

# Trends, constraints and competitiveness of potato exports in Nigeria

N. O. Chigozirim, O. N. Philips, M. A. Nnanna<sup>1</sup>

<sup>1</sup>*Department of Agribusiness and Management, Michael Okpara University of Agriculture Umudike, Abia State, Nigeria (chigozirim@mouau.edu.ng)*

## ABSTRACT

This article analyzed the trends, constraints and competitiveness of potato exports in Nigeria from 1961- 2016. This article employed trend analysis, Generalized Method of Moments (GMM) and Revealed Comparative Advantage (RCA). The results revealed that the trend in export is positive. The constraints to the exports of potato are mainly administrative and institutional, which include the documentation process; time required to export and costs of exports. Nigerian potato exports were more competitive from 2010 – 2016. There should be a more judicious effort in implementing the executive orders for the ease of doing business in Nigeria.

**Key words:** potato, export, constraints, competitiveness, trends

## INTRODUCTION

Potato (*Solanum tuberosum L.*) is a vital root crop economically and nutritionally. To emphasise its importance, the Food and Agriculture Organization of the United Nations declared 2008 as the potato year (FAO, 2009). The industrial significance of potato cannot be overemphasised as it can be used for feed production and medicinal purpose (Solomon et al., 2015). About 73 – 86% of the potato produced in Sub-Saharan Africa is for human consumption, while 9% is left for seed production and little amount is left for export (Scott et al., 2013). Globally, raw potato cost an estimated USD 4.4 billion to be purchased in the year 2018 with the global imports rising by 1.7% (Workman, 2019). European countries

were the major importers of raw potato in 2018 estimated to worth USD 2.7 billion. European imports accounted for about 61.8% of the total global imports. America accounted for 17.3% of the total world potato imports (Workman 2019).

Potato is a resilient crop that has survived institutional instability, market failures, disease outbreaks, civil strife and other shocks (Scott, 2011). With its resilience, nutritional values and expanding market opportunities, potato is an important crop for winning the fight against food insecurity, poverty and climate change (Emana and Nigussie, 2011). Potato is a staple crop that addresses food security, and a crop known for its high yield. Potato has a life cycle of nine to twelve weeks. Potato farming is very

lucrative in Nigeria; this is because it suits her rain-fed cropping pattern. Potato is harvested earlier when compared to the cereals; this gives it more advantage as the grains require an average of 2 -3 months for harvest (Devaux et al., 2014; Nteranya 2015; Ugonna et al., 2013). Potato is very affordable to low-income earners, and nutritionally rich staple food, contributing significantly to vitamins and minerals needs of the peoples' diet (FAO 2019). Cereals are the world most consumed food crops, but potatoes have gained importance, and are now part of the world's best dishes (Chandrasekara and Kumar 2016). Crude oil has dominated the exports from Nigeria, resulting in the neglect of potential export commodities such as potato.

Another challenge to the export of potatoes is that farmers and processors do not add the necessary values and meet the specified standards required by importers (Ajetombi, 2013). The local production of potatoes has not been sufficient all year round, and this jeopardises the export potentials of potatoes from Nigeria (Solomon et al. 2015). There so many heterogeneous small scale farmers producing potatoes without any form of standardisation and international regulation, this is a threat to the development of Nigerian potato exports. There is a low level of Intermarket integration for the trade of potatoes in the West Africa sub-region, despite the economic integration efforts of the Economic Community of West African States (ECOWAS). These pose a severe risk to the producers and traders.

Moreover, this results in the variability of the product quality and standard across the region. Hence, when the potential of the regional market is not well harnessed, the trade benefits are not feasible due to the delays in export time and documentation procedures. Other challenges to the international trade of potatoes

are the increasing cost of a money transaction, cultural bias, delay in trade procedures and non-tariff barrier such as informal taxation (Elbehri et al., 2013).

In Nigeria, international trade administration is expensive, the process for imports and exports are very costly, bureaucratic and time-consuming (Hoekman and Zarrouk 2009). The low application of information and communication technology, as well as the poor coordination of inspection activities, results in the delay of potato exports. There is the need to analyse the trend, constraints and competitiveness of potato exports in Nigeria. This study is aimed at providing empirical evidence on the trends, constraints and competitiveness of potato exports in Nigeria. Specifically, this study addressed the following research questions;

1. What are the constraints limiting the potato exports in Nigeria within the period studied?
2. How competitive are Nigeria potato exports when compared to global potato exports in the period analysed?

## MATERIAL AND METHODS

Nigeria is the research location for this article. This article adopted principally secondary data obtained from the Food and Agriculture Organization (FAO) database and World Bank Statistical Bulletin (World Development Indicators) from 1961 to 2017. Specifically, data on potato area harvested, potato yield, potato production, potato producer price were sourced from FAO database. In contrast, data on the cost of export, documents to export, time to export, lead time to export and the

average time to export through custom were sourced from the World Bank Development Indicators.

Augmented Dickey-Fuller (ADF) test for integration of time series data was applied. Descriptive statistics were used to describe the nature of data. Trend analysis (i.e. quadratic equation), Generalized Method of moments and Revealed Comparative Advantage (RCA) were applied in this article. The ADF model is specified thus

$$\Delta Y_t = b_0 + b_1 Y_{t-1} + \sum_{t-1}^m \rho_i \Delta Y_{t-1} + \mu_t \quad \dots (1)$$

This test is one tail with a null hypothesis is  $\delta=0$  versus  $\delta<0$  (thus expansive negative estimations of the test measurements prompts the dismissal of the invalid) and  $\Delta$  is the difference operator. Under the alternative,  $Y_t$  must be differenced to make it stationary; under the option,  $Y_t$  is as of now stationary and no differencing is required (Dickey and Fuller, 1981). The ADF equation is in line with (Kuhe and Uba 2018). Where  $\Delta$  is the difference operator,  $\mu$  is the random term,  $t$  is the time trend,  $m$  is the number of lagged differences,  $b$  is the parameter estimates and  $\rho$  is the coefficient of the proceeding observations.

The Generalized Moments of Method (GMM) were used in the estimation of the constraints in the export of potatoes as adopted by Hamed, Hadi and Hossein (2014)

$$s = b_1 CE_1 + b_2 DE_2 + b_3 TE_3 + b_4 ACC_4 + b_5 LTT_5 + b_6 LE_6 + e_t \quad (2)$$

Where CE is the cost to export (US\$ per container), DE is the documents to export (number), TE is the time to export (days), ACC is the average time to clear exports through customs (days), LE is the lead time to export,

median case (days) and LTT is the Lead time to import, median case (days).

The present article employed (Balassa 1989) export-based Revealed Comparative Advantage (RCA) index in revealing the evolution pattern of changing competitiveness strength in the export of the potatoes, which represents the dynamics of export structure, using the following formula:

$$RCA sl_j^i = \left[ \frac{sl_i}{sl_{total}} \right] / \left[ \frac{sl_i^H}{sl_{total}^H} \right] \quad \dots (3)$$

Where RCA is the revealed comparative advantage,  $sl$  is the export of potato in tons,  $sl_{total}$  is the world export value (in US dollars),  $sl_{total}^H$  is the total of export of potato in tons and  $sl_{total}^H$  is the total world export value (in US dollars).

## RESULTS AND DISCUSSION

Table 1 presents the result of the unit root test analysis. It revealed that there is a mixed order of integration. The entire variables were stationary at first difference except for LE, ACC and LT, which were stationary at level. This result implies that the variables are fit for econometric analysis, with the likelihood long run and short-run relationship among the variables (Philips and Perso 1998; Pesaran et al., 2001).

Table 1. Unit root test of the variables

	ADF test		
	Level	1st difference	Decision
potato export	-0.08535	-6.12107	I(1)
potato world export	-1.67993	-7.77966	I(1)
potato producer price	0.306471	-7.61671	I(1)
Cost to export (US\$ per container)	0.113578	-5.07221	I(1)
Documents to export (number)	-0.7679	-5.71039	I(1)
Time to export (days)	-1.49989	-6.5999	I(1)
Lead time to export, median case (days)	-5.1889	-10.0905	I(0)
Average time to clear exports through customs (days)	-5.37169	-9.22301	I(0)
Lead time to import, median case (days)	-5.1835	-10.7793	I(0)

Source: FAO database and World Bank development indicators. Computed by the authors using Eviews 9.5-3.7498, -2.5005 and -1.6793 are Mackinnon critical value for rejection of hypothesis of unit root applied at 1%, 5% and 10% respectively. I(0), and I(1) indicates that the variable has a constant mean at the level, first difference and second difference respectively.

The export of potato became significant since 2005, and has maintained a positive trend as illustrated in Figure 1, and this may be due to the outstanding efforts of the government to improve the quality and quantity of potato, as seen in the root and tuber expansion

programmes (IFAD 2005). The forecast clearly shows that the export of potato may experience a positive trend in the next five years; all things being equal. The drive to diversify the economy will be a significant force driving the increase in the export of potato to other countries.

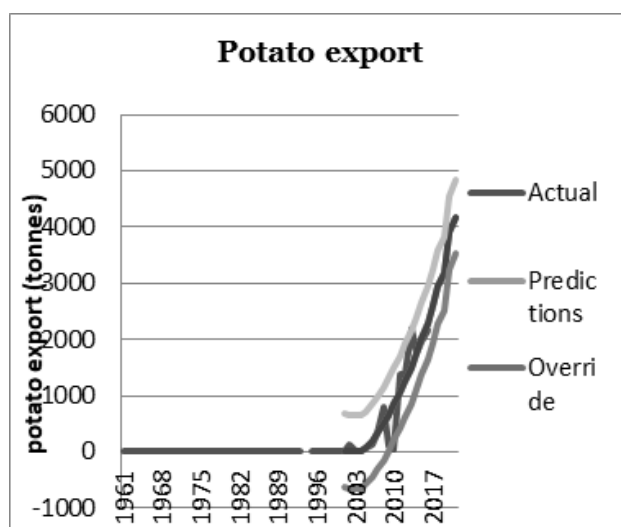


Figure 1. Trend of potato exports in Nigeria (1961-2021)  
Source: FAO database. Computed by the authors using Ms Excel

Table 2 presents the estimation of the difficulties in the export of potato from Nigeria, the GMM model was found to be significant, based on the value of J-statistics. The R-square value of 0.883 indicates that 88.3% variation in the dependent variable (potato export) was accounted for by the independent variable included in the model.

Table 2. Generalized method of moments analysis of the difficulties in the exporting of potato

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Cost to export	-6.344860	0.719351	-8.820251	***
Documents to export	1253.311	172.0553	7.284354	***
Time to export	-181.7184	28.80809	-6.307893	***
Lead time to export	295.1540	198.8713	1.484146	
Average time to clear exports through customs	-169.3788	83.05320	-2.039401	*
Lead time to import	-348.8911	143.6938	-2.428018	*
R-squared	0.883352	Mean dependent var		227.7322
Adjusted R-squared	0.871449	S.D. dependent var		578.6050
S.E. of regression	207.4531	Sum squared resid		2108802.
Durbin-Watson stat	1.109692	J-statistic		0.014143

\*,\*\*and \*\*\* indicates that the values are significant at 10%, 5% and 1% respectively.

Source: FAO database and World Bank Development indicators. Computed by the authors using Eviews 9.5

The cost of export was high at 10% and negatively influenced the export of potato from Nigeria. This implies that the increase in the cost of exportation decreases the number of potato exports. An increase in the cost of exporting a container of potato poses a severe constraint to the quantity of potato exported from Nigeria. Trade barriers such as the increasing tariffs and cost of transportation are major setbacks to exports. The ability to get containers in unacceptable conditions and temperature to avoid the bruising and spoilage of the fresh potatoes is a critical constraint as it is costly (Luataladio et al., 2009). According to World Bank (2005), the third-highest component to export costs is the transport cost, as the profit from the export of fresh potatoes

varies by market destination and market prices. Administrative costs are significant constraints; for instance, an exporter of fresh potatoes is required to pay 50% of the Freight on Board value (World Bank, 2005; FCMB, 2018).

The number of documents and the documentation process required for the exportation of potato were significant at 1% and positively influenced the export of potato from the country against a priori expectation. The result implies that the documentation process for exporting in Nigeria is of international standard, and does not pose as a constraint to the export of potato from Nigeria. The submission of numerous documents is a significant constraint to the export of potatoes.

Significant players in the export sector have demanded the reduction of export documents from 10 to 7. The documents include duly completed NXP form, Pro-forma invoice on a sales contract, copy of Nigeria Export Promotion Council Certificate, clean certificate of inspection, certificate of origin, single good declaration, bill of lading and a packing list (World Bank, 2005; Awolowo, 2018).

Time to exports was found to be statistically significant at 1% and negatively influenced the export of potato from Nigeria. This result implies that the longer the time required for exports, the more the delays in the quantity of potato exported from the country. Awolowo (2018) insisted that the reduction of export time by 50% will ensure an above-average export performance.

Average time to clear exports through the customs was significant at 10% and negatively influenced the exports of potato; and this implies that the time required for the potato exporters to clear his consignment in the exporting destination pose a severe constraint to the export of potato, the quantity of potato exported decreases as the average time to clear potato exports increases. Adewale (2019)

confirmed that shipping terms are not the best for exporters because of lead time to get the goods to the buyers for confirmation.

Lead time to import was significant at 1% and negatively affected the export of potato from Nigeria. Import and export have a healthy relationship if the lead time to import into one's country is short. It may encourage more imports which may pose a severe impediment to exports of the same product. The lead time to import into Nigeria poses a severe constraint to the export of potato.

The real comparative advantage of Nigeria potato exports was estimated, and ratios presented in Table 4. Since the SAP Nigeria has started gaining competitive advantage in the export of potato but became more competitive from 2010 – 2016. The first Yaoundé convention in 1960 within EU/ ACP (European/ African, Caribbean, Pacific) relation which was favourable to developing products for European industry, which focused on palm oil, coffee, cocoa and cotton excluding any of the root and tuber, resulted in the insignificant production of potato for exports (Soule, 2013).

Table 3. Export competitiveness of potato

	range	Mean
1961 - 1967	0	0
1968 - 1974	0	0
1975 - 1981	0	0
1982 - 1988	0	0
1989 - 1995	0.0982	0.036471
1996 - 2002	0.517	0.088571
2003 - 2009	2.3233	0.618057
2010 - 2016	5.327	3.80329

Source: FAO database. Computed by the authors using Ms. Office Excel 2010 and Gretl

## CONCLUSION

This article analyzed the trend in potatoes exports, imports, areas harvested, output and yield. The constraints to the exports of potatoes were analyzed from the angle of ease of doing business. The competitiveness of Nigeria potatoes exports was analyzed as a ratio of global potatoes exports. Nigeria recorded significant exports of potatoes from 2001, primarily to Europe. The exports of potatoes may continue to grow with the intensified drive by the government to diversify the economy. The significant constraints impeding the exports of potatoes were time to export, the time required to clear exports and the costs of exporting; these constraints are institutional and administrative. There should be a more judicious effort in implementing the executive orders for the ease of doing business in Nigeria, as it will eliminate the bottlenecks of agricultural exports from Nigeria. Nigeria potatoes exports were more competitive with a mean value of 3.803 from 2010 – 2016, and this could be attributed to the renewed efforts for increased agricultural productivity as a means to diversify the economy.

## REFERENCES

- Adewale M. (2019). Challenges of exportation of goods in Nigeria. <https://freightdrive.info/blog/challenges-exportation-goods-nigeria/> accessed 23/05/19
- Ajetombi J. (2013). There's great opportunity for potato export in Nigeria. <http://businessnews.com.ng/2013/09/08/theres-great-opportunity-potato-export-nigeria-ajetombi/> accessed 23/05/19
- Awolowo O. (2018). Challenges to Export in Nigeria and the Way Forward. Lagos Chamber of Commerce and Industry Annual Symposium, Henry Fajemironkun Hall, 1, Idowu Taylor Street Victoria Island, Lagos 29 August, 2018. <https://lagoschamber.ng/wp-content/uploads/2018/08/Export-Challenges-and-Way-Forward-nepc-presentation.pdf> accessed 26/05/2019.
- Chandrasekara A., Kumar, T. J. (2016). Roots and Tuber Crops as Functional Foods: A Review on Phytochemical Constituents and Their Potential Health Benefits. vol. 2016, Article ID 3631647, 15 pages, 2016. <https://doi.org/10.1155/2016/3631647>.
- Devaux, A., Kromann, P., Ortiz, O. (2014). Potatoes for Sustainable Global Food Security. *Potato Research.*, 57(3–4):85–199. DOI: <https://dx.doi.org/10.1007/s11540-014-9265-1>
- Dickey D.A., Fuller D.W. (1981). The Likelihood Ratio Statistics for Autoregressive Time-series with a Unit Root. *Econometrica*, 49: 1057-1072.
- Elbehri A., Kaminski J., Koroma S., Iafraite M., Benali M. (2013). West African Food Systems: An Overview of trends and indicators of demand, supply and trade. *Rebuilding West Africa's Food Potential: Policies and market incentives for small holder-inclusive food value chains.* The Food and Agricultural Organization of the United Nations and international Fund for Agricultural Development. Rome.
- Emana, B., Nigussie M. (2011). Potato value chain analysis and development in Ethiopia. The case of Tigray and SNNP regions. Consultancy report. International Potato Centre (CIP) and USAID (United States Agency for International Development), Addis Ababa.

- FAO (Food and Agriculture Organization). 2009. International year of the potato 2008: new light on a hidden treasure. An end of year review. FAO, Rome.
- FAO (Food and Agriculture Organization). 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome. Licence: CC BY-NC-SA 3.0 IGO.
- FCMB (First City Monument Bank). 2018. Prospects, Challenges of Export in Nigeria, and Way Forward: Accessing Finance for Export. <https://lagoschamber.ng/wp-content/uploads/2018/08/LCCI-EXPORT-FORUM-Prospects-Challenges-Wayforward.pdf> accessed 26/05/2019
- Hamed K., Hadi D., Hossein K. (2014). Export Diversification and Economic Growth in Some Selected Developing Countries. *African Journal of Business Management* Vol. 8(17): 700 – 704. <https://doi.org/10.5897/AJBM2012.397>
- Hoekman, B., Zarrouk J., (2009). Changes in Cross-Border Trade Costs in the Pan-Arab Free Trade Area, 2001–2008. Policy Research Working Paper 5031. The World Bank Poverty Reduction and Economic Management Network International Trade Department August 2009.
- International Fund for Agricultural Development (IFAD) (2005). A review of cassava in Africa with country case studies on Nigeria, Ghana, the United Republic of Tanzania, Uganda and Benin. Proceedings of the Validation Forum on the Global Cassava Development Strategy Volume 2.
- Kuhe, D. A., Uba T. (2018). The Relationship between Crude Oil Prices, Exchange Rate and Agricultural Commodity Price Returns Volatility in Nigeria: A Time Series Approach. *Archives of Current Research International* 15(2): 1-12.
- Luataladio, N., Ortize O., Harverkort A., Cladiz.D. (2009). Sustainable Potato Production Guidelines for Developing Countries. Food and Agriculture Organization of the United Nations 2009. <http://www.fao.org/3/a-i1127e.pdf> accessed 24/05/2019
- Nteranya, S. (2015). Root and Tuber Crops (Cassava, Yam, Potato and Sweet Potato). Background Paper: An Action Plan for African Agricultural Transformation. United Nations Commission for Africa. Feeding Africa held at Abdou Diouf International Conference Centre, Dahar Senegal.
- Pesaran, H.M., Shin Y. Smith R.J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16: 289-326.
- Philips, P.C.B. and P. Perso. 1998. Testing for Unit Root in Time Series Regression. *Bimetrika*, 75: 322-348. DOI: 10.2307/2336182
- Scott, G. (2011). Growth rates for potatoes in Latin America in comparative perspective: 1961–07. *America Journal of Potato Research* 88: 143–152.
- Scott, G., Labarta R., Suarez V. (2013). Booms, Busts, and Emerging Markets for Potatoes in East and Central Africa 1961–2010. *Potato Research*. 56. 10.1007/s11540-013-9240-2. DOI:10.1007/s11540-013-9240-2
- Solomon, S. G., Okomoda V. T., Oloche J. A. (2015). Evaluation of Sweet Potato (*Ipomea batatas*) Peel as a Replacement for Maize Meal



- in the Diet of *Clarias gariepinus* Fingerling. *Journal of Fisheries Sciences*. 9(4): 063-068.
- Soule, B. G. (2013). Analytical Review of National investment Strategies and Agricultural Policies for the Promotion of Staple Food Value Chains in West Africa: West African Food Systems: An Overview of trends and indicators of demand, supply and trade. *Rebuilding West Africa's Food Potential: Policies and market incentives for small holder-inclusive food value chains*. The Food and Agricultural Organization of the United Nations and international Fund for Agricultural Development. Rome.
- Ugonna, C.U., Jolaosa M.O., Onwualu A. P. (2013). A Technical Appraisal of Potato Value Chain in Nigeria. *International Research Journal of Agricultural Science and Soil Science* 3 (8): 291-30. DOI: <http://dx.doi.org/10.14303/irjas.2013.084>
- Workman, D. (2019). Potatoes Imports by Country. [www.worldtopexports.com](http://www.worldtopexports.com). Accessed 24/05/19
- World Bank (2005). *Bangladesh Growth and Export Competitiveness. Poverty Reduction and Economic Management Sector Unit South Asia Region*. Report No. 31394-BD.

## Trendovi, ograničenja i konkurentnost izvoznika krumpira u Nigeriji

### SAŽETAK

Ovaj je članak analizirao trendove, ograničenja i konkurentnost izvoznika krumpira u Nigeriji od 1961 do 2016. U članku se koristila analiza trendova, generalizirana metoda momenata (GMM) i pokazatelj komparativnih prednosti (RCA). Rezultati su pokazali da je trend u izvozu pozitivan. Ograničenja izvoza krumpira uglavnom su administrativna i institucionalna, što uključuje proces izrade dokumentacije, vrijeme potrebno za izvoz i trošove izvoza. Nigerijski izvoznici krumpira bili su više konkurentni od 2010. do 2016. Trebalo bi uložiti više napora od strane sudova za provedbu izvršnih naloga za olakšavanje poslovanja u Nigeriji.

**Ključne riječi:** krumpir, izvoz, ograničenja, konkurentnost, trendovi