

**COMPARATIVE ANALYSIS FOR EFFECTS OF NON- TARIFF BARRIERS ON  
MAIZE PRICES BY SMALLHOLDER FARMERS IN MBOZI AND MOMBA  
DISTRICTS, TANZANIA**

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**Abstract**

This study assessed the effects of Non-Tariff Barriers (NTBs) on prices received by maize smallholder farmers in Mbozi and Momba districts in a comparative approach. A cross sectional data were collected from farmers in the two districts using structured questionnaires. A two-stage stratified sampling procedure was used in selecting a sample size of 400 smallholder farmers. Multiple regression models were used in comparing the effects of NTBs among farmers in the two districts. Findings show that, NTBs had a negative influence on the price received by farmers in both districts. Furthermore, the effects of NTBs on the price were higher in Mbozi District than were in Momba District. The coefficients of NTBs show that farm gate prices could decrease by 7% in Mbozi District with a unit increase in NTBs cost while in Momba District the prices only decreased by 5 percent. Comparatively, the prices of maize in Mbozi District were lower than those in Momba District by 2.2 percent whereby the differences represents the NTBs costs. Thus, it can be concluded that, the effects of NTBs were higher for farmers in Mbozi district than those in Momba. It is recommended that, protective food policy such as weighing bridges and road blocks should be reduced in order to maintain reasonable high prices in rural areas and low prices in urban deficit centers.

**Key words:** NTBs Effects, Maize farmers' prices, Mbozi and Momba districts, Tanzania

## INTRODUCTION

Maize, rice, and wheat are the main cultivated staple food crops in the world including the Sub-Saharan African countries (SSA). Among of these crops, maize has emerged as a crucial staple crop of guaranteeing food security in most of SSA in the last few decades (Friedrich and Kassam, 2016; FAOSTAT, 2015). This is because food security in these countries is linked to staple food production and marketing (ACT, 2010; KI, 2011; FAO, 2016). Similar to other countries in SSA, maize in Tanzania is considered as the most important staple food crop, grown in 45% of the total arable land and generates nearly 50% of the rural cash income for smallholder farmers (UNESCO11; Baffes *et al.*, 2015). Moreover in Tanzania, maize is consumed by the majority (about 90%) of its population followed by rice (17%) which is more preferred staple food for medium and high income earners (National Bureau of Statistics (NBS), 2008; Minot, 2014). Thus, an increase in maize production and marketing through improving its prices has the potential of raising the income and welfare of poor smallholder famers in Tanzania.

According to the World Bank's Agricultural Distortions Project (ADP) (2008), the staple food sub-sector in Tanzania is still highly regulated and price incentives remain strongly distorted when comparing with her neighbouring countries such as Kenya and Uganda. In these countries food policies have been changed from taxation to a slight support of farm-gate prices while in Tanzania prices are still lower (Ihle *et al.*, 2010; Onono *et al.*, 2013). This situation is caused by the Government of Tanzania (GoT) intervention on marketing of staple food crops through imposition of arbitrary trade restrictions which include tariffs and NTBs from time to time (Karugia *et al.*, 2009; FAO, 2012; Gabagambi, 2013). Moreover, government interventions in the form of NTBs have been reported by the World Bank (2012) and Karugia *et al.* (2009) as an obstacle for smallholder farmers against accessing both village and district markets. NTBs in this study refer to policy measures other than ordinary customs tariffs that are instituted by governments to ensure food security and price stability in the country (Mold, 2005; Karugia *et al.*, 2009). These include; roadblocks, Municipal and Council permits, trade license, customs procedures, red tape and weighbridges as applied at the region, district, and wards levels within the country. However, NTBs which are involved in cross border maize trade such as export bans, quotas and those related to Technical Barriers to Trade (TBT), Sanitary and Phytosanitary

(SPS), standards and regulations were not considered in the analysis of this study. This study focused only on this lower level of the maize supply chain because the imposed NTBs by the government in the first place are implemented by local councils at the region and district levels. Thus, their presence at the district and regions are believed to have significant effects on farmers' prices both at the farm and market levels.

However, maize production in Tanzania for the recent years has been experiencing declining trends as a result of limited access to formal markets by most of smallholder farmers (Indeximundi, 2015; FAO, 2016). To promote the maize production and marketing, the Government of Tanzania has been implementing different policies and strategies especially in the major producing regions (Mbeya, Songwe, Iringa, Njombe, Ruvuma, Rukwa, and Katavi). These strategies included the provision of subsidies on farmers' inputs through the National Agriculture Input Voucher Scheme (NAIVS) whereby about USD 300 million were invested for the period of 2008 to 2013 (Gabagambi, 2013, Aloyce *et al.*, 2014). This was also supported by the purchase of maize from farmers through National Food Reserve Agency (NFRA) at a fixed floor price which is above the market prices (Aloyce *et al.*, 2014; Musumba and Costa, 2015). These two strategies aimed at maintaining low prices in deficit regions and reasonable high maize prices in surplus areas as an incentive for farmers to produce and sell more maize. This is because with the presence of NFRA, farmers were assured of the market for their maize produce.

Despite these government's efforts, the prices for smallholder farmers especially in surplus rural areas continued to decline and the poorest consumers in the urban areas have continued to be burdened with higher prices. Furthermore in many occasions, NFRA, which is the main maize government buyer, has frequently been constrained with the shortage of funds to purchase much of the maize brought by farmers at the centre due to capital deficit (KI, 2011; World Bank, 2012). This phenomenon has forced farmers to remain with large stocks of unsold maize despite that they have already incurred all the necessary costs of transporting their produce to the buying centres. For instance in years 2013 and 2014, NFRA buying centre at Vwawa and Itepula village in Mbozi District failed to purchase much of the maize brought by farmers at the centre. This trend motivated the current study into investigating the current effects of NTBs strategies interventions and the extent to which these NTBs strategies contribute to the current decline in maize prices for farmers in Mbozi and Momba Districts of Tanzania.

## 2.0 METHODOLOGY

### 2.1 The Study Area

The study was conducted in the two major surplus maize producing districts in the Southern part of Tanzania, namely Mbozi and Momba in Songwe region (Fig.1). Mbozi and Momba Districts were selected because of their agricultural potential of being surplus-producing areas for maize in Songwe region. The two districts account for about 50% of the maize produced in Songwe region and 40% of the maize from the two maize producing regions of Songwe and Mbeya (KI, 2011; NBS, 2014). Furthermore, the two districts are also located far from major domestic consumer markets such as Dar es Salaam and Arusha. Therefore, involving them in the study was considered useful in obtaining more information related to spatial effects of NTBs on the price and market participation for surplus farmers.

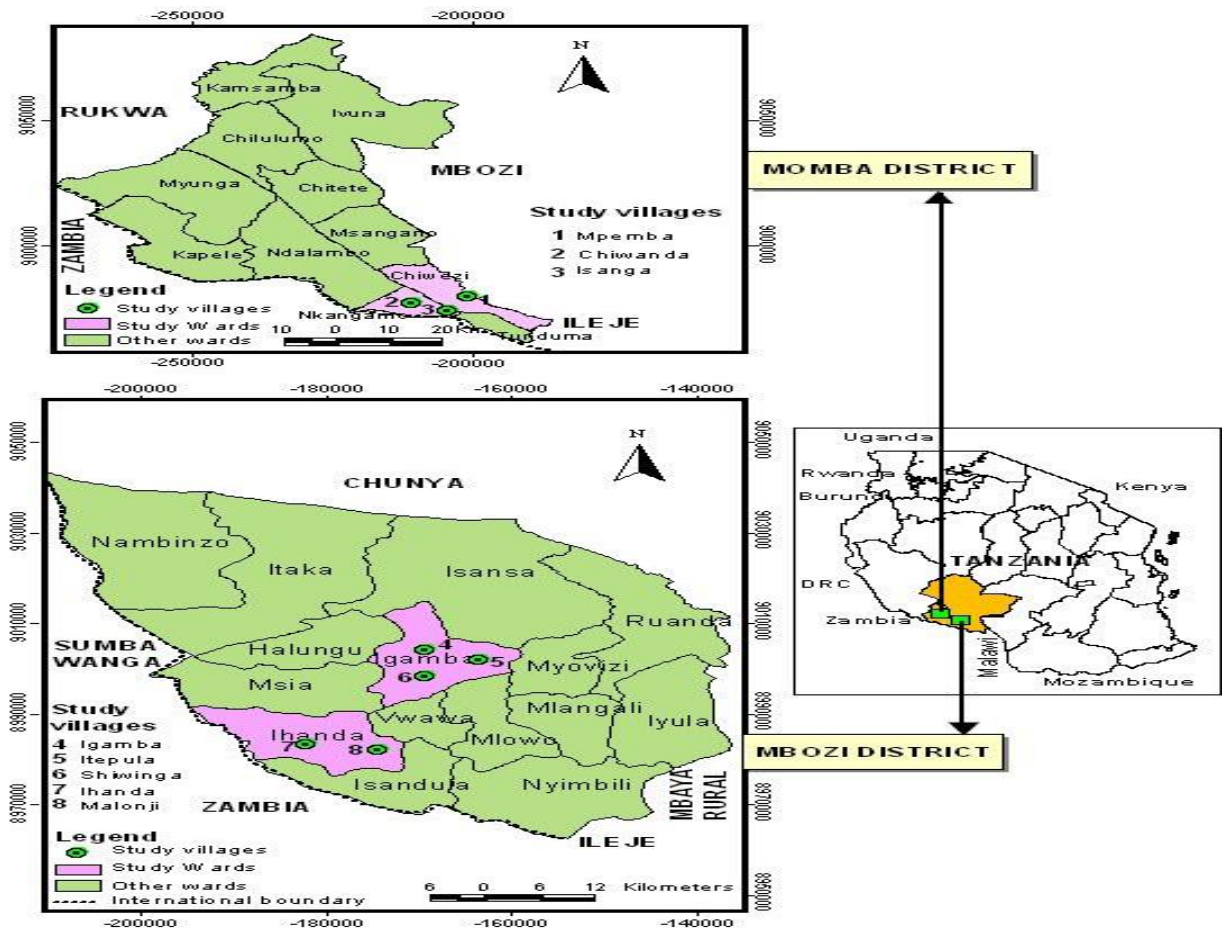


Figure 1: Map showing study wards and villages in Mbozi and Momba districts in Tanzania.

## **2.2 Design and Sampling procedures**

A cross sectional design was employed in the collection of data from a sample of 400 farmers in the two districts at one point in time. A two-stage stratified sampling procedure was used in the selection of wards and villages which were involved in this study. In this regard, wards in the study area were stratified based on the distance to the district markets the farmer's homestead is and this created homogeneity among the selected wards. Thus in the first stage, wards from the available list at the districts offices and with the help of the Agricultural officers were stratified into two strata. The first stratum comprised wards that were close to the district markets; Mlowo and Tunduma maize markets for Mbozi and Momba respectively. The second stratum comprised wards which were located far away from the two district markets. Thus, one ward from each stratum was randomly selected in every district making a total of four wards (two wards from each district). In this respect, Ihanda and Chiwenzi wards were selected in the first stratum as they were located closer to their respective district markets (about 5km and 4km from Vwawa and Tuduma for Ihanda and Chiwenzi wards respectively). In the second stratum, Igamba and Nkangamo wards were selected because of being located far from the district markets. The selection of wards was also based on maize production potential and the existence of NTBs which were the target of this study. Wards with no NTBs during the period of study were not included in the study.

In the second stage, eight villages from the selected four wards in Mbozi and Momba Districts were randomly selected using a systematic sampling technique. The selected eight villages included; Igamba, Itepula, Shiwinga, Ihanda and Malonji in Mbozi District and Mpemba, Chiwanda and Isanga in Momba District. The number of villages selected was determined by the proportion of the population size to the total population in the four selected wards from the two districts. The population for Igamba and Ihanda wards in Mbozi District was 36 230 people (60%) and 25 297 people (40%) for Chiwenzi and Nkangamo wards in Momba District. Therefore, using these population distribution, a proportion of 60% villages (about 5 villages) were sampled from Mbozi District and 40% villages (equivalent to 3 villages) were randomly selected from Momba District. Thus from each village, the sampled householder farmers were proportionally selected using the Kothari (2009) formula from the total number of households

and interviewed. This makes a sample size of 400 smallholder famers in total which were involved in this study.

### 2.3 Data collection methods and Analysis

Data on NTBs costs, quantity of maize produced, and distance to markets, market prices received by famers in Mbozi and Momba districts were collected through structured and semi- structured questionnaires. Also, Focus Group Discussion was conducted at the village and individual interview at the district level with key informants–Village officers, transporters, district officers, custom officials and extension officers to supplement information collected from questionnaire. Collected data were coded and analyzed in STATA computer software version 13. The Multiple regression models using an Ordinary Least Square regression (OLS) technique was used in the estimation of the effect of NTBs on price received by farmers in the two districts. However, to capture the spatial effects of NTBs, the distance from the selected villages to Tunduma maize market in Momba district was used as a reference point. This is because most of the maize from the two districts are sold and across the borders to the neighbouring countries (Zambia, DRC and Malawi) through this market.

The multiple regressions model showing the relationship between dependent (farm gate price) and independent variables was presented under the following OLS equation:

$$\ln P_t = \beta_0 + \beta_1 \ln P_i + \beta_2 \ln IP_i + \gamma \ln Db_i + \rho \ln R_i + \eta \ln S_{it} + \varepsilon_i \dots\dots\dots (1)$$

Whereby;

$P_t$  = Maize price at the farm gate level (TZS/kg)

$P_i$  = Market price of maize at the urban market (TZS/Kg)

$IP$  = represent international prices at period t (TZS/kg)

$S = is$  the seasonal dummy variable measuring the effects of season variation on the local prices (Harvest season =1, lean season= 0).

$Db_i = is$  the variable that measures the distance between rural market and border markets at Tunduma,

$R_i = NTBs$  costs as attributed by road blocks, weighbridges, council permit and custom procedures (TZS/kg).

$\varepsilon$  = Error term

$\beta$ ,  $\gamma$ ,  $\eta$  and  $\rho$  = coefficients parameters to be estimated from the model.

However, the coefficient  $\rho$  in equation (50) will measure the effects of NTBs imposed on average price level between two markets in Mbozi and Momba districts.

### **3.0 RESULTS AND DISCUSSION**

#### **3.1 The Effect of NTBs on Farm-gate Price received by Smallholder farmers in Mbozi and Momba districts**

To determine the spatial effect of NTBs on the price received by small holder farmers in the two districts, the distance from the village to Tunduma maize market was used as a reference point. This is because Tunduma market is located along the border of Tanzania and Zambia through which maize from the two districts is sold and sometimes transported across the border to Zambia, Malawi, and the DRC. The regression results as presented in Table 1 indicate that, NTBs had a negative influence on the price received by farmers in both districts. Furthermore, the effects of NTBs on the price were higher in Mbozi District than were in Momba District. The coefficients of NTBs show that farm gate prices could decrease by 7% in Mbozi District with a unit increase in NTBs cost while in Momba District the prices only decreased by 5 percent. In other words, the prices of maize in Mbozi District were lower than those in Momba District by 2.2 percent whereby the differences represents the NTBs costs. The possible explanation for such differences is the spatiality whereby most of the villages which were involved in this study from Mbozi District were located far from Tunduma border as opposed to the villages in Momba District. For example, Itepula and Shiwinga villages in Mbozi are located about 60 km away from Tunduma maize market. This distance forces traders to pass across five (5) road blocks and one weighbridge at Mpemba village, when transporting maize to Tunduma market in Momba District. These barriers are reported by traders to be time consuming and therefore traders are attempted to pay bribes to officials in order to reduce the time wastage at the barrier (Gabagambi, 2013; Ismail, 2014).

**Table 1: The effects of NTBs on farm-gate price received by smallholder farmers in Mbozi and Momba districts**

Variable	Mbozi District			Momba District		
	Coefficient	Std error	t -Value	Coefficient	Std Error	t -Value
Constant	-10.095**	2.983	-3.384	5.073***	1.256	4.038
International price (TZS/Kg)	0.236**	0.051	2.304	0.408***	0.103	10.012
Price at the urban market (TZS/Kg)	2.277***	0.513	4.434	0.150	0.183	0.818
Seasonality Dummy (1= Harvest season, 0 = Lean season).	-0.143**	0.048	-2.996	-0.172***	0.026	6.660
NTBs costs (TZS/Kg)	-0.067*	0.020	-2.292	-0.045**	0.020	-3.389
Distance from village to border market (Km)	-0.222***	0.027	-8.198	-0.140***	0.014	-9.743

Dependent variable: Farm -gate price received by farmers (TZS/Kg), International price was taken at FOB for period 2010 – 2013. Exchange rate averaged at 1\$= 1578 TZS. \*\*\*, \*\* and \* denote significant level at 1%, 5% and 10% respectively.

These findings are in line with those reported by the World Bank (2012) and Minot (2014) who found that in Africa smallholder farmers who sell surplus harvests to the nearby markets typically receive less than 20% of the consumer prices of their produce, with the rest being eaten up by transaction costs related to NTBs and post-harvest losses. This implies further that rural farmers in Tanzania, who in most cases are located along poor road networks, are likely to continue receiving the lowest prices as opposed to their counterpart traders. These observations are consistent with findings reported by FAO (2013) who revealed that maize farmers from the rural areas in the Southern Highlands of Tanzania received the lowest producer prices in the year 2011 and 2012 as opposed to those in the Northern parts. The lowest prices in the Southern Highlands of Tanzania could be attributed to poor road networks leading to high transaction costs, which traders deduct on the farm-gate price.



In addition, the differences in the NTBs effects between the two districts can also be attributed to the existence of informal cross border trade which facilitates the movement of maize from Momba District to the neighbouring countries such as Zambia, Malawi, and the DRC. For example, during the interview with KIs, it was found that the quantities of maize which is informally traded from Tanzania to Zambia through Tunduma border increased from 2 449 MT in 2009 to 3 730MT in year 2010 because of the export ban on maize trade in 2008 (KI, 2011, FEWS NET, 2012). These informal transactions had adverse effects on the introduced NTBs such as export bans, road blocks, and custom procedures to both traders and farmers who are located closer to the border posts (Minot, 2010; FAO, 2013).

On the other hand, the distance from the villages to Tunduma market had shown a depressive effects on the farm gate prices and was significant at one percent ( $P = 0.000$ ). This implies that the prices received by farmers will decrease with an increase in the distance to the market. The findings indicate further that the prices received by famers in Mbozi District will be less as opposed to those received by farmers in Momba District which is closer to the market. This was also reflected by the differences in the size of distance coefficients for the two districts. The maize prices in Mbozi District fell by 22% for a unit increase in distance kilometre while that in Momba District fell by 14 percent (Table 1). This is because farmers in Momba District were closer to the market and therefore they could access the markets at lower transport and transaction costs resulting from the imposed NTBs.

These findings are in line with those reported by World Bank (2009) and Moctar *et al.* (2015) who revealed that transaction costs generally increase with an increase of the distance making the arbitrage (trade between markets) more costly. Also, the findings concur with those reported by Omiti *et al.* (2009) who found that the households that were located in the urban centres received higher prices and sold more produce than those who were in the rural areas because the former could access markets at lower transportation and transaction costs than the latter. This situation was also revealed by the higher average farm-gate price of TZS 360/Kg for Ihanda and Mpemba villages which were located closer to the border market and the lowest price in Shiwinga village (about 60km to Tunduma market) which had an average of TZS 250/kg in year 2014. Therefore, farmers at Shiwinga village in Mbozi District earned less income from maize

sales as compared to those in Mpemba and Chiwanda villages in Momba District due to incurring of more NTBs costs in terms of roadblocks, council permits, and weighbridges.

Moreover, maize producer prices in Mbozi District were responding more to change in the prices in the urban markets such as Mlowo and Tunduma centres as opposed to maize producer prices in Momba District. The coefficient of maize prices in the urban market of Mbozi District was 2.28 and significant at one percent (1%) implying that the prices received by farmers could increase by 23% for every 10 unit increase on the price in the urban market (Table 1). These findings concur with those reported by Mkenda and Van Campenhout (2011) and Moctar *et al.* (2015) who found a positive relationship between prices in the rural and urban markets in Tanzania. In contrast to this, urban maize prices were found to be insignificantly related to producer prices in Momba District. This could be explained by the reality that Momba District is closer to the border market in Tunduma town centre leading to small margins in price variation. The producer prices were also found to increase with changes in the international price (valued at f.o.b) in the two districts whereby a unit increases in the international price could lead to an increase of 40% in the maize prices in Momba District. Conversely, the effects of international price change could not be truly realized by the majority of smallholder farmers in the rural areas because of weak market integration between production areas and the central markets in the urban areas. These findings concur with those reported by Kilima *et al.* (2008), World Bank (2009), and FAO (2013) who found that maize markets in Tanzania, especially at the farmers' level, are weakly integrated with consumer markets and international prices. This reduces the price transmission effect from urban to rural markets where farmers sell their produce.

#### **4. CONCLUSION AND RECOMMENDATIONS**

Based on the study findings, it can be concluded that, price received by smallholder farmers in the two districts was found to decrease with an increase in the cost of NTBs and distance to the urban markets where prices were lower in Mbozi District than was the case with those in Momba District. Moreover, maize producer prices in Mbozi District were responding more to change in the prices in the urban markets such as Mlowo and Tunduma centres as opposed to maize producer prices in Momba District. Therefore, the study recommends the implementation of policies that emphasize the reduction of transaction costs as attributed to NTBs and long distance

to the markets should be enhanced. This could be done through the establishment of Time-Bound programme which will involve both private and public sectors for eliminating or reducing the number of unnecessary NTBs on food crop trade such as weighbridges, road blocks, and council permits at the district and region levels.

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