Estimating NTBs costs of Maize Production and Marketing for Smallholder Farmers in Tanzania: A Case of Mbozi and Momba Districts in Mbeya region

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This paper estimated Non-Tariff Barriers (NTBs) costs of maize production and marketing of smallholder farmers in Mbozi and Momba districts of Mbeya region in Tanzania. A cross sectional design survey was used in collecting data from farmers in the two districts using structured questionnaires. Stratified and simple random sampling procedures were used in selecting a total of 120 smallholder farmers. Descriptive measures were used in summarizing the NTBs costs incurred by farmers. Results indicated that, estimated NTBs costs of farmers in Mbozi district were higher when compared to those in Momba district. It also observed that, farmers in Mbozi district paid a total of Tzs.73/Kg as NTBs costs to reach the Tunduma maize market while farmers in Momba district paid Tzs.48/Kg to reach the same maize market. The difference was explained by spatiality being that Momba district is closer to Tunduma market. Based on these results, it can be concluded that, effects of NTBs costs were higher for farmers of Mbozi district than those of Momba district. It recommended that, protective food policy such as weighing bridges and road blocks should be reduced in order to maintain reasonable high prices in rural and low prices in urban deficit areas.

Key words: NTBs Costs, Maize smallholder farmers, Mbozi and Momba districts, Tanzania

INTRODUCTION

In the last few decades, maize has emerged as a crucial staple crop to guarantee food security in Sub-Saharan Africa countries (SSA) (Friedrich and Kassam, 2016). In most of these countries, maize is produced mostly by smallholder farmers for self-consumption and partly to be sold on the domestic markets (IFPRI, 2013; FAO, 2015; Friedrich and Kassam, 2016). However, the maize production sector in these countries exhibits a very low productivity and even with improved seeds; with the average yield of about 1.1 ton per hectare (Jayne et al., 2010; Minot, 2014). Similar to other SSA, maize production estimates in Tanzania has been varying significant from year to year depending on the weather condition prevailing on those periods (NBS, 2008; FAO, 2013). For example, maize production has shown fluctuation trends of positive and negative growth rate for the period ranging from 2005 to 2014 as shown in Fig 1. Generally, maize production in Tanzania has been averaged at 4.1 million metric tons over the period ranging from 2005 to 2014 (Minot, 2010; Indeximundi, 2015). The negative growth rate experienced in maize production in the respective years can be linked to the implemented NTBs policies and strategies by the government in that year. For example in year 2008 and 2011 the government of Tanzania banned exports of maize to neighboring countries viz. (Kenya, Zambia, DRC and Malawi) as food security strategies. This situation discouraged farmers especially in the major producing regions viz. (Mbeya, Iringa, Ruvuma, Rukwa and Katavi) to allocate more productive resources on maize production in the year 2009, making maize production to be less than the previous year of 2008 (Fig 1).

Although maize is produced by farmers from all over the country in Tanzania, about 40% of national production
comes only from few regions in the Southern Highlands namely Mbeya, Songwe, Iringa, Njombe, Ruvuma and Rukwa followed with Arusha and Manyara from the Northern Highlands (Match Makers Associates, 2010; Mkenda and Van Campenhout, 2011; FAO, 2012). Of the total produced maize outputs, only 30% of maize surpluses from these regions are reported to reach markets both at the region level and main consumer markets in big cities like Dares Salaam and Arusha (Rasmussen, 2009; Minot, 2010; FAO, 2013). The low percentage of maize supplied by farmers can also be associated with high transaction costs been attributed to NTBs which limits farmers to access markets in the urban centers where they could secure high prices (World Bank, 2009; Gilson and Charalambides, 2011; Moctar et al., 2015).

Moreover, maize farmers are also uncertain on the extent of their markets because the Tanzania government has a history of instituting export bans arbitrary on maize trade depending on the maize harvest and expected level of prices to protect consumers (World Bank, 2012). This policy in most cases has led to negative impacts on maize producers in the sense that, they cannot even export maize grain to take advantages of high world prices and different market opportunities created by different economic integrations such as East Africa Community (EAC) and Southern Africa Development Community (SADC) (KI, 2011; Minot, 2013; Msumba and Costa, 2015). Findings by Gabagambi (2013) and Gilson and Charalambides (2011) indicated that maize from Tanzania was highly demanded in Kenya, Democratic Republic of Congo (DRC), South Sudan and Somalia where consumer prices were reported to be almost twice as much as local market prices. Therefore, the arbitrary imposition of NTBs on staple crops like maize by the government, would limit market access of poor rural farmers to only village and nearby town centers markets.

In addition, high transaction costs are also linked with small households’ difficulty to access inputs and good markets for their produce (Makhura et al., 2001; Bwalya et al., 2013). These transaction costs on the other hand, could reduce the space over which food crops are marketed and thus affecting household decisions such as production diversification, consumption preferences and investment (Minot, 2010; Mkenda and Van Campenhout, 2011). Similarly, Mbise et al. (2010) supported the argument by claiming that, the size of transaction costs related to NTBs could also affect the decision of farmers on how much quantity to supply to the market. This was revealed in the study of Bwalya et al. (2013) who found that, in developing countries including Tanzania, small holder farmers only contribute 20% to 30% of marketable surplus. The low rate of supply and market participation can be explained by high transaction costs faced by smallholder farmers in accessing adequate and timely markets as well as fair prices. In addition, market participation for maize smallholder farmers in Tanzania was highly influenced by multiple factors related to production as well as market transaction costs (Mbise et al. 2010; Sitko et al., 2014). Such market transaction costs, apart from transport costs, may include NTBs such as costs that are derived from road blocks, weighing bridges, bribery, local government permits, custom procedures and other factors. These costs are difficult to measure and quantify; but they are measured indirectly from the action of market actors (Trader and farmers). Thus, their presence along maize supply chain often leads to farmers being exploited by middlemen or brokers as all the costs involved in moving maize to market are shifted to farmers as compensation. This situation discourages farmers’ involvement in maize production and marketing (FAO, 2012; Haug and Hella, 2013; Baffes et al., 2015).

Moreover, high transfer costs may result in lower prices received by a selling household and higher prices paid by a buying household (Key et al., 2000; Karfakis and Rapsomanikis, 2008). Furthermore, Key et al. (2000) have alluded that high transaction costs is one of the key reasons for smallholder farmers’ failure to participate in markets and supply the right quantity of produce. This
often leads to exploitation of farmers by middlemen or brokers who discourage farmers’ involvement in maize production and marketing (Rasmussen, 2009; Minot, 2010; FAO, 2012). Therefore, in order to link rural food surplus production zones such as Mbozi and Momba districts to major deficit urban areas and consumer markets, a well-functioning domestic market is necessary. This could only be possible if obstacles and costs created by NTBs are clearly determined and understood by both policy makers and government. This situation need a scientific enquires of knowledge on the actual costs of NTBs both on production and marketing as incurred by farmers. It was against this background, that this study was intended to estimate the actual costs of NTBs on production and marketing of maize in Mbozi and Momba districts. This outcome would contribute to the body of knowledge on the existing literatures of NTB.

MATERIAL AND METHODS

Study area and sampling procedures

The study was conducted in the Southern Highlands Zone of Tanzania covering two major surplus maize producing districts, namely Mbozi and Momba in Mbeya region. Mbozi and Momba districts were selected based on their agricultural potential of being surplus-producing areas for maize in Mbeya region. The two districts also depends more on external markets (Malawi, Democratic Republic Congo (DRC) and Zambia) for their surplus maize (Minot, 2010) and are also situated far from major domestic markets such as Dares Salaam and Arusha. In this regard, Tunduma international maize market at the border of Tanzania and Zambia in Momba district was used as the reference in estimating the costs of NTBs on maize production between rural and urban markets.

A cross sectional design survey was employed in data collection and the two-stage stratified sampling was used in the selection of the sample size. In the first stage, wards from the available list at the districts office were stratified into two strata, first stratum was for wards close to the district markets and the second for those located far from the district markets. Then, four wards were randomly selected, two from each district namely Igamba, Ihanda in Mbozi district and Nkangamo and Chiwenzi from Momba district. In the second stage, two villages from each ward were randomly selected making a total of 8 villages. A total of 120 small householder farmers were randomly selected from the eight villages and interviewed. The collected data were analyzed using descriptive statistical measures.

Measuring of NTBs Costs

According to Karfakis and Rapsomanikis (2008) transaction costs have a large unobservable component which includes costs related to NTBs. Therefore, their measurement can only be indirectly revealed from the behavior of potential agents (farmer or trader) in these markets. Basing on this argument at the first instance, market transaction costs of maize per ton were estimated by summing up all costs incurred by farmers or traders in transporting their maize merchandise from the point of origin to the final destination (market). These costs were further split into two groups: non-NTB transaction costs (costs that are not NTB related such as vehicle hire and maintenance, loading and offloading, and transporters’ allowances) and NTB transaction costs such as cost derived from weighbridges, road blocks, customs clearance, Council/ Municipal permits, police check point paid as corruption. Because the focus of this study was on estimating the actual cost of NTBs incurred by maize farmers, then the estimation of NTBs cost was done by adding all costs incurred by farmers in term of money and
time wasted at various NTBs. However, amount of money paid by traders or farmers for accommodation and meals in a day were used as proxy for time wasted at the weighing bridges, road blocks and custom points.

Amount of money paid to overcome road blocks and police check point barriers as corruption (in mean value) were also added to get the sum of cost incurred by a trader or farmer at such NTBs. However, most of empirical finding from previous studies (World Bank, 2009; Karugia et al., 2009; Mkenda and Van Campenhout, 2011; Minot, 2014) ascertain that, traders in most cases are more informed about NTBs costs than their counterpart smallholder farmers in rural areas. Therefore, information on NTBs costs used in this study to large extent were taken from traders, this is because costs of NTBs are felt first by traders and then transferred to farmers in term of lower prices (KI, 2011; Gabagambi, 2013; Moctar et al., 2015). Moreover, to take note on the spatial effects of NTBs, the distance from village markets to Tunduma maize market was used in measuring the NTBs costs incurred by farmers in Mbozi and Momba districts. This is because Tunduma is located at the border of Tanzania and Zambia through which maize from the two districts also cross the border to Zambia, Malawi and Democratic Republic of Congo (DRC).

### RESULTS AND DISCUSSION

**Estimated NTBs Costs for Smallholder Farmers in Mbozi and Momba Districts**

Results as presented in Table 1 indicate that, farmers in the two districts experienced similar types of NTBs costs in production and when accessing maize market at Tunduma border and Mlowo centre. However, the size of NTBs costs were higher for farmers in Mbozi district as compared to those in Momba district whereby a farmer in Mbozi district has to pay a total of TZS. 73 per kilogram of maize to reach the maize market at Tunduma town. While in Momba district farmers pay only TZS.48 per kilogram to reach the market (Table 1). It was also found that, farmers in the two districts paid the highest NTBs costs when clearing weighing bridges obstacles which were amounted to TZS.26. 30 and 17.60 per kilogram for Mbozi and Momba districts respectively (Table 1). The higher value of NTBs costs in Mbozi district can be attributed to poor rural roads and more NTBs created by long distance to reach the Tunduma market (about 60 km) which in turn translate into high transfer costs. This requires farmers or traders who transporting maize from Itepula or Shiwinga villages in Mbozi district to Tunduma market to pass through five road blocks. These road blocks will include Igamba, Mlowo, Vwawa, Ihanda, Mpemba road blocks and one weighing bridge at Mpemba village. While a farmer or trader from Isanga village in Momba district has to pass only two road blocks namely Nkangamo and Tunduma and one weighing bridges at Nkangamo village. These findings concur with those of Karugia et al. (2009); KI (2011) and Gabagambi (2013) who found similar results in Tanzania, Kenya and Uganda for maize farmers.

Moreover, among the costs incurred by farmers in clearing NTBs obstacles, more money were paid at weighing bridges, police check points, custom and road blocks for both two districts. This is because weighing bridges, police check points, custom and road blocks were reported to be time consuming and staffed by unfriendly police officers or council officers whereby transporters or traders were bribed them in order to pass the barrier easily (Coulson, 2010; Porteous, 2012; Haug and Hella, 2013). These findings are in line with those of Karugia et al. (2009) and KI (2011) who found that, money paid by maize traders and transporters as corruption were high at weighing bridges and police check points in Tanzania and Kenya. According to Karugia et al. (2009), the percentages of money paid by traders and transporters at weighing bridges in Tanzania and Kenya were estimated at 0.97 and 2.41% respectively. These results further imply that, farmers especially in the rural areas will continue to get the lowest prices from traders if no extra efforts would be made by the government on reducing or removal these obstacles created by various NTBs on the staple food trade like maize. This is because most of smallholder farmers in rural areas in Developing countries like Tanzania are said to be price takers and therefore compensates traders from the transaction costs related to NTBs already incurred by traders (KI, 2011; FAO, 2013; Minot, 2014). Also, the findings coincident with those of Magrinia et al. (2014) in Africa that the effects of NTBs various with the size and distance of the country from the importing country.

**Prices Received by Maize Farmers With and Without NTBs in Mbozi and Momba Districts**

Table 2 presents the actual prices that farmers could receive in the absence of NTBs in the two districts. Findings indicated that, farmers in the two districts could receive higher prices if the government will not impose NTBs on maize trade. This is because the lower prices with NTBs cost received by smallholder farmers in the two

### Table 1: Estimated Costs of various NTBs as Experienced by Maize Farmers in Mbozi and Momba Districts (in TZS/Kg)

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Distance (Km)</th>
<th>Road block</th>
<th>Weigh bridge</th>
<th>Customer</th>
<th>Police</th>
<th>Council permit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itepula village in Mbozi district</td>
<td>Tunduma</td>
<td>60</td>
<td>10.38</td>
<td>26.30</td>
<td>12.71</td>
<td>18.56</td>
<td>5.00</td>
<td>72.90</td>
</tr>
<tr>
<td>Isanga village in Momba district</td>
<td>Tunduma</td>
<td>40</td>
<td>6.95</td>
<td>17.60</td>
<td>8.52</td>
<td>12.44</td>
<td>3.35</td>
<td>48.84</td>
</tr>
</tbody>
</table>

Source: Author calculation from Field data, 2016; the exchange rate of USD/ TZS = 2,110.46

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detracted to the higher transaction costs as attributed by NTBs faced by traders in moving maize to urban markets. Moreover, the higher price without NTBs can also be explained by the tendency of traders to shift the extra NTBs costs incurred in moving maize from the village to district markets to farmers in term of lower prices. These arguments support findings by KI (2011) and Gabagambi (2013) in their studies in Tanzania on trade barriers to smallholder farmer that, the incidences of trade barriers like NTBs falls on farmers’ shoulder and not on final consumers as assumed to be by the policy. Thus, an increase in the application of NTBs strategies will imply more reduction in farmers’ income through the lowered farm-gate prices and hence the poverty differences between rural and urban areas will continue to expand.

More interesting, it was found that, the differences in price without NTBs between the two districts becomes very small (about TZS. 07 per Kg) compared to that with NTBs (about TZS.30 per kg). This implies that, the spatial price differences to some extent were created by the imposed NTBs in the two districts (Table 2). These findings were in line with those of World Bank (2009) and Minot (2014) that, price difference between two spatial markets under market failure is created by transaction costs related to NTBs policies and strategies. Also, the findings are consistence to the transaction theory as explained by Law of One Price (LOP) that, the differences in prices between two markets under the market failure are explained by the size of transaction costs involve in moving a product between them.

Results as presented in Table 2 further indicated that, the contribution of NTBs costs on producer prices were very low (only 4%) between district and main consumer markets i.e. Tunduma and Dar es Salaam consumer markets. While that of rural to district markets (Itepula and Isanga to Tunduma market) was 25% and 17% in Mbozi and Momba districts respectively. This can be explained by the facts that, Tunduma and Dar es Salaam markets are well integrated and connected with a good road networks which allow changes in price and information to be transmitted quickly between the two markets. These findings concur with those of FAO (2013) in Tanzania that, price margins between Dares Salaam and Arusha were lower in the period of export ban in year 2011 because the two markets were connected with a well road networks and more integrated.

Moreover, the low prices for smallholder farmers in the rural areas denotes the higher transaction costs as attributed by NTBs and poor roads faced by traders in moving maize to urban markets. This is because traders in most cases has to ensure that the extra costs incurred in transporting maize from village markets to district markets are shifted to farmers in forms of lower prices(Gabagambi, 2013; Minot, 2014). Furthermore, these findings also coincide with those of Karugia et al. (2009) and Porteous (2012) on the effects of NTBs on maize trade in East African Countries (EAC). Their findings indicated that, the cost of NTBs applied on maize imported into Tanzania were about TZS 187 per ton per kilometer.

### CONCLUSIONS AND POLICY IMPLICATION

This study estimated the costs of NTBs on maize production and marketing among smallholder farmers in Mbozi and Momba districts of Mbeya in Tanzania. Findings from this study indicated that, the size of NTBs costs experienced by farmers differed between farmers in the two districts. Costs of NTBs were higher for farmers in Mbozi district as compared to those in Momba district. These findings carry a policy implication that, implementation of NTBs strategies by governments would harm more farmers in the rural areas than those who live close to the urban markets. Therefore, in order to encourage farmers to allocate more resource on maize production and access markets especially in surplus areas, the study recommend removal of destructive NTBs strategies such as weighing bridges, road blocks and police check points in the study area. This will help the government to achieve its goals of creating high prices in surplus districts and low consumer prices in deficit urban centers. Additionally, improvement of physical infrastructures such as rural feeder roads and highway which links smallholder farmers with major markets could reduce much of the transaction costs attributed to NTBs. This could contribute much to government efforts of reducing food insecurity and poverty among rural populations.

### REFERENCES


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