Utilization of School Libraries by Students in Selected Schools in Dar Es Salaam, Tanzania

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ABSTRACT

The study investigated the utilization of school libraries by Students in selected schools in Dar es Salaam, Tanzania. Data were collected from 147 respondents using questionnaire, interview, and covert observation. Qualitative data were subjected to content analysis while quantitative data were analysed using statistical package for social sciences (SPSS) version 18.0 computer software programme. Findings revealed that students from both private and government schools rarely used the school libraries. However, the majority (25%) of private school students use libraries everyday while only 1 percent of the students from government owned schools use library every day. Moreover, the study revealed that books and newspapers are the main available resources for school library information in the school libraries. Furthermore, the study findings revealed that self-reading, doing assignments, reading notes, and borrowing books are the main activities conducted by students in school libraries. The study concludes that students' utilization of school libraries is low in government schools as compared to private schools. The study concludes further that books and newspapers are the main information resources found in the selected schools libraries while the main students' activities in school libraries are self-reading, doing assignment, reading notes, and borrowing books. The study recommend that head teachers in both private and government schools should lobby top management from the Ministry of Education Science and Technology to consistently allocate adequate funding for building school libraries and library collections, training school librarians and conducting information literacy training programmes for both students and teachers.

Key words: *Libraries, School libraries, Information resources, Library utilization, Students' activities*

1. INTRODUCTION

Students need information, which is relevant, current, and timely for them to excel in academic issues and school libraries are available to support this mission (Mahwasane, 2017). A good library is first judged by the quality, currency, relevance, and size of its collection. Collection development requires adequate funding and innovative planning in order to be sustained. Trained staff, coherent, effective, and active library policy is also important. Secondary School students need to use library information resources effectively in order to understand and widen their knowledge. On the relationship between the curriculum and the school library Khanyisiwe (2007) reveals that, secondary school libraries should meet the needs of the curriculum in that, library information resources should relate to the curriculum of a particular institution. On the role of libraries in students' performance in Columbia, Laitsch (2003) reveals a need for library specialists to support both students and teachers in the effective use of the library in the teaching and learning process. Library specialists need the teacher's and the principal's support in order to be effective. Library specialists serve as both teachers to students and in-service providers to teachers.

However, in Tanzania most of the School libraries are faced with a number of problems that make students more dependent (Mubofu and Malekani, 2019). For example, Newton Tanzania Collaborative (2011) visited different schools in Tanzania and discovered different problems including lack of library materials. Furthermore, Hossain (2019) identified lack of information materials and inadequate funding as the problems faced by school libraries.

Additionally, Mubofu and Malekani (2019) identified lack of reading habit by students and teachers, lack of resources, inadequacy of space, lack of maintenance in the libraries, and lack of trained school librarians as part of the problems facing school libraries in Tanzania. Others include lack of funds, lack of interest by Head of Schools, and lack of interest by the Tanzanian Government Officials. In some of the schools in Tanzania, Government Secondary Schools and in particular Ward Secondary Schools school libraries are almost non-existent. As a result, most secondary school students proceed to universities and colleges without being able to make effective use of this important resource. From these findings, the study discovered that the usability of libraries by students and teachers in secondary school libraries was poor. It is however, important to note that for any library to

provide good information services to clients, the government should ensure that libraries have sufficient stocks of books that reflect the curriculum being taught at the school. There should also be well-trained teacher librarians to run the school libraries. Contemporary scholars (i.e. Babayi, Abubakar, and Mohammed, 2019; CLN and Usman. 2019) noted that school libraries are valuable in literacy work from the earliest stage because it nurtures good reading habits of children awhile still at young age and also helps pupils to increase their knowledge and improve their speaking, writing, argumentation, and critical thinking skills.

Despite the great potential of school libraries in students' performance, the usage of school libraries is still low (Mahwasane, 2017, Phillips and Recker, 2018; Shonhe, 2019; Tofi and Agipu, 2019; Babayi, Abubakar, and Mohammed, 2019; and Mubofu and Malekani, 2019). The study investigated the school library utilization by students' in selected secondary schools in Dar es Salaam, Tanzania.

2. METHODOLOGY

This study surveyed both private and government Secondary Schools in Dar es Salaam Region. The study involved three Secondary Schools in Temeke, Kinondoni, and Ilala Districts, therefore, amounting to nine (9) secondary schools. The three districts were selected because of the availability of a large number of both private and government secondary schools. The study used both qualitative and quantitative research approaches. The method was appropriate to the study because it helped the researchers to get in-depth information from respondents. It also helped to get the real and natural data from the study area. A hundred and forty seven (147) respondents participated in this study. Out of these, 18 were teachers, 9 were Library staff, and 120 were students. Teachers and students were selected because they were directly involved in using library information resources while library staff were involved in providing the information services. Both probability and non-probability sampling techniques were used in selecting the respondents. Simple random sampling was applied to select students' respondents while purposive sampling techniques was used to select the library staff. On the other hand, teachers were conveniently selected for inclusion in this study.

Data were collected using a combination of methods in order to improve validity and reliability. Therefore, a structured standardised self-administered questionnaire with both closed and open-ended questions was administered to respondents.

Interviews and overt observation were included in data collection. Questionnaires were administered to students while interviews were conducted to library staff and Teachers in selected schools in Temeke, Ilala, and Kinondoni Districts in Dar es Salaam. The collected data were organised, coded, analysed and presented qualitatively and quantitatively. Quantitative data were analysed using a statistical package for social sciences (SPSS) version 18.0 computer software programme while qualitative data were subjected to content analysis.

3. RESULTS AND DISCUSSION

Frequency of library usage by students in secondary schools

The study wanted to find out how often students use the library for different class activities. This is because a library is part of the school's knowledge resource and its use is very necessary in the teaching and learning process. The findings revealed that, 10 (25%) students in private schools used the library every day, 6 (15%), used the library once per week, 5 (12%) used it twice a week, and 4 (10%) used it three times a week. Furthermore, 15 (38%) students used the library rarely and no respondent failed to use the library at all. With regard to government schools the findings revealed that, 1 (1%) students used the library everyday, 5 (6%) use the library once per week, 2 (3%) used the library twice a week, while 3 (4%) used the library three times a week. About 52 (65%) students used the library rarely and 17 (21%) did not use the library at all

Therefore, it is evident that, students in both private and government owned schools rarely use the school library. Sixty five (65%) of the students rarely use school libraries in government schools while only 38% use school libraries in private schools. This is an indication that the habit of using the library regularly is not well nurtured among the pupils. Moreover, the study findings indicate that the majority of the students especially in government schools do not use the library. A study by Babayi, Abubakar, and Mohammed (2019) on the state of school libraries in Adamawa State in Nigeria established that school libraries aim at ensuring that the school community including teachers and students have access to information resources for academic use. This goal can only be attained if teachers and students make effective use of the libraries (Babayi, Abubakar and Mohammed, *op. cit.*).

Information resources available in school libraries

Any library should be equipped with different types of reading information resources that meet students and teachers' academic needs. Students through questionnaires were required to mention different information resources found in their school libraries. The findings revealed that 120 (100%) of the students cited books, 77 (64.1%) of the students cited journals, 96 (80%) cited computer and Internet, 97 (80.8%) cited Newspapers, and 49 (40.8%) of the students cited magazines. The findings reveal further that students were familiar with different materials, which were available in the library. In addition, they understood that computer and Internet services were part of secondary school library information resources. Newspapers were mentioned by 97 (80.8%) students. This reveals that they were aware of the current information, which was supposed to be in the libraries every day. The study revealed that six (6) of the surveyed secondary school libraries had no current newspapers. Newspapers were received once a week. There were also no computers in all the government surveyed school libraries while in private secondary schools there were few computers. However, the libraries were not automated.

Although books are 100 percent available in the surveyed libraries, this does not guarantee their access and use because the books were not used by teachers in preparing their teaching notes. There were also ill equipped library staff in those libraries (Babayi, Abubakar, and Mohammed, 2019). The main objective of any library regardless of its type is to acquire, process, and disseminate relevant information resources such as books, journals, and newspapers to the intended targets. However, school libraries had library staff with low ability of providing proper information services to clients (Babayi, Abubakar, and Mohammed, 2019). This implies that the government and private school owners should work together to ensure that library staff in the schools are employed through the Tanzania public service recruitment agency in order to get t competent employees who would help their libraries to provide the right services, to the right customers, and at the right time.

Activities conducted by students in school libraries

Students were asked to mention different activities, which they conducted in the library. The findings revealed that, 90 (75%) of the students respondents cited 'self-reading,' 41(34.2%) cited reading notes,' and 58 (48.3%) cited doing assignments. Others were 41 (34.2%) who cited borrowing books, 32 (26.7%) cited writing

notes, 7 (5.8%) cited doing discussion and 40 (33.3%) cited reading news**.** The findings show that majority 75% of students used the school library as a self-reading room. This is probably because a library provides a suitable environment for students to have private study and librarians are available to ensure that silence prevails in the library. However, the findings from covert observation revealed that some students used the library as a place for sleeping while others considered the library as a discussion room. The study revealed further that some students visited the library during the examination period only and they used libraries to read their notes instead of reading the available library information resources. This was confirmed by the library staff during interview.

> *This is an examination week that is why you see many students in the library trying to prepare themselves for the examination. When there are no examinations, you will see empty chairs. However, under normal circumstances students hardly come to the library.*

The study revealed further that, students treated the library as a leisure place because they never know the use of the library and its information resources. It is therefore crucial for the librarians and the school management to ensure that students are well oriented on the use of school libraries. Orientation is primarily concerned with ways of introducing the user to the general techniques of library usage and services available, and the organisation, layout and facilities of a particular library. Failure to orient students on how to make use of the libraries would lead to sustained abuse of libraries making students fail in their examinations because of misuse of libraries causing students mass failures in our schools (Laddunuri, 2012).

Students and teachers' use of school library

During the interview, teachers were asked to state the reasons as to why most of the students and teachers do not visit their school library for study purposes. Teachers cited lack of books as a factor that makes them and students fail to visit school libraries. For instance, teachers interviewed noted the following reasons for not visiting school libraries:

- *Small number of mixed information resources*
- *Lack of books for advanced level*
- *Inadequacy of current books*

- *Insufficiency of reading materials such as teachers' notes*
- *Inadequacy of appropriate materials for teachers to prepare students notes*
- *Students are not aware of using library materials for class activities*

The findings from these interviews indicate that there is a problem with the information resources available in school libraries. The information resources are outdated unavailable or students and teachers are not aware of their availability. The issues identified during the interview need to be arrested if at all school libraries are to be helpful to learners since libraries act as the heart of any educational institution (Laitsch, 2003; Benard, and Dulle, 2014;Dilshad and Akhtar, 2019 and Babayi, Abubakar and Mohammed, 2019). Furthermore, during face-to-face interviews, teachers claimed that students are not aware of libraries. This makes it difficult to plan activities in the library, and most of students like to be spoon-fed. It was also reported that most of the students visit the library during the examination period. The researchers observed that teachers and students do not have the habit of attending the library on a regular basis. School libraries play a central role in education and contribute greatly to academic achievement of Students (Benard and Dulle, 2014).

Researchers revealed that students and teachers who are key stakeholders and users of school libraries are discouraged in using school libraries because of inadequacy of appropriate information resources, absence of computers, and lack of internet that could be used to retrieve online information sources (Mubofu and Malekani, 2019). It is evident therefore, that much attention is needed to support school libraries in terms of appropriate information resources, funding, and staffing for them to contribute much to students' academic performance.

4. CONCLUSIONS AND RECOMMENDATIONS

The study concludes that students' utilization of school libraries is low in government schools as compared to private schools. Most (65%) of the students in government schools rarely use school libraries for solving their information needs while only 38 percent of students in private schools rarely use school libraries. Furthermore, the study concludes that students in private schools use school library and 21percent of students in government schools do not use their school library at all.

Moreover, it is concluded that books and newspapers are the main information resources found in the selected secondary schools libraries in Temeke, Kinondoni, and Ilala Districts in Dar es Salaam region. The study also concludes that self-reading, doing assignments, reading notes, and borrowing books are the main activities conducted by students in school libraries. Other activities include reading newspapers, writing notes, and discussion.

Furthermore, the study concludes that students and teachers' visit to school library is poor because of small number of mixed information resources, lack of books for advanced level, inadequacy of current books, and insufficiency of reading materials such as teachers' notes. Others include, inadequacy of appropriate materials for teachers to prepare students notes, and unawareness of students on using library information resources for class activities

The study recommends that head teachers in both private and government schools through their Boards of Directors should lobby top management from the Ministry of Education Science and Technology to consistently allocate adequate funding for building school libraries and library collections, training school librarians and conducting information literacy training programmes for both students and teachers.

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Assessment of Rice Price Volatility and Trend in Dar es Salaam Markets, Tanzania

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ABSTRACT

The high food prices experienced over recent years across the world have led to a widespread view that food price volatility has increased. However, volatility has generally been lower over the two most recent decades than was the case previously. This paper evaluated the patterns and trends in rice real price volatility in wholesale markets in Dar es Salaam region of Tanzania. Rice volatility was evaluated using the standard deviation of returns by employing the web-based Food Price Monitoring and Analysis (FPMA) Tool. The findings revealed that most of the prices were very close to the average signifying reliability of the data used for analysis. Furthermore, the findings revealed some episodes of unstable rice prices. It appears that international price shocks can be transmitted into local markets. The paper recommends that in the event of volatility, policy interventions should focus on the role of trade and unimpeded access to global supplies as well as the use of established national food reserves with great conformity to market fundamentals. In addition, an improved surveillance system on food demand and production is imperative.

Key Words: Rice price volatility, Rice price trend, city food markets, Tanzania.

1. INTRODUCTION

Background

Rice is the most rapidly growing staple food in Africa. Though its production is steadily increasing, the consumption is still out-pacing the production (Hallberg, 2019; Maertens and Velde, 2017). Rice is the second most important staple food and commercial crop in Tanzania after maize; it is one of the major sources of employment, income and food security for Tanzania farming households (Trevor and Lewis, 2015). Tanzania is the second largest producer of rice in Southern Africa

after Madagascar with production level of 2,621,034 tonnes per year (FAOSTAT, 2017). The cultivated area is 681,000 ha; this represents 18 percent of Tanzania's cultivated land. About 71 percent of the rice grown in Tanzania is produced under rain-fed conditions. Irrigated land comprises 29 percent of the total area for rice production most of which is carried out in small village level traditional irrigation systems. The average yield is very low, 1.6 to 2.4/ha, but with irrigation, production can increase to more than 5t/ha (USDA, 2018). However, its domestic output is expanding. Farmers grow a number of traditional varieties such as *Machale, Supa, Bora Kupata, Kahago, Tule na Bwana and Kibakuli* (Rugumamu, 2014). These varieties have long maturity and yield is affected by irregular rainfall pattern coupled with occurrence of pests such as rice stem borer (Leonard and Rwegasira, 2015; Rugumamu, 2014) and disease particularly rice blast disease (Duku *et al*., 2016; Chuwa *et al*., 2015) and bacteria leaf blight (Duku *et al*., 2016) which adversely contribute to the yield decline.

Rice accounted for 10 percent of The Total Dietary Energy Supply (DES) in 2005-07 worldwide (Mandela, 2016; Bentsen *et al*., 2015). On average, over the period 2004-08, Per Capita Consumption of rice was 20 kg/year (Nigatu *et al*., 2017; Laizer *et al*., 2018) and a self-sufficiency ratio of 85 percent (Ismail and Ngadiman, 2017). Rice is a staple food consumed in both urban and rural areas. Among the urban area, Dar es Salaam, which is the principal end market, is of greater importance as it accounts for about 60 percent of the national consumption (Trevor and Lewis, 2015). In Dar es Salaam, a network of brokers, wholesalers, intermediaries, and retailers ensure that the product gets to the final consumer (Mutayoba, and Ngaruko, 2018; Lenné, and Ward, 2010; Rondinelli, 1987). Overall, there is considerable cash transactions involved in this process, making rice an extremely good crop for stimulating economic activity. It is therefore the crop that touches many lives of the poor households of Tanzania and plays an important role in the food security and economic livelihoods.

Price Volatility: The Concept

Price volatility measures the rate at which prices rise or fall over a specific period of time. Here we are explicitly concerned with variations in agricultural prices over time (FAO, 2010). Not all price variations are problematic; a good example is when the prices move along a smooth and well-established trend reflecting market fundamentals or when prices exhibit a typical and well-known seasonal pattern. However, variations in prices become problematic when they are large, sudden, and cannot be anticipated;, as a result, they create a level of uncertainty which

increases risks for producers, traders, consumers, and governments; and may lead to sub-optimal decisions (FAO and OECD, 2011and FAO, 2010). Variations in prices that do not reflect market fundamentals are also problematic as they can lead to incorrect decisions. Some degree of price volatility usually arises in agricultural commodity markets because of three fundamentals of the market (FAO, 2012). First, agricultural crop production varies each season because of natural shocks such as weather events (droughts, floods, etc.) and pests and diseases. Second, since demand for agricultural commodities and supply are relatively inelastic, broad-based price adjustments may be necessary to clear the market, especially where the stocks are low. Third, since in agriculture, production takes a long time, the supply cannot keep pace with price changes in the short term; otherwise, stocks must be available elsewhere to counteract changes in production. High price volatility makes it difficult for farmers to take production decisions because of uncertainty about future prices. It also affects food security of vulnerable populations whose access to food is reduced by high prices and who cannot afford to buy in bulk when prices are low.

Price volatility in agricultural markets is still an important matter in the discussion at political, analytical, and technical levels. For instance, the food price crisis of 2007/08 resulted in increased price levels and the negative consequences on food security and poverty in developing countries. It also increased volatility on key markets (most notably grains) that triggered many studies at both conceptual (Oyo, *et al*., 2018 and Clapp, 2017) and empirical (Anderson, 2012, Apergis and Rezitis, 2003; von Braun and Tadesse, 2012) levels. In addition, this prompted a shift in policy thinking towards the need of making global markets less fragile and more resilient. For instance, according to Oyo *et al.* (2018), smallholders in sub-Saharan Africa co-exist whereby the non-resilient households offer labour to the resilient households for survival during turbulent seasons irrespective of the magnitude of the external shocks and stressors. In addition, non-resilient households cannot be liberated by external handouts but rather through building their capacity for self-reliance.

Volatility becomes an issue of concern and of possible policy response when it induces risk averse behaviour that leads to inefficient investment decisions and when it creates problems that are beyond the capacity of producers, consumers, or nations to cope. What constitutes excessive volatility depends very much on the situation of the individual or nation. Poor consumers without access to adequate social support in developing countries are most immediately affected by

price surges. Small resource constrained farmers face particularly severe problems when prices fall. Most developing countries dependent on rice imports, the episode periods result into severe economic, social, and political stress because of high prices and fears of scarcity. Indeed, most countries engage in at least some food trade, even if they are actively promoting food self-sufficiency (Clapp, 2017).

Analyzing rice price volatility and seasonality in local markets is an important issue. This is achieved by looking at the long-term volatility in domestic rice prices using standard statistical measures using real prices. Food price volatility has been extensively studied at international level but empirical studies of domestic prices instability are still scarce. It is also believed that large cities such as Dar es Salaam are likely to be characterized by better storage infrastructure and competitive markets that could help stabilize prices. In addition, large cities are able to draw supplies from larger markets when needed., there is also domestic rice production that can stabilize its price and dampen prices of imports. This paper therefore evaluates the patterns and trends in rice real price volatility in the markets of Dar es Salaam region of Tanzania.

Overview of rice industry in Tanzania

There are active markets for paddy and rice throughout the year (Wilson and Lewis, 2015). Both products store well, can be kept from one year to the next, and are therefore extensively traded. Rice in Tanzania is mostly sold to consumers as polished milled rice. The preferred type for consumption is aromatic long grain rice but there is also a demand for sticky white long grain rice. Very few other products are available although there are limited supplies of brown rice and rice flour. Value added products such as rice crackers, as produced in Thailand, appear to have no place in the Tanzanian market.

Rice is a staple food and is consumed in both urban and rural areas. The urban area of greater Dar es Salaam is the principal end market and accounts for about 60 percent of the national consumption. Mbeya and Morogoro Regions are the main sources of supply. Dar es Salaam had the Tanzania's highest Gross Domestic Product (GDP) per capita of US$ 1 741 compared with the national average of US$ 1 471 in 2010, due to the highest urban population (Achandi and Mujawamariya, 2016; Wilson and Lewis, 2015). Rural consumers include smallholder rice farmers, who retain about 370 kg of their production for consumption by their own household of around five persons (West and Haug, 2017; Wilson and Lewis, 2015). Consumers usually purchase rice loose from bulk sacks either from traditional small retailers or

at farmers' markets (Kikuchi *et al*., 2016). Quality differentiation is limited mainly to the amount of broken rice present (e.g. 80 percent whole grain, 20 percent broken grain), to whether it is aromatic or non-aromatic, and to whether it is local or imported. There is no significant premium for < 5 percent broken rice as demand is largely for 20 percent broken. Processors therefore mix broken and unbroken rice to achieve 20 percent broken; they also mix non-aromatic with aromatic rice, as there is little demand for the former. Tanzanian rice achieves a premium over imported rice (Wilsonand Lewis, 2015). There are also regional ('place-of-origin' or 'geographic') preferences. rice is often labelled as being from regions that are perceived by consumers as offering special qualities; rice from Kyela is considered to be the best, followed by rice from Mbeya; Morogoro rice is viewed as good quality, but inferior to Kyela and Mbeya; and Shinyanga and Mwanza rice is viewed as low quality as it is less aromatic. Historically Shinyanga and Mwanza rice is believed to contain larger amount of foreign matter (Ibid).

Causes and types of price volatility: The theoretical framework

Volatility is a directionless measure of the extent of the variability of a price or quantity (Gilbert, and Morgan, 2010; Regnier, 2007). In a purely descriptive sense, volatility refers to variations in economic variables over time. Here, the explicit concern is on variations in agricultural prices over time. There is emerging consensus that the country's food system is becoming more vulnerable and susceptible to episodes of extreme price volatility. As markets are increasingly integrated, shocks in the national economy can now transpire and propagate to domestic markets faster than was the case before (Ramey, 2016). Increased vulnerability is triggered by an apparent increase in extreme weather events (Azoulay, 2016; Maco *et al*., 2018; Ma *et al*., 2019), where harvest outcomes are prone to weather vagaries as well as greater reliance on international trade to meet food needs at the expense of stock holding. One of the main factors behind food price volatility in international food markets is lack of reliable and up-to-date information on food supplies (cereal crops in particular) (Sekhar, 2017; Fasanya, and Olawepo, 2018) export availabilities, and import requirements. In this framework, stocks data are seen as the most problematic.

In an attempt of distinguishing how different factors affect price changes, three groups of potential causes have been singled out, exogenous shocks, also called "root" causes; "conditional" causes, and "internal" drivers (Fig. 1). Root causes, such as extreme weather events, oil price shocks, production shocks, and demand shocks are independent core factors affecting food price fluctuations. They are

exogenous because the possibility of a causal relationship going from the agricultural sector to root causes is minimal. The exogenous shocks are expected to generate food price spikes and volatility, and the magnitude of their impacts depends partly on the political and economic environment of a given country. In other words, a second group of factors related to specific political and economic conditions – labelled here as conditional drivers—can dampen or exacerbate the exogenous shocks. Some of these factors (such as a high concentration of production or low transparency in commodity markets) are rather time-invariant and difficult to measure. The third group of causes consists of factors that are triggered by the same price dynamics, and these internal causes are endogenous shock-amplifiers and include discretionary trade policies, speculative activities (driven by price expectations), and declines in world food stocks.

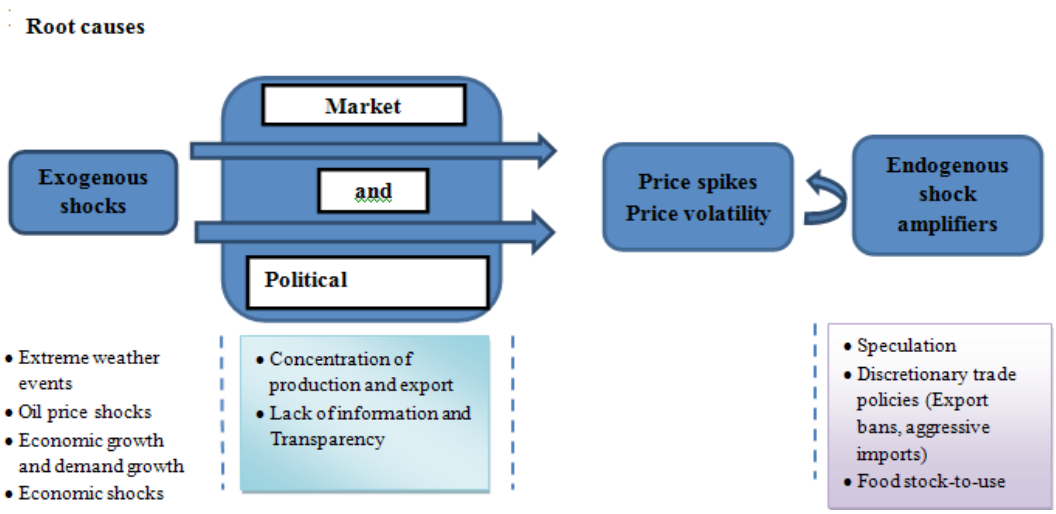

Figure 1: *Schematic illustration of causes of food price volatility (Adopted from Tadesse, et al., 2014)*

Two types of volatility are generally analysed in literature (Huchet-Bourdon, 2011; Tothova, 2011): realized or historical volatility (Lahmiri, 2017; Christensen, and Hansen, 2002; Mayhew, 1995) and implied or future volatility (Cao *et al.,* 2010; Christensen, and Hansen, 2002; Mayhew, 1995). While historical volatility, which is the focus of the study, is related to the observed past trend of prices, implied volatility refers to the market expectations in terms of volatility at the beginning of the period (Lahmiri, 2017). According to IFPRI (2011) and FAO (2012), when prices are volatile, households can reduce their inputs spending and this may have an impact on the quantity and quality of the food supply. These variations have an

impact to farmers and poor people whether they are theoretically predictable or not because their response possibilities can be rather inelastic due to fixed land size and small budgets. Additionally, food price volatility deteriorates the balance of payments of the government, for both net importers and net exporters of agricultural commodities (McCombie and Thirlwall, 2016; Woertz, 2017) and thus affects their investment capacity and ultimately growth (Jawad and Niazi, 2017).

Countries respond to the food price surge through a spectrum of policies (FAO, 2010). Many countries chose to intervene directly in the market by managing food reserves in order to stabilize domestic prices. Several food importing countries reduced import tariffs, while many producing countries limited or even banned exports in order to avoid food shortages and further increases of price. For instance, food prices decreased in Tanzania in 2008 because of a good harvest and export bans (HLPE, 2011). There have also been proposals for establishing international mechanisms to either counteract speculation in futures markets or establish regional physical food reserves. However, as Sarris (2011) notes, such programmes require a sizable commitment of resources.

Producers are more concerned about low prices, which may threaten their living standards as well as their longer-term viability when income is too low to provide for the farm family or for the operational needs of the farm (Wodon and Zaman, 2008). Uncertainty may result in less than optimal production and investment decisions (Martins-Filho *et al*., 2010). In developing countries, many households are both producers and purchasers of agricultural products. For this group, the impacts of price volatility are complex, with net outcomes depending on a combination of many factors (Rapsomanikis, 2009).

Tanzania is one of those developing countries, which were affected by the 2008 food crisis. Agricultural commodity prices represent a large proportion of the final price poor consumers pay for food items, and that food expenditures are a relatively large part of their household expenditure. For instance, the budget share of food expenditure is about 70 percent in Tanzania and 45 percent in Pakistan against an average of 10 percent in the United States (HLPE, 2011). This makes poorer countries much more responsive to changes in food prices than are wealthier ones (Regmi *et al*., 2001).

Rice and price volatility

Globally, rice is not closely linked in terms of either production or consumption with other major grains. It is produced on different types of land and largely in different countries, and it is mainly consumed by different groups of consumers. As a result, there is little transmission of price changes from other grains to rice, or vice versa. Rice prices therefore tend to follow their own peculiar path. Financial activity on future markets has little impact. Nevertheless, rice prices did rise sharply in 2007–2008 and remain high in 2009. The rice story in 2007–2009 is peculiar and in some sense pre-modern (Christiaensen, 2009; Timmer, 2009). Rice differs from other food commodities in that only a small proportion of the world rice enters international trade (most major consumers are also major producers), and that much rice which is traded is bought or sold at contracted, and not free market prices. The free market is therefore residual and has the potential of exhibiting high volatility. Globally, there were no significant production or consumption shocks in the rice market, which was in surplus through the whole of 2007–2008.

The international rice market is evidently highly problematic as well as politically important. Most of the so-called food riots in 2007–2009 involved rice. It is urgent and important that steps are taken to avoid a repeat of this episode (Timmer, 2010). In our view, however, it would be an error to see the problems affecting the rice market as generalizing to other grains markets or to wider agricultural markets. Both the sequence of events over 2007–2009 and the volatility statistics in the subsector underline that 'rice is different'. The analysis of food price dynamics and volatility has become more and more important for producers, consumers, traders, and policy makers (Pio-Lepetit and M'Barek, 2011, Gaetano *et al.,* 2018 and Huffaker *et al*., 2018).

2. METHODOLOGY

Study area

Dar es Salaam is the coastal largest commercial city of Tanzania with a population projected at 5,147,070 million people with an annual growth rate of 5.6percent (URT, 2018) indicating a higher potential market for food. Dar es Salaam was purposively selected because it is the principal end market accounting for about 60 percent of the national consumption (Ibid). The city is also well connected with other local markets that supply the commodity when needed.

The data

Secondary price data from Regional Agricultural Trade Intelligence Network (RATIN) price database were used for analysis (http://www.ratin.net/). Network (RATIN) is a reliable source of grains price data whose database regularly gets updated. Monthly average wholesale price in local currency (Tanzanian Shillings) in tonnes from major markets of Dar es Salaam covering 13 years (January 2006-October 2018) was obtained. The network was developed by Eastern Africa Grain Council (EAGC) where farmers, traders, and processors can get regional market information covering five countries including Kenya, Uganda, Tanzania, Burundi, and Rwanda. The study used monthly price data covering January 1980 to March 2011. For the analysis of changes in volatility, it is useful to have a somewhat longer time series with large proportion of observations (Cabrera *et al*., 2018). It is worth mentioning that price series used were real prices, deflated by the Consumer Price Index (CPI). CPI measures the average change in the price paid by consumers for consumer goods and services.

Measuring food price volatility

Volatility can be measured using the coefficient of variation (CV) (Carriero *et al*., 2016; Bellemare, 2015; Patton, and Sheppard, 2015), defined as $CV = s/\mu$, where s is the standard deviation of the variable of interest over a given time and μ is the mean value over that period. According to Alagidede and Ibrahim (2017), one advantage of this measure is that it has no unit. This is because it allows easy comparison of, for example, domestic price volatility measured in different markets and countries.

Another measure of volatility can be obtained using the standard deviation of returns (Alan and Kyre, 2019; Davis, 2018; Baillie and DeGennaro, 1990; Schwert, 1990). The return is defined as the proportional change in price from one period to the next. The return is generally measured as the difference in the logarithm of prices from one period to the next. The return is also referred to as unconditional volatility. It is unconditional in that, it does not take into account any prior information; it is based only on observed variation in returns. It is argued that using standard deviations of log prices is a better measure than other potential metrics because the former avoids the issue of defining trends (Gilbert and Morgan 2010). It is for this reason that standard deviations of (logarithmic) price differences or returns are widely used to measure realized volatility **(**Minot, 2012; Rosa and Vasciaveon, 2012)**.** Thus, in this study, using Food Price Monitoring and Analysis (FPMA) Tool, the measure of price volatility used is the standard deviation of the log monthly price changes

for the preceding 12 months. Alongside this, the average of the log monthly price changes for the preceding 12 months is also plotted, helping to determine the general trend in prices over the period, which is independent of the volatility. All calculations in FPMA tool are based on prices in real terms.

Data analysis

The Food Price Monitoring and Analysis (FPMA) Tool, which was developed in collaboration with FAO's Global Information and Early Warning System on food and agriculture (FAO-GIEW), was used to provide and analyze rice price information. The FPMA Tool is a web-based tool that provides an advanced technical solution for dissemination and analysis of price information. The tool is linked to the FPMA database, which includes monthly and weekly retail and/or wholesale prices for several food commodities in the selected markets of several countries including Tanzania. The Tool was developed in 2010 as part of FAO's initiatives of addressing the soaring food prices.

The Food Price Monitoring and Analysis (FPMA) database includes over 1400 monthly domestic retail and/or wholesale price series of major foods consumed in 94 countries and weekly/monthly prices for 85 internationally traded foods. The Tool provides easy access to the data, allowing users to browse and analyze trends quickly of single price series, create comparisons among countries/markets/commodities, and download charts, data, and basic statistics such as maximum and minimum levels, averages, percentage changes, and standard deviations over different periods.

3. RESULTS AND DISCUSSION

Rice price volatility and trend

The available monthly wholesale price data for 13 years (2006-2018) for Dar es Salaam rice markets, which were obtained from RATIN price database, were analyzed (Table 1 and Figure 2). Data in Table 1 show the summary statistics of the average rice prices per ton in Dar es Salaam markets. The data were obtained from 120 points equivalent to 80 percent of observations. This value is large enough to justify the reliability of the series. Additionally, the effect of missing data has been reduced by moving average method that is automatically processed by FPMA Tool.

During the period, a tonne of rice averaged at about 1.1 million TAS. The minimum price of about 0.72 million and maximum price of about 1.83 million were observed in the year 2007 and 2012 respectively. In fact, the price more than doubled in five years. The price hike in the year 2012 coincided with the period when the world was experiencing price volatilities in various food crops particularly grains including rice (FAO, 2014). This finding could support the idea that instability in international markets is the main source of price volatility in Africa (FAO, 2010). With the mean of 1,109,595.39, the standard deviation of 183,878.54 is very low which means that most of the prices are very close to the average. This means that there is a small variance between the data and the statistical average, thus the data are reliable. Therefore, we can confirm that prices in 2012 were volatile. Volatility seems to spill across agricultural markets with markets experiencing common shocks, rather than being isolated from each other. On the rice market, the price explosion was particularly pronounced during this period (Policy Report, 2015).

Table 1: Summary statistics of average rice prices in Dar es Salaam markets, Tanzania (2006-2018)

Start date	End date	Data points	Percent change	Average price	Std. Deviation	Min. price	Min. date	Max. price	Max. date	Price change
Jan. 2006	August 2018	120	31.56	1,109,595.39	183,878.54	721,511.64	August 2007	1,834,324.88	May 2012	1,112,813.244

Figure 2 presents the average intra-annual volatility and price trend for the rice commodity at Dar es Salaam rice markets. The findings show that volatility ranged from 5 to 40 percent during the 13 year period. The prices of rice were particularly unstable in 2009-2012 and 2014-2017. No significant major trend emerged from the graphical analysis. This means that during the period, real rice price volatilities did not show any clear trend at Dar es Salaam markets in Tanzania. However, in a few instances, prices deviated by multiples of standard deviation from the average.

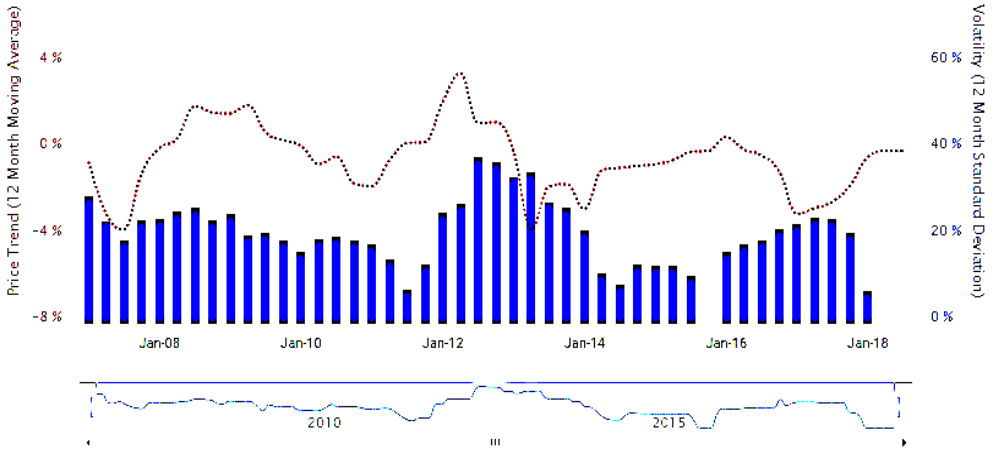

Figure 2: *Wholesale Real Prices at Dar es Salaam Rice Market showing price trend and volatility*

4. CONCLUSION AND RECOMMENDATIONS

Conclusion

This paper therefore evaluated the patterns and trends in rice real price volatility in wholesale markets in Dar es Salaam region of Tanzania. Rice volatility was evaluated using the standard deviation of returns by employing the web-based Food Price Monitoring and Analysis (FPMA) Tool. The findings revealed that most of the prices were very close to the average implying that, the data were reliable. the findings revealed further that, the prices of rice were particularly unstable in 2009-2012 and 2014-2017. The earlier price hike coincided with global price volatilities, which swept across agricultural markets in Africa. Price instability in international markets is the main source of price volatility in Africa. This is because changes in the prices of some global commodities such as fossil fuel appear to have global effect. In addition, during the period under study, the real rice price volatilities did not show any clear trend at Dar es Salaam markets in Tanzania.

Recommendations

In the events of volatility, policy interventions should focus on the role of trade by allowing more imports particularly when volatility is caused by low domestic

supplies due to underproduction. In the long run, budgetary provisions should allow the government to use food reserves through the National Food Reserve Agency (NFRA) to buffer volatility especially if the shocks last for short periods. Due regard must be given to ensuring that the basic requirements of a free market are not violated and that the operations associated with the reserve do not disturb the market's orderly functioning. Instead of engaging in isolated measures such as price stabilization, the authorities should seek for better coherence and coordination in their policy responses. These must yield both greater assurances of unimpeded access to global supplies, and improved confidence and transparency in market functioning, especially in the major commodity exchanges such as rice. An improved surveillance system on demand and production particularly in large cities would help dampen uncertainty and enable markets to perform better before full impacts of crises transpire. Such measures would also help stabilize the market.

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