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What is the evidence on the economic impact of Tanzania's National Food Reserve Agency (NFRA) on smallholder maize farmers in Tanzania?

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List of abbreviations

FAO	Food and Agricultural Organisation of the United Nations
IFPRI	International Food Policy Research Institute
NFRA	National Food Reserve Agency
OPM	Oxford Policy Management
P4P	Purchase for Progress
SGR	Strategic Grain Reserve
SSA	Sub-Saharan Africa
WFP	World Food Programme

1 Introduction

1.1 Smallholder farming in Tanzania

Agriculture is an important part of the Tanzanian economy. Specifically, agriculture accounts for 45% of GDP, employs more than 75% of the working population and is an important source of foreign exchange (WFP, 2013). Moreover, domestic agriculture is integral to ensuring food security within the country and hence, Tanzanian agriculture is characterised by a high level of subsistence farming. While large-scale farmers and some smallholders produce to generate income, most farmers in Tanzania produce agricultural outputs in order to feed their families (Verstraelen and Liston, 2013).

Within the agricultural sector, maize is an important commodity and staple covering 45% of the country's arable land. In terms of maize production, 85% of the country's maize is produced by small-scale farmers many of whom live in remote, rural areas which requires them to sell to traders due to prohibitively high transportation costs (WFP, 2013). There is a low level of commercialisation in the Tanzanian agricultural sector, in general, and particularly amongst maize farmers. According to the World Bank, more than two thirds of maize farmers did not sell any of their produce in 2011 and only a quarter of total maize output is marketed (Morisset, 2013). However, marketed maize sales generate 50% of cash income in rural areas (Barreiro-Hurle, 2012).

1.2 Theoretical Economic Impacts of Monopoly Maize Markets

In Tanzania, the National Food Reserve Agency (NFRA) and World Food Programme's Purchase for Progress (P4P)¹ are the two largest maize buyers. The focus of this report is to determine the impact of the NFRA's activities on smallholders' welfare and hence the impact of P4P will not be considered in this paper despite being a large market player. In considering the economic impacts of the NFRA on smallholders, there are two aspects to consider. The first consideration is the impact of the NFRA on the price of maize in the country – does the agency offer pan-territorial prices? Does the agency buy and sell grain at the same price? Does the agency offer higher-than-market prices to smallholders?

The second consideration is the way in which smallholders engage in the maize market. On average, in Sub-Saharan Africa, a small majority of farmers are net sellers of grain, producing and selling more grain than they purchase and consume. However, the majority of smallholders are net buyers of maize and hence the welfare impacts of monopoly maize buyers on this group depends on the agency's impact on the purchase and sale price of maize. Finally, a small group of smallholders produce for subsistence only and hence are autarkic with respect to the maize market. Therefore, it is important to consider the impact of changes to the price of maize for each of these groups as considering aggregate welfare impacts will mask the heterogeneous impact across groups of smallholders.

The purpose of this report is to determine the state of the literature, in terms of quantitative and qualitative evidence, regarding the economic impact of the National Food Reserve Agency on smallholder maize farmers in Tanzania. The aim of this paper is to determine whether there is rigorous evidence to address this question and to try to identify gaps in the literature rather than to

¹ Through P4P, the WFP acts as a staple food buyer. The WFP buys locally from 19000 smallholder Tanzanian farmers and invests in capacity building in order to improve collective marketing and reduce post-harvest losses, among other goals. P4P has entered into an agreement with the NFRA that links P4P farmers to the NFRA to provide them with a sustainable market for their crops (WFP, 2013).

provide a systematic literature review. The rest of this paper is structured as follows: Section 2 outlines the search methodology, Section 3 outlines the role of the NFRA in Tanzania, Section 4 presents the qualitative and quantitative evidence and Section 5 concludes by summarising the evidence and outlining some gaps in the literature.

2 Search Methodology

This paper is based on extensive research pertaining to National Food Reserve Agency in Tanzania and the economic impact of these markets on smallholder farmers. The papers used in this report are restricted to papers from Tanzania and focus solely on maize markets rather than other staples or crops. The search was structured around the following key search phrases:

- National Food Reserve Agency (Tanzania)
- Smallholder maize farmers
- Smallholder maize farmers' income
- Smallholder livelihoods
- Maize in Tanzania

The appropriate but limited evidence was found by searching relevant databases (such as Taylor and Francis, Science Direct, and IDEAS RePEc), journals (i.e., Agricultural economics, American Journal of Agricultural Economics, World Development etc.), and grey literature including from international organisations, NGOs (e.g. FAO, IFPRI), think tanks and research centres as well as regional groups and donors (e.g., bilateral and multilateral).

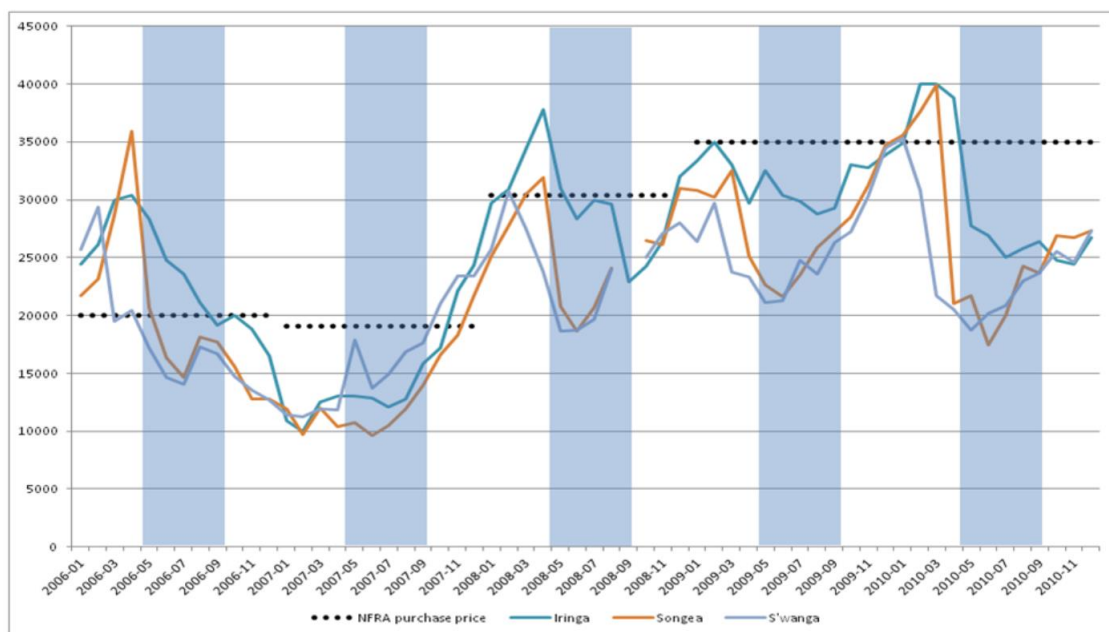
This report does not constitute a systematic review but is rather a brief literature review intended to indicate the state of academic knowledge with regards to the impact of a specific monopoly maize market (the NFRA) on smallholder farmers in Tanzania. Therefore, although the search used was extensive, this report is not completely exhaustive in terms of drawing on related literature such as other crop markets or other regions.

3 The National Food Reserve Agency

Tanzania has a history of state intervention in the maize market. Following the droughts of 1973-5, the government established a Strategic Grain Reserve (SGR) in 1976. In 2008, the SGR became the National Food Reserve Agency (NFRA) managed by the Ministry of Agriculture, Food Security and Cooperatives. The NFRA has a dual mandate to guarantee food security and to stabilise maize prices. To this end, the NFRA procures, stores and releases grain stocks. In order to incentivise production, the NFRA aims to support maize prices and provide remunerative markets for maize farmers.

Price stability is achieved, in theory, by purchasing large volumes of maize in surplus regions and selling at subsidised prices to deficit areas. The government offers fixed floor prices which are usually about 5% higher than wholesale market maize prices announced by the Minister of Agriculture providing an incentive for production (Mhlanga et al., 2014). Grain is predominantly sold at subsidised prices with a small proportion either distributed for free or at commercial prices during the lean period (WFP, 2013). Figure 1 illustrates NFRA and wholesale maize prices between 2006 and 2010. Market prices are generally below the government floor except during the harvest. Although the NFRA is therefore a price setting entity, it often cannot afford to purchase significant volumes of maize, and hence it cannot significantly influence the price. Due to the low level of intervention by the government, about 10% of national marketed maize, due to budget constraints the NFRA does not have as large an impact as in other SSA countries such as Kenya, for example. Furthermore, the NFRA is more concerned with food security than market intervention (Curtis, 2014). This may limit the scope for the NFRA to significantly impact the livelihoods of smallholders and the extent to which they do impact smallholders will depend on what type of smallholders² have access to the NFRA. Overall, the NFRA is considered to increase maize prices during procurement, for NFRA farmers, and these prices fall when their stocks are released. Hence, NFRA support to producers is temporary and only felt during the procurement period.

Figure 1: Maize Prices in Tanzania



Source: Mhlanga, N., Anaadumba, P., & Ngaiza, R. (2014). Institutional Procurement of Staples from Smallholders: The case of purchase for progress in Tanzania (Background Paper). FAO.

² Smallholders can either be net sellers, net buyers or autarkic with respect to maize.

Maize marketing in Tanzania involves traders purchasing maize from farmers during the harvest and then selling the produce to urban markets, the NFRA or neighbouring countries. Traders provide farmers with a spot contract and weigh maize using bucket measures rather than weight which many farmers feel is not fair as it does not account for maize quality. The maize is then sold on to the NFRA, millers or neighbouring countries. Hence, maize marketing in Tanzania is trader dominated (Mhlanga et al., 2014).

4 Evidence

4.1 Qualitative Evidence

In a study on the impact of trade barriers for staple foods on the livelihoods of small-scale farmers, Verstraelen and Liston (2013) also interview farmers about their experience with the NFRA, an alternative market for their produce. Overall, the NFRA has been said to have a number of shortcomings including poor budget allocation, which negatively affects farmers' livelihoods as smallholder farmers have to wait several weeks before receiving payment for their produce (Verstraelen and Liston, 2013). This result is confirmed in the ACORD report which states that in October 2013, the NFRA owed farmers Shs 17 billion³ for maize purchases (Curtis, 2014). Furthermore, farmers do not receive the price paid to traders by the NFRA as traders subtract transport costs, loading and unloading costs, reduction of maize to dust during travel and their margin leaving smallholders with only a fraction of the total price paid by the NFRA (Verstraelen and Liston, 2013).

4.2 Quantitative Evidence

Mmbando et al. (2015) analyse the factors that influence farmers decisions to market their maize output using cross-sectional household data from smallholders in Tanzania in 2010. They find that output price has a positive impact on market participation suggesting that the higher the maize price, the more likely farmers are to sell their output. They do not, however, find a statistically significant impact of output price on the intensity of market participation. The authors do not attribute higher prices to the role of the NFRA in the Tanzanian maize market and do not examine the impact of higher price, and therefore greater market participation, on smallholders' net income and economic welfare.

³ This is equivalent to approximately US\$8 million in November 2015.

5 Summary and Conclusions

The evidence pertaining to the impact of the NFRA on smallholder maize farmers in Tanzania is scant. In terms of qualitative evidence, it seems that many farmers are unable to access the NFRA and when they do, they receive lower prices for their maize due to the role of traders. Furthermore, due to the NFRA's budget constraints, many farmers remain unpaid for the produce for months after the harvest despite selling their grains which would be expected to negatively impact the welfare of smallholder farmers. The quantitative evidence suggests that higher prices, not necessarily attributed to the NFRA, increases farmers' market participation but the welfare impacts of this market participation is not discussed.

One reason for the lack of evidence may be due to the low levels of intervention of the NFRA in the maize market and its inability to significantly alter the maize price due to budget constraints. Furthermore, the NFRA does not reach all smallholder maize farmers and accounts for only a small proportion of total maize purchases. However, given then goal of the NFRA to stabilise prices and provide price support with the goal to reduce poverty and raise smallholders' income, it is an important question to address. This is in the light of findings from other Sub-Saharan African countries in which monopoly maize purchasing agencies which raise maize prices actually harm many smallholders due to the fact that the majority of smallholders are net buyers of maize. Furthermore, the WFP's P4P programme is also a large buyer in the Tanzanian maize market and it would be interesting to consider the impact of the WFP on maize prices as well as the livelihoods of smallholders participating in their programme (see Mhlanga et al., 2014). This, however, is beyond the scope of this report.

Table 1: Summary of the Evidence

Papers Considered				
Author(s)	Year	Qualitative or Quantitative?	Size of Economic Effect	Economic Impact
Verstraelen and Liston	2013	Qualitative	Unknown	Although some farmers are able to sell to the NFRA, they have to wait several weeks before being paid for their maize
Curtis	2014	Qualitative	Unknown	The NFRA owed farmers Shs 17 billion for maize that had been sold to the NFRA
Mmbando, Wale and Baiyegunhi	2015	Quantitative	Unknown	Farmers are more likely to participate in the maize market when offered a higher price for their output

References

Barreiro-Hurle, J. (2012). Analysis of Incentives and Disincentives for Maize in the United Republic of Tanzania (Technical Note Series). FAO, MAFAP Rome.

Curtis, M. (2014). *Why Wait Until the Next Food Crisis? Improving food reserves strategies in East Africa*. (Policy Brief). Agency for Cooperation and Research In Development (ACORD). Retrieved from <http://www.acordinternational.org/silo/files/why-wait-until-the-next-food-crisis-.pdf>

Mhlanga, N., Anaadumba, P., & Ngaiza, R. (2014). *Institutional Procurement of Staples from Smallholders: The case of purchase for progress in Tanzania* (Background Paper). FAO. Retrieved from http://www.fao.org/fileadmin/user_upload/ivc/docs/Tanzania_P4P_case_study.pdf

Mmbando, F. E., Wale, E. Z., & Baiyegunhi, L. J. S. (2015). Determinants of smallholder farmers' participation in maize and pigeonpea markets in Tanzania. *Agrekon*, 54(1), 96–119.

Morisset, J. (2013). *Why Tanzanian farmers don't sell what they produce?* [World Bank]. Retrieved from <http://blogs.worldbank.org/african/why-don-t-tanzanian-farmers-sell-what-they-produce>

Verstraelen, A., & Njoroge, L. (2013). *Impact of tariff and non-tariff barriers for staple foods on the livelihood of small scale farmers* (Policy Brief No. 1). Retrieved from http://www.repoa.or.tz/images/uploads/Impact_of_tariff_and_non-tariff_trade_barriers_for_staple_foods_-TM_PAN_doc_2.pdf

WFP. (2014). *Purchase for Progress - P4P Tanzania*. Retrieved from <http://documents.wfp.org/stellent/groups/public/documents/reports/wfp230983.pdf>

Annex A Annotated Bibliography

Barreiro-Hurle, J. (2012). Analysis of Incentives and Disincentives for Maize in the United Republic of Tanzania (Technical Note Series). FAO, MAFAP Rome.

URL: www.fao.org/3/a-at481e.pdf

Abstract:

Maize is the 5th agricultural commodity in The United Republic of Tanzania by value of production during the period 2005-2010 accounting for 7.5 percent of total production value. Moreover, it represents close to five percent of total agricultural imports in The United Republic of Tanzania for the same period and is the main energy source in the diet accounting for 25 percent of total caloric intake; Maize is a very political commodity in The United Republic of Tanzania and frequent trade measures are put in place to assure food security; The United Republic of Tanzania is considered to be a potential maize producer for the whole east African region.

Curtis, M. (2014). Why Wait Until the Next Food Crisis? Improving food reserves strategies in East Africa. (Policy Brief). Agency for Cooperation and Research In Development (ACORD).

URL: <http://www.acordinternational.org/silo/files/why-wait-until-the-next-food-crisis-.pdf>

Abstract:

This report highlights the importance of African countries holding food reserves for promoting food security and price stability. It analyses the food reserves policies of three countries in East Africa – Kenya, Tanzania and Uganda – showing how these can, indeed must, be improved to address hunger. National food reserves, when designed and implemented effectively, can play a vital role in promoting food security and price stability. After the 2008 food price crisis – when 150 million more people were pushed into poverty worldwide - the UN's Food and Agriculture Organisation (FAO) stated that countries with reserve stocks were 'able to respond more quickly and cheaply than those with limited or no reserves'.¹ Since then, food prices have remained high and/or volatile in most parts of Africa, reducing the incomes of poor people who are mainly net buyers of food. However, although most African countries currently hold food reserves, many are poorly managed, and some hold no stocks at all. This report focuses on Kenya, Tanzania and Uganda, partly since these countries have very different policies towards food reserves. Both Kenya and Tanzania hold sizeable grain reserves but Uganda holds none and has explicitly rejected doing so, stating that they are expensive and require careful management. Our analysis is that all three countries need to re-examine their policy on food reserves to improve food security for the most vulnerable. Policy towards food reserves should be seen as a complement to other social protection policies.

Mhlanga, N., Anaadumba, P., & Ngaiza, R. (2014). Institutional Procurement of Staples from Smallholders: The case of purchase for progress in Tanzania (Background Paper). FAO.

URL: http://www.fao.org/fileadmin/user_upload/ivc/docs/Tanzania_P4P_case_study.pdf

Abstract:

Not Available.

Mmbando, F. E., Wale, E. Z., & Baiyegunhi, L. J. S. (2015). Determinants of smallholder farmers' participation in maize and pigeonpea markets in Tanzania. *Agrekon*, 54(1), 96–119.

URL: <http://doi.org/10.1080/03031853.2014.974630>

Abstract:

This paper analyses factors influencing market participation decisions and the level of commercialisation among maize and pigeonpea smallholder farmers in Tanzania. The study utilises cross-sectional farm household-level data collected in 2010 from a randomly selected sample of 700 smallholder farming households. The two-step decision-making process was analysed using a Heckman selectivity procedure. The results showed that fixed transaction costs associated with market information and household characteristics such as gender and education level of the household head had a statistically significant influence on market participation. Proportional transaction costs (distance to market) and variables such as output prices, farm size, labour force, membership of farmer associations and geographical location of households influenced both market participation and intensity of participation. The results suggest that policies aimed at improving rural road infrastructure, market information systems, smallholder asset accumulation, human capital and promotion of farmer association could reduce transaction costs and enhance market participation and marketed supply by smallholder farmers.

Morisset, J. (2013). Why Tanzanian farmers don't sell what they produce? [World Bank].

URL: <http://blogs.worldbank.org/africacan/why-don-t-tanzanian-farmers-sell-what-they-produce>

Abstract:

Not available.

Verstraelen, A., & Njoroge, L. (2013). Impact of tariff and non-tariff barriers for staple foods on the livelihood of small scale farmers (Policy Brief No. 1).

URL: http://www.repoa.or.tz/images/uploads/Impact_of_tariff_and_non-tariff_trade_barriers_for_staple_foods_-TM_PAN_doc_2.pdf

Abstract:

Access to remunerative produce markets is the single most important incentive to increase agricultural production. Farmers must not be inhibited from accessing markets. There is broad consensus among stakeholders including farmers, traders, service providers and development community that domestic and cross-border trade barriers should be eliminated as a matter of priority. Trade bans reduce overall income of the farmers by half and shift their interest to production of other (cash) crops like sunflower, because of the higher guaranteed revenues to farmers. Trade bans precipitate increased price volatility, thus causing uncertainties in the value chain. The uncertainties dissuade farmers and other private sector actors along the value

chain to make long term investments in agricultural production, storage, warehousing and transport. NFRA has not been able to stabilise prices nor play its role as buyer of last resort because of bureaucratic procedures, political interference, underutilization of capacity, and chronic inefficiency. The staple food value chain suffers from post-harvest losses due to lack of appropriate storage facilities and limited experience in post-harvest handling. The situation is made worse when there is cross-border trade bans. Uncertain and inconsistent government policy regarding cross-border trade of cereals leads to price volatility and inability to plan ahead of production.

WFP. (2014). Purchase for Progress - P4P Tanzania.

URL: <http://documents.wfp.org/stellent/groups/public/documents/reports/wfp230983.pdf>

Abstract:

In Tanzania, P4P activities cover 14 districts in 10 regions, and reach nearly 19,000 smallholder farmers — 41 percent of whom are women. In order to reach farmers, WFP engages with Savings and Credit Cooperatives (SACCOs), which provide credit and savings accounts to registered smallholders. As of December 2013, WFP supported 28 SACCOs. In order to improve collective marketing and reduce post-harvest losses, WFP has engaged in capacity development, as well as investments to rehabilitate storage facilities, linking them to an emerging warehouse receipt system (WRS). An agreement between WFP and Tanzania's National Food Reserve Agency (NFRA) has now provided smallholder farmers from 17 P4P-supported farmers' organizations (FOs) with a potentially sustainable market for their crops.