracked down on companies "entrusted with supplying subsidized fertilizers to farmers but acting to the contrary."⁵⁶ The program's high cost, projected to be \$146 million in FY 2010, raises the question of whether TASP is sustainable.⁵⁷

Current Market Structure and Challenges

Farmers still face many constraints to fertilizer use including perceived and actual high costs, unreliable availability at village level, uncertain rainfall, weak market infrastructure, weak output prices, and inadequate local credit.⁵⁸

Production

Tanzania has phosphate deposits capable of providing domestic fertilizer. The largest, the Minjingu deposit, was discovered in 1956.⁵⁹ In 1983, the mine opened as the Minjingu Phosphate Company, a subsidiary of the Tanzania State Mining Corporation.⁶⁰ Until 1992, the company mined Minjingu phosphate rock and supplied it to the TFC factory in Tanga, which processed it into chemical phosphate fertilizer⁶¹ but in 1991, the factory closed due to managerial problems and mechanical breakdowns.^{62,63} After privatization, the mining company became Minjingu Mines and Fertilizer Ltd. It is now called Minjingu Organic Hyper Phosphate+.⁶⁴

The mine has transitioned through many phases of production. At its peak, it produced 25,000 tons per year. As of 2001, it was only producing 925 tons and exporting the majority to Kenya.⁶⁵ Yet news from January 2009 reported that the company was positioning itself to become the major source of fertilizer in East, Central, and South Africa.⁶⁶ President Kikwete opened the second phase of a new plant to produce NPK complex fertilizers and called on stakeholders to help Tanzania become a net fertilizer exporter.⁶⁷ However, in May 2009, nonpayment of Tsh 2.4 billion (\$2.2 million) by TFC prevented 15,000 tons of fertilizer from being distributed to farmers during the planting season.⁶⁸ Production stopped and workers were indefinitely laid off.

Importation and Distribution

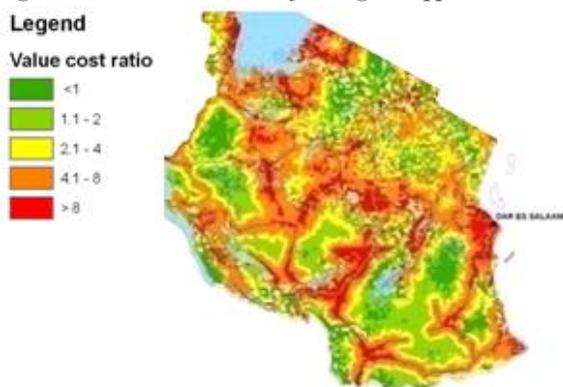
Like most countries in SSA, Tanzania imports most of its fertilizer at large expense.⁶⁹ In 2007 alone, the country spent \$25.1 million.⁷⁰ TFC and six large private companies (including two tobacco companies) and twelve minor one are the registered fertilizer importers.⁷¹ These importers also wholesale and distribute the fertilizer, often out of Dar es Salaam headquarters to warehouses in regional and sometimes district towns.⁷²

Port costs are a particularly inefficient link in the fertilizer value chain. Old, inadequate port infrastructure prevents economies of scale for bulk shipments.⁷³ In 2008, Yara International (world's largest fertilizer company) announced plans to invest \$60 million for the creation of fertilizer terminals at Dar es Salaam and Beira, Mozambique ports.⁷⁴

Conclusion

Despite numerous strategies over the last fifty years, from heavy government involvement to liberalization, major weaknesses in Tanzania's fertilizer market prevent efficient use of fertilizer. High transportation costs, low knowledge level of farmers and agrodealers, unavailability of improved seed to respond to fertilizer, and low access to credit all contribute to the market's problems. The government's current framework, TAIP, acknowledges this interconnectedness by targeting multiple components of the market.

Figure 2. Value Cost Ratios of 35 kg N Application



Data Source: Derived from Guo et al., 2009, p. 17

A recent study used transport cost, FOB fertilizer prices, port costs, optimal nitrogen application rates, and net maize farm-gate prices to create a geospatial

model of value cost ratios for urea use for maize across East Africa.⁷⁵ The model simulates the effects of potential policies (e.g., reducing fertilizer costs, transport costs, and port costs). Figure 2, for example, identifies areas with high and low value cost ratios for nitrogen use.

This type of model could help Tanzania tailor solutions relevant to specific road, soil, and market conditions of different areas of the country.⁷⁶ With smart, sustainable subsidies that support the private market instead of replacing it, Tanzanian farmers will hopefully be able to effectively use fertilizers to achieve food security and economic growth.

Please direct comments or questions about this research to the Evans Policy Analysis & Research (EPAR) PI, Leigh Anderson, at eparx@u.washington.edu.

Endnotes

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- ² Ikerra & Semoka, 2008, p. 8
- ³ Wobst & Mhamba, 2003, p. 5
- ⁴ FAOStat
- ⁵ Van Straaten, 2002, p. 280
- ⁶ The World Bank, 2007, p. 325
- ⁷ FAOStat
- ⁸ United Republic of Tanzania, 2009, p. 23
- ⁹ Wobst & Mhamba, 2003, p. 1
- ¹⁰ Ibid.
- ¹¹ Ondaatje, 1998, p. 125a
- ¹² Skarstein, 2005, p. 339
- ¹³ Tanzania Fertilizer Company Ltd., 2006
- ¹⁴ Suzuki & Bernards, 1987, p. 25
- ¹⁵ Ibid.
- ¹⁶ Skarstein, 2005, p. 352
- ¹⁷ Kherallah, Delgado, Gabre-Madhin, Minot, & Johnson, 2002, p. 42
- ¹⁸ Kherallah, et al., 2002, p. 42
- ¹⁹ Kherallah, et al., 2002, p. 19
- ²⁰ Therkildsen, 2009, p. 16
- ²¹ Kherallah, et al., 2002, p. 19
- ²² Skarstein, 2005, p. 351
- ²³ Rweyemamu, 2003, p. 17
- ²⁴ The World Bank and the Government of the United Republic of Tanzania, 2001, p. 51
- ²⁵ Skarstein, 2005, p. 351
- ²⁶ MAC/NBS, 2000, p. 73 as cited in Skarstein, 2005, p. 352
- ²⁷ Skarstein, 2005, p. 352
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- ³³ Prorustica Ltd., 2006, p. 41
- ³⁴ Therkildsen, 2009, p. 16
- ³⁵ Ibid.
- ³⁶ Prorustica Ltd., 2006, p. 41
- ³⁷ Minot, 2009, Slide 16
- ³⁸ Prorustica Ltd., 2006, p. 41
- ³⁹ FSRP Fertiliser Review Team, 2009, p. 4
- ⁴⁰ Agricultural Council of Tanzania, 2007, p. 2
- ⁴¹ Agricultural Council of Tanzania, 2007, p. 3
- ⁴² Agricultural Council of Tanzania, 2007, p. 6
- ⁴³ Minot, 2009, Slide 16
- ⁴⁴ FSRP Fertiliser Review Team, 2009, p.10
- ⁴⁵ Ikerra & Semoka, 2008, p. 5–6
- ⁴⁶ FSRP Fertiliser Review Team, 2009, p.10
- ⁴⁷ Therkildsen, 2009, p. 16
- ⁴⁸ FSRP Fertiliser Review Team, 2009, p.10
- ⁴⁹ Minot & Benson, 2009, p. 6
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- ⁵¹ FSRP Fertiliser Review Team, 2009, p. 4
- ⁵² FSRP Fertiliser Review Team, 2009, p.10
- ⁵³ CNFA, 2008
- ⁵⁴ Alliance for a Green Revolution in Africa, 2009
- ⁵⁵ Ibid.
- ⁵⁶ IPP Media, 2007
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- ⁵⁸ Tanzania Fertiliser Partnership, 2006
- ⁵⁹ Minjingu Mines & Fertilisers Ltd., n.d.
- ⁶⁰ Van Straaten, 2002, p. 284
- ⁶¹ Minjingu Mines & Fertilisers Ltd., n.d.
- ⁶² Ibid.
- ⁶³ Tanzania Fertilizer Company Ltd., 2006
- ⁶⁴ Minjingu Mines & Fertilisers Ltd., n.d.
- ⁶⁵ Prorustica Ltd., 2006, p. 7
- ⁶⁶ Makunga, 2009, Front Page 3
- ⁶⁷ Ibid.
- ⁶⁸ Arusha Times, 2009
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- ⁷⁰ FAOStat
- ⁷¹ Ikerra & Semoka, 2008, p. 4
- ⁷² Ibid.
- ⁷³ Agricultural Council of Tanzania, 2007, p. 5
- ⁷⁴ Boudreaux, 2008
- ⁷⁵ Guo, Koo, & Wood, 2009
- ⁷⁶ Guo et al., 2009, p. 18

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