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Research Article

Self-Regulation Status of Exporters and Nigerian Crop Produce Rejection

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Abstract

This study investigated the relationship between self-regulation status of exporters and the level of Nigerian crop produce rejection by the destination countries. This study adopted descriptive research design using a cross-sectional survey. Primary data were sourced from a sample of 305 crop exporters with the aid of a structured questionnaire. Data were analysed using descriptive statistics, principal component analysis, and ordinary least square regression (OLS) model. The results of principal component analysis showed that a high proportion (39.67%) of the exporters were non self-regulated. The OLS regression results showed that the five domains of self-regulation; absence of phytosanitary certificate, infestation of crop produce with harmful organisms and/or contaminants, forgery and/or alteration of phytosanitary certificate, concealment of strange agro-produce in a consignment of certified crop produce, and exportation of prohibited materials, had significant relationships with crop produce rejection at $p<0.01$, as they increased the number of times of crop produce rejection by 4.24, 4.73, 3.29, 3.89, and 2.81, respectively. At $p<0.01$, exporters being non self-regulated significantly increased the number of crop rejection by approximately 5 times. In conclusion, infestation of crop produce with harmful organisms/contaminants contributed most to Nigerian crop produce rejection and there is a significant relationship between self-regulation status of crop produce exporters and Nigerian crop produce rejection. It was recommended that the Nigeria Agricultural Quarantine Service should train the crop exporters more on the need to meet laid down protocols, guidelines, and processes involved in phytosanitary inspection. This is with a view to improving the exporters' self-regulation and support the zero rejection initiative of the Federal Government of Nigeria.

Keywords

Crop Produce Export, Crop Produce Interception, Crop Produce Rejection, Self-Regulation, Phytosanitary Certificate

1. Introduction

1.1. Background to the Study

Crop produce rejection is the failure of the agro-commodity to access the international market as a result of the inability to pass through the quarantine entry or exit points or other regulatory agencies of the importing country, due to poor agro-product quality or non-compliance with other specific regulatory standards in international trade. In international trade,

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agro-produce exports are required to meet the nutritional, health, taste, ornamental, industrial and culinary needs of citizens, among other reasons.

Crop produce intended for export may be rejected due to the absence of sanitary/phytosanitary certificate [4]. The consignment must be accompanied by a valid sanitary certificate (for products of animal and aquatic origin) and a phytosanitary certificate (for products of plants origin). The certificates are issued after inspection and certification of the contents of the cargo, in accordance with the conditions on the import permit of the destination country. The exporter must submit the items for inspection and certification by the Nigeria Agricultural Quarantine service (NAQS) and obtain the applicable certificate prior to shipment [9].

The Nigeria standing Inter-Ministerial Technical Committee on Zero reject of Nigeria Agric Commodities and produce/non-oil export agreed on a 5-year plan 2017-2021. Together, with the private stakeholders in the Agriculture sector, they agreed on a phased implementation approach to control and streamline existing products, build key capacities, strengthen the legal and regulatory environment, and build the fundamentals of quality environment. The integrated export control plan includes the traceability of export consignments, training and certification of farmers, sampling and analysis of samples in approved and certified labs (accredited), control and monitoring of procedures, and initiate produce value addition, and market access [6].

The Nigeria government further developed a unified control system Act plan (2021-2025) on Zero reject of Nigeria Agric Commodities and produce/non-oil exports. These initiatives highlighted the fact that Nigeria has a comparative advantage in exporting many agro-commodities, but low produce quality and safety issues remain a barrier to greater competitiveness in the international market, resulting in constant rejection of Nigeria agro-produce in the international market. The focus is on those thematic areas such as the legislation and regulation, standardization, metrology (measurement), conformity assessment and export documentation process [10].

It is very important to note that all information required in the sanitary/phytosanitary certificate must be provided legibly in print as incomplete information on the certificate can lead to rejection of produce. Also, forgery or alteration of certificate will render the certificate invalid and make products subject to rejection. Any alteration in the date on the certificate, type of consignment, weight and volume of consignment, and authorized signature on the certificate renders it invalid. A certificate with mutilated particulars is, therefore, unacceptable [8]. The information on the label of the cargo must be descriptive of the exact contents of the cargo as they are in the Sanitary and Phytosanitary certificates [3]. In addition to the sanitary/phytosanitary certificate, some countries require additional declarations like date of harvest, place of harvest, and whether there are any special handling precautions. Absence of such additional declaration to such destination countries leads to rejection [8].

Crop produce intended for export must be free of harmful organisms or toxic substances as rejection can be due to infestation of produce with harmful organisms [4]. Concealment of an uncertified agricultural item in the consignment of a certified produce earns total rejection. Certain products require the exporter to give the Nigeria Agricultural Quarantine Service an advance notification of country to which export is intended [10]. For example, export of Scent leaf (*Ocimum gratissimum),* Utazi leaf (*Gongronema latifolium),* and Uziza leaf (*Piper guineese)* without advance notification to the destination country is considered to be improper export procedure, leading to rejection. Some countries prohibit the export of certain agricultural items; cargo of products on the prohibition list of the destination country is liable to rejection at the port of entry. Also, the detection of residues of unapproved fumigants in the crop produce intended for export may constitute basis for rejection of the cargo [16].

Self-regulation refers to the behavioural control processes including the ability to inhibit and delay responses, flexibility shift, adaptation and maintenance of emotional control in order to achieve goals and direct behaviour towards a target concern. Developing the idea about self-regulation points out four components of self-regulation [7]. These include standards of a desirable behaviour; to make changes in relation to some well-defined and clear standards, as uncertain and conflicting standards do not promote effective self-regulation. The component of monitoring of situations and thoughts, that precede breaking standards, has to do with known operating standard and what needs to be done to achieve self-regulation [12].

The willpower component of self-regulation allows one's internal strength to control urges. The ability to overcome the operating norms and sustaining self-regulation despite the challenges thereof. Also, the motivation component is the inherent drive to self-regulate. Self-regulation is therefore the ability to control one's behaviour, emotions and thoughts in the pursuit of long-term goals. It is one of the key components of emotional intelligence. It was found that there is a synergistic effect in the collaboration between public (stakeholders) and government monitoring with the individual self-regulation, thus increasing exporters' propensity to adopt self-regulation [13].

Crop produce exporters must be willing at all times to comply with all processes necessary for export. Furthermore, the regulatory authorities should be able and willing to regulate properly and efficiently to boost export trade without frustrating the process. If there is no collective will and disposition to drive the export control measures, crop produce rejection will persist. It is therefore noted that the collective self-will called "self-regulation" is worth investigating. Self-regulation is necessary to drive the need to willingly accept to play by the rules and ensure that export control measures are diligently pursued and complied without any coercion. This is a strong option to explore in order to reduce crop produce rejection. It is against this background that this study investigates the self-

regulation status of Nigerian crop produce exporters in an attempt to check agro-export rejection.

1.2. Objectives of the Study

The aim of this study is to investigate the relationship between self-regulation status of exporters and the level of Nigerian crop produce rejection by the destination countries.

The specific objectives of this study are to:

Examine the self-regulation status of crop produce exporters in Nigeria.

Explore the extent of crop produce rejection by the destination countries.

Investigate the effect of self-regulation status of crop produce exporters on Nigerian crop produce rejection.

2. Literature Review

2.1. Theoretical Review

The theories backing this study are the self-regulation theory and the institutional theory.

2.1.1. Self-Regulation Theory by Barry Zimmerman in 1986

Self-regulation theory is a system of conscious, personal management that involves the process of guiding one's own thoughts, behaviour and feelings to reach goals. Self-regulation consists of several stages wherein individuals function as contributors to their motivation, behaviour, and development within a network of reciprocally interacting influences. According to this theory, self-regulation has four components; standards of desirable behaviour, motivation to meet standards, monitoring of situations and thoughts that precede breaking such standards, and willpower. Therefore, for crop produce exporters to be self-regulated, they must be self-motivated to meet desirable export standards, monitor the process of abiding with stated regulations and be steadfast to ensure they do not break any rules or standards.

2.1.2. Institutional Theory by John Meyer and Brian Rowan in 1977

Institutional theory posits that organizations are influenced by the formal and informal rules and norms of the institutional environment in which they operate rather than purely technical or efficiency considerations. The theory assumes that organizations conform to these institutional pressures to gain legitimacy, resources, and stability. According to institutional theory, there exist three types of isomorphism (coercive, mimetic, and normative) that influence organizational behaviour. Coercive isomorphism occurs when organizations conform to pressures from formal institutions such as government regulations or industry standards, such as compliance with phytosanitary regulations, to access international markets and avoid penalties. Mimetic isomorphism arises when organizations emulate practices of other successful or legitimate organizations, often in response to uncertainty, just to gain credibility and ensure compliance with best practices. Normative isomorphism is driven by professional standards and norms, often influenced by professionalization and industry associations. For exporters, normative isomorphism might involve adhering to industry standards set by agricultural and export associations that promote certain quality and safety standards.

2.2. Empirical Review

The determinants of trade flow of some selected non-traditional agricultural export commodities in Nigeria were examined [1]. The study utilized trade data encompassing 36 countries for the period of 2007-2017. Data were analysed using gravity estimation model and Hausman test was used in model selection. Results showed that Nigeria's exports of non-traditional commodities, classified under the Harmonised Standard Code, HS12 in the United Nations International Trade Statistics, conformed to the fundamental expectations of the gravity model. This implied that bilateral trade flows increased in proportion to the Gross Domestic Product (GDP) of trading partners and decreased in proportion to the geographical distance between them. Also, the study highlighted that both the level of openness of Nigeria's economy and the openness of the importing countries played significant roles in determining the trade flow of Nigeria's HS12 commodity exports [1].

The determinants, efficiency, and potential of agro-food exports from Nigeria to the European Union (EU) between 1995 and 2019 using stochastic frontier gravity model were studied [2]. The findings of the study indicated several key determinants of agro-food exports from Nigeria to the EU. The economic size, measured by GDP of both Nigeria and the EU countries, has a positive influence on agro-food exports. Bilateral distance also positively affects agro-food exports from Nigeria to the EU. The findings showed further that Nigeria's per capita GDP, the per capita GDP of its EU trading partners, bilateral exchange rates, and the presence of EU new member states (NMS) exert negative effects on Nigeria's agro-food exports to the EU. Also, the research report highlighted that Nigeria's agro-food exports to the EU are characterized by relatively low levels of efficiency [2].

The Rapid Alert System for Food and Feed (1999 to 2019) was analysed [14]. This was to identify the prevalent food borne pathogens in food shipments originating from African nations to the European Union (EU). *Salmonella* was found to be the most common food borne pathogen in African food exports to the European Union. It was found that Salmonella accounted for 87.8% of 596 PM notifications. Eastern Africa had 52% of Salmonella cases, while Sudan had the most (182). Most Salmonella-contaminated products fell under nuts, nut products, and seeds, primarily sesame seeds (335 out of 343). About 97% of Salmonella-contaminated sesame seeds posed serious consumer risks. This study highlights the pressing

need for African countries exporting to the EU to enhance food safety systems to avoid economic losses from non-compliance with EU standards [14].

The notifications originating from the Rapid Alert System for Food and Feed (RASFF) concerning the contamination of U.S. food and feed products with mycotoxins (specifically Aflatoxins) over the period from 2010 to 2019 were analysed [11]. It was found that approximately 95% of RASFF notifications pertaining to mycotoxins in the U.S. were linked to food items, while only a minor (5%) were related to feed products. Within the realms of US food notifications concerning mycotoxins, a staggering 98.9% were attributed to aflatoxins contamination in almond, peanut, and pistachio nuts. A substantial portion of these notifications, specifically 57.9%, exceeded the (Food and Drug Administration) FDA's prescribed action level for food of 20 ng-g-1 in total aflatoxins levels. The Netherlands took the lead by issuing approximately 27% of aflatoxins notifications concerning U.S. nuts. More than 78% of aflatoxins notifications for U.S. led to border rejections. Therefore, all U.S. feed notifications in the RASFF system were associated with aflatoxins contamination [11].

The impact of phytosanitary standards on international trade in plant products was examined [5]. It was noted that phytosanitary standards is complex in two ways. Firstly, phytosanitary control protects against low-quality goods, non-native pests and diseases. Secondly, phytosanitary negatively affects international trade, makes it difficult for small producers to enter the market, especially when it comes to developing countries. The study provides examples of Vietnam and Chile results. It was concluded that excessively strict phytosanitary regulations act more as a barrier than as a catalyst for trade. Moreover, there was a tendency to tighten requirements. The authors draw attention not only to the necessity, but also to the complexity of harmonisation of phytosanitary standards [5].

The effect of macroeconomic variables, specifically the exchange rate and crude oil prices on agricultural exports in Nigeria during the period of 1981 to 2016 was investigated [15]. Secondary data used were sourced from World Bank Database, Central Bank of Nigeria Statistical Bulletin and Annual financial reports of Statistics of various issues. The research employed the Bound Test Approach, incorporating unit root tests such as the Augmented Dickey Fuller and Philips-Perron tests, as well as regression analysis, to analyze the data. Additionally, a Granger causality test was conducted to assess whether crude oil prices could predict agricultural exports. Results showed a long-term relationship between agricultural exports and the exchange rate, but there was no co-integration between crude oil prices and agricultural exports. However, the study indicated that agricultural exports did not have a causative effect on crude oil prices.

The trend of Nigerian crop produce rejection by the destination countries (2012-2022) was investigated [4]. Secondary data on rejection notices (2012-2022 June) from the European Union's Rapid Alerts System on Foods and Feeds (RASFF), and the UK's Department of Environment, Foods and Rural Affairs (DEFRA) were analysed using descriptive statistics. From the findings, Nigerian crop produce were rejected mostly due to the presence of toxic contaminants (*Salmonella* spp (80, 24.8%), unauthorized Dichlorvos (77, 23.9%), Aflatoxin (37, 11.5%), dead insects (12, 3.7%)), illegal importation (48, 14.9%), absence of phytosanitary certificate, absence of import permit (34, 10.6%), and expired certificate (7, 2.2%). There were 322 crop rejection alerts of 6 major crop produce by 6 main destination countries. Continuous crop produce rejection within the period of 2012-2022 (June) led to economic losses for Nigeria and loss of market access for the produce in the destination countries.

3. Methodology

3.1. The Study Area

The study area is Nigeria. Nigeria comprises six geo-political zones. The population of this study comprises the Nigerian crop produce exporters. There are crop produce exporters in all the six geo-political zones of the country, but only five of the six zones were covered because of insurgency in the North-East Zone. The agro-export industry is a specialized and regulated one, there are not many crop exporters in the nation because it is not an open-door enterprise. The total number of active crop produce exporters in the 5 geopolitical zones was estimated by the NAQS zonal offices to be 305. All the estimated 305 crop produce exporters in the five geopolitical zones were covered in the survey.

3.2. Sources of Data

Data were sourced primarily with the aid of structured questionnaire to elicit information from the 305 crop exporters. Also, key informant interviews (KII) were conducted, covering the 2 notable leaders of crop exporters in each zone. To guarantee the suitability and reliability of the research instrument, the questionnaire used was pre-tested and adjusted to capture necessary information required for the study and was moderated by an agribusiness expert in the field. Data were collected on the ability of the crop produce exporters to self-regulate and their experience of crop produce rejection.

For the ethical consent, a letter of consent was written to the Association of Nigerian Exporters before the commencement of data collection. Each respondent was requested to read the consent form and sign to indicate that they have read and agreed to participate in the study.

3.3. Method of Data Analysis

Data were analysed using descriptive statistics, Principal Component Analysis (PCA) and Ordinary Least Square (OLS) Regression.

3.3.1. Principal Component Analysis

To investigate the self-regulation status of Nigerian crop produce exporters, the principal component analysis was used. A score was generated, based on the 5 domains of self-regulation in the regulatory processes. The domains are negative and dichotomous in nature (Table 1). The exporters were to respond to the questions or statements which served as the indicators for each domain:

Table 1. *The indicators of self-regulation.*

Self-regulation domain	Self-regulation indicators
1. Absence of phytosanitary certificate	Are you aware of the need for phytosanitary certification?
	Do you know where to obtain phytosanitary certification?
	Have you ever obtained a phytosanitary certification?
2. Infestation of crop produce with harmful organisms/ contaminants	Infestation with harmful organisms
	Can you identify crop pests, pathogens and contaminants?
	Do you subject your crop produce to inspection for certification?
	Do you know how to prevent crop pests, pathogens and contaminants?
	Do you use storage pesticide?
	Does your crop produce pass through certified pack-house/warehouse?
3. Forgery/alteration of phytosanitary certificate	I am aware that a phytosanitary certificate can expire
	I have never used an expired phytosanitary certificate
	I am aware that a phytosanitary certificate can be forged
	I have never used a forged phytosanitary certificate
	I am aware that the information on a phytosanitary certificate can be altered by an exporter.
	I have never altered information on a Phytosanitary Certificate
4. Concealment of strange agro-produce in a consignment of certified crop produce	Do you know that a strange agro-produce is the one that is not certified for a particular consignment?
	Are you aware that a strange agro-produce can be concealed in a consignment of certified crop produce?
	Do you know that the consequence of concealment is the rejection of the certified consignment?
	Are you aware that service providers can conceal strange materials in a consignment of certified agro-produce?
5. Exported prohibited materials	Are you aware that some crop produce are prohibited from export to some destination countries?
	Are you aware that absence of import permit from destination countries leads to rejection?
	Do you know the destination countries where your crop produce is/are prohibited?

The indicators of each domain are dichotomous; it is either yes or no. due to the negative nature of the domains and the positive nature of the indicators, a positive response (yes) was coded ‘0’ while a negative response (no) was coded ‘1’. This implies that self-regulation status for each domain can be categorized into 2: An exporter can be self-regulated or non self-regulated.

Thus, exporters with domain index of zero are said to be self-regulated while exporters who take up any value other than zero are non self-regulated in that domain.

Overall, self-regulation index was generated as an average of the indices of the five self-regulation domains. Self-regulation status was of two categories, exporters whose regulatory index equal zero are categorised as self-regulated while those with regulatory index greater than zero and less than or equal to one, are categorised as non self-regulated.

3.3.2. Ordinary Least Square (OLS) Regression

To model the relationship between the dependent variable (number of times of crop rejection), and the independent variables (self-regulation indicators), OLS regression was employed. The simple OLS Equation is expressed as:

$$Y = \beta_0 + \beta_1 X + \varepsilon$$

Where: Y = Dependent variable, X = Independent variable, β_0 = Intercept, β_1 = Slope and ε = error term

In the analysis, 6 OLS regression equations were run to investigate the effect of self-regulation status of crop produce exporters on Nigerian crop produce rejection based on the 5 domains and the overall self-regulation status.

$$CPR = \beta_0 + \beta_1 PCI + \varepsilon \quad (1)$$

Where: CPR = Crop Produce Rejection and PCI = Phytosanitary certification index

$$CPR = \beta_0 + \beta_1 CII + \varepsilon \quad (2)$$

CII = Crop infestation index

$$CPR = \beta_0 + \beta_1 FAI + \varepsilon \quad (3)$$

FAI = Forgery/Alteration index

$$CPR = \beta_0 + \beta_1 CI + \varepsilon \quad (4)$$

CI = Concealment index

$$CPR = \beta_0 + \beta_1 PMI + \varepsilon \quad (5)$$

PMI = Prohibited materials index

$$CPR = \beta_0 + \beta_1 SRS + \varepsilon \quad (6)$$

SRS = Self-regulation status index

4. Results and Discussion

4.1. Self-Regulation Status of Crop Produce Exporters

Results on Table 2 show the distribution of the exporters self-regulation status based on each domain of self-regulation and the overall self-regulation status. Based on the results, high proportion of the exporters were not self-regulated, 35.41% were likely to be guilty of the absence of phytosanitary certificate, 34.43% could have their crop produce infested with harmful organisms/contaminants, and 35.08% could be involved in forgery/alteration of phytosanitary certificate. Also, 33.44% were not self-regulated; they could be involved in concealment of strange agro-produce in a consignment of certified crop produce, and 28.20% could engage in the exportation of prohibited materials. The overall self-regulation status shows that 39.67% of the exporters were not self-regulated. They could be guilty in any of the 5 domains and therefore lead to rejection of their crop produce.

Table 2. *Distribution of Exporters Based on Self-Regulation Status.*

Domains of self-regulation	Frequency (n=305)	Percentage
Absence of phytosanitary certificate		
Non self-regulated	108	35.41
Self-regulated	197	64.59
Infestation of crop produce with harmful organisms/ Contaminants		
Non self-regulated	105	34.43
Self-regulated	200	65.57
Forgery/alteration of phytosanitary certificate		
Non self-regulated	107	35.08
Self-regulated	198	64.92
Concealment of strange agro-produce in a consignment of certified crop produce		
Non self-regulated	102	33.44
Self-regulated	203	66.56
Exported prohibited materials		
Non self-regulated	86	28.20
Self-regulated	219	71.80
Overall self-regulation measure		
Non self-regulated	121	39.67
Self-regulated	184	60.33

Source: Data Analysis, 2025.

4.2. Crop Produce Exportation, Interception and Rejection

Table 3 shows the distribution of crop produce exporters based on the numbers of crop exportation, interception and rejection. The average number of crop export per exporter was approximately 59 times, pointing to about 17,995 times for all

the exporters. Many (45.90%) had exported between 1 and 50 times, 36.72% had exported about 51 to 100 times, 13.11% had exported about 101 to 150 times and 4.26% had exported more than 150 times, over their years of exportation business.

More so, the average interception times was approximately 2 times per exporter. The mean value of crop produce interception of 1.78 ± (2.97) shows that there had been about 542 interception times across the exporters. Although most (63.93%) of the exporters experienced no interception of their crop produce, close to one-quarter (22.62%) and more than one-tenth (13.44%) had experienced interception between 1 to 5 times and 6 to 10 times, respectively. Interception can lead to rejection.

Additionally, the mean number of rejections was found to be 0.64±(1.25), denoting approximately 1 rejection per exporter. Although, majority (73.11%) of the exporters claimed that their produce had never been rejected, this mean value also come to about 195 times of crop produce rejection for all the exporters. This result shows that out of about 542 interceptions, 195 were rejected. More so, a high proportion (21.97%) of the exporters stated that their produce had been rejected 1 to 3 times, and 4.92% had experienced rejection 4 - 6 times.

From the analysis of Nigeria Agricultural Quarantine Service (NAQS) national reports, it was found 322 Nigerian crop rejection alerts of 6 major crop produce by 6 main destination countries within the period of 2012-2022 (June) [4]. She concluded that continuous crop produce rejection within the period led to economic losses and loss of market access for the produce in the destination countries.

Table 3. *Crop Produce Exportation, Interception and Rejection.*

Variables	Frequency (n=305)	Percentage
Number of exports		
1-50	140	45.90
51-100	112	36.72
101-150	40	13.11
>150	13	4.26
Mean: 58.62±(46.74)		
Number of interceptions		
0	195	63.93
1-5	69	22.62
5-10	41	13.44
Mean: 1.78 ± (2.97)		
Number of rejections		
0	223	73.11
1-3	67	21.97
4-6	15	4.92
Mean: 0.64 ± (1.25)		

Source: Data Analysis, 2025.

4.3. Relationship Between Self-Regulation Status of Crop Produce Exporters and Times of Produce Rejection

The cross tabulation results of the relationship between self-regulation status of crop exporters and Nigerian crop produce rejection are shown in Table 4. Results show that about 55.37% of the non self-regulated exporters had rejections and 32.23% did not encounter crop produce rejection despite not been compliant with the regulation policies. Additionally, all (100%) of the self-regulated exporters did not experience any rejection, the results were significant at 1% (p=0.000). Meaning that there is a possibility that self-regulation status of Nigerian exporters influence crop produce rejection.

Table 4. *Self-regulation Status and Crop Produce Rejection.*

Self-regulation status	Number of Rejection		
	No rejection	1-5	6-10
Non self-regulated	39 (32.23)	67 (55.37)	15 (12.40)
Self-regulated	184 (100.00)	0 (0.00)	0 (0.00)
Pearson chi2 (2) = 170.5459		Pr = 0.000***	

Source: Data Analysis, 2025.
Note: Figures in parentheses are percentages
*** significant at 1% level.

4.4. Effect of Self-regulation Status of Crop Produce Exporters on Nigerian Crop Produce Rejection

The ordinary least square regression results of the effect of self-regulation status of crop produce exporters on Nigerian crop produce rejection are presented based on each domain of self-regulation and the overall self-regulation status.

4.4.1. Effect of Absence of Phytosanitary Certificate on Nigerian Crop Produce Rejection

Results of the effect of absence of phytosanitary certificate on crop produce rejection are presented on Table 5. The model was significant at p<0.01, indicating that it has a good fit in determining the relationship between the predicting and the predicted variables. R-squared of 0.3756 implies that the absence of phytosanitary certificate was responsible for 37.56% of the change in crop produce rejection.

Results show that phytosanitary index was positive and significant at p<0.01. Absence of phytosanitary certificate was associated with a 4.24 units increase in crop produce rejection. Therefore, exporters who do not possess phytosanitary certificates face crop produce rejection, all things being equal.

Table 5. *Effect of Absence of Phytosanitary Certificate on Nigerian Crop Produce Rejection.*

Independent Variable	β	Standard Error	P>/t/
Phytosanitary certification index	4.2420***	0.3142	0.000
Constant	0.1034	0.0696	0.139
Number of observation = 305 F (1, 303) = 182.25 Prob > F = 0.0000		R-squared = 0.3756 Adjusted R-squared = 0.3735 Root MSE = 0. 9943	

Source: Data Analysis, 2025.
Note: *** significant at 1% level

4.4.2. Effect of Crop Infestation with Harmful Organisms/Contaminants on Nigerian Crop Produce Rejection

Presented in Table 6 are the results of the effect of crop infestation with harmful organisms on Nigerian crop produce rejection. The model was significant at p<0.01 and the R-squared of 0.3787 indicates that the model has a good fit. Results show that crop infestation with harmful substances was positive and significant with the level of crop produce rejection at p<0.01. Infested crop produce was associated with a 4.72 units increase in the level of crop produce rejection. Thus, crop produce which are infested would encounter rejection, all things being equal. The results of a research work in 2023 showed that a staggering 98.9% of rejections were attributed to aflatoxins contamination in almond, peanut, and pistachio nuts [11]. Also, more than 78% of aflatoxins notifications for U.S. led to border rejections.

Further, it was found by an author in 2025 that 40,708kg of Sesame seed was rejected in 2017 by the United Kingdom due to the presence of Salmonella, and increased to 209,032kg of Sesame seed rejected due to the same reason by Germany, Greece and Netherland in 2018 [4]. Also, 631,707kg of Sesame seed was rejected by Germany, Poland, Greece for the same reason of presence of Salmonella in 2019, 212,783kg rejected by Germany, Greece and Netherland in 2020 and 25kg in 2022. In the same vein, another author, in 2021 found that Salmonella accounted for 87.8% of 596 PM rejection notifications from the European Union to African Nations [14].

Table 6. *Effect of Crop Infestation with Harmful Organisms/Contaminants on Nigerian Crop Produce Rejection.*

Independent variable	β	Standard error	P>/t/
Crop infestation index	4.7267***	0.3478	0.000
Constant	0.1964	0.0657	0.003
Number of observation = 305 F (1, 303) = 184.67		R-squared = 0.3787 Adjusted R-squared = 0.3766	

Independent variable	β	Standard error	P>/t/
Prob > F = 0.0000		Root MSE = 0. 9918	

Source: Data Analysis, 2025.
Note: *** significant at 1% level.

4.4.3. Effect of Forgery/Alteration of Phytosanitary Certificate on Nigerian Crop Produce Rejection

Table 7 illustrates the effect of forgery/alteration of phytosanitary certificate on Nigerian crop produce rejection. The model used was also significant at p<0.01. R-squared value indicates that the independent variable contributed to about 25.26% change in the dependent variable. Results show that forgery or alteration of phytosanitary certificate was associated with a 3.29 units increase in the level of crop produce rejection and this was significant at p<0.01. Based on this result, crop produce exporters with forged phytosanitary certificates encounter rejection, all things being equal.

Table 7. *Effect of Certification Forgery/Alteration on Nigerian Crop Produce Rejection.*

Independent variable	β	Standard error	P>/t/
Forgery/Alteration index	3.2905***	0.3251	0.000
Constant	0.2754	0.0722	0.000
Number of observation = 305 F (1, 303) = 102.39 Prob > F = 0.0000		R-squared = 0.2526 Adjusted R-squared = 0.2501 Root MSE = 1.0879	

Source: Data Analysis, 2025.
Note: *** significant at 1% level.

4.4.4. Effect of Concealment of Strange Agro-produce on Nigerian Crop Produce Rejection

Regression results in Table 8 show the effect of concealment of strange agro-produce on Nigerian Crop Produce Rejection. The model was significant at p<0.01, indicating a good fit and the R-squared of 0.2720 indicates that the predicting variable was responsible for 27.20% change in the predicted variable. According to the findings, concealment of strange agro-produce in a certified consignment was positive and significant at p<0.01. Strange agro-produce concealment was associated with a 3.88 units increase in the number of crop produce rejection. Thus, exporters who conceal strange agro-produce in the consignment of certified crop produce could encounter rejection, all things being equal.

Table 8. *Effect of Concealment of Strange Agro-produce on Nigerian Crop Produce Rejection.*

Independent variable	β	Standard error	P>/t/
Concealment index	3.8855***	0.3652	0.000
Constant	0.2382	0.0724	0.001
Number of observation = 305 F (1, 303) = 113.19 Prob > F = 0.000		R-squared = 0.2720 Adjusted R-squared = 0.2696 Root MSE = 1.0737	

Source: Data Analysis, 2025.
Note: *** significant at 1% level.

4.4.5. Effect of Exportation of Prohibited Materials Exportation on Nigerian Crop Produce Rejection

Results of the effect of exportation of prohibited materials on crop produce rejection are illustrated in Table 9. The model was also significant at p<0.01 and the R-squared value of 0.2226 indicates that the independent variable was responsible for about 22.26% change in the dependent variable. Exportation of prohibited materials was positive and significant at p<0.01. The exportation of prohibited materials was responsible for 2.81 units increase in the level of crop produce rejection. All things being equal, an exporter whose produce is not free of prohibited materials is said to be non self-regulated and could experience rejection.

Table 9. Effect of Exportation of Prohibited Materials Exportation on Nigerian Crop Produce Rejection.

Independent variable	β	Standard error	P>/t/
Prohibited materials index	2.8129***	0.3020	0.000
Constant	0.3169	0.0726	0.000
Number of observation = 305 F (1, 303) = 86.75 Prob > F = 0.0000		R-squared = 0.2226 Adjusted R-squared = 0.2200 Root MSE = 1.1095	

Source: Data Analysis, 2025

Note: *** significant at 1% level.

4.4.6. Effect of Self-Regulation Status of Crop Exporters on Nigerian Crop Produce Rejection

The regression results on the effect of self-regulation status of crop produce exporters on Nigerian crop produce rejection are presented in Table 10. Similarly, the model is significant at p<0.01 and the R-squared value shows that the independent variable accounted for 39.23% change in the dependent variable.

Results show that non self-regulation status was significant and was positively related to crop produce rejection at p<0.01. Exporters that do not comply with the regulatory measures could experience their produce being rejected as non self-regulation status was associated with a 5.03 units increase in crop produce rejection.

Table 10. Effect of Self-Regulation Status on Nigerian Crop Produce Rejection.

Independent variable	β	Standard error	P>/t/
Self-regulation status index	5.0310***	0.3582	0.000
Constant	0.0970	0.0683	0.000
Number of observation = 305 F (1, 303) = 197.25 Prob > F = 0.0000		R-squared = 0.3943 Adjusted R-squared = 0.3923 Root MSE = 0.9793	

Source: Data Analysis, 2025.

Note: *** significant at 1% level

5. Conclusion

High proportions of the crop exporters were not self-regulated in the domains of self-regulation - absence of phytosanitary certificate, crop infestation with organisms/contaminants, forgery/alteration of phytosanitary certificate, concealment of strange agro-produce in a consignment of certified crop produce, and exportation of prohibited materials. These lead to a significant increase in Nigerian crop produce rejection. Overall, high proportions of the exporters were not self-regu-

lated and non self-regulation of exporters increases crop produce rejection. In conclusion, infestation of crop produce with harmful organisms/contaminants contributes most to Nigerian crop produce rejection and there is a significant relationship between self-regulation status of crop produce exporters and Nigerian crop produce rejection.

6. Recommendation

Based on the findings of this study, there is the need to improve self-regulation of exporters in order to reduce crop produce rejection. There should be an increased awareness and training of Nigerian crop produce exporters. Nigeria Agricultural Quarantine Service (NAQS) should collaborate with export associations and conduct regular training programmes to improve exporters' understanding of international standards, including Good Agricultural Practices (GAP) and phytosanitary requirements. These include improving post-harvest handling, registering every warehouse and instituting integrated pest management (IPM) and insect trapping. This is with a view to improving the exporters' self-regulation and support the zero rejection initiative of the Federal Government of Nigeria.

7. Suggestions for Further Studies

This study mainly assessed the relationship between self-regulation status of Nigerian exporters and the level of crop produce rejection in the destination countries. Other studies can focus on particular crop produce, especially the major ones being exported in Nigeria. These crops include cocoa, sesame, hibiscus, cashew, ginger, yam, soybean, melon, potatoes and maize.

8. Ethical Approval

Primary data were collected directly from the Nigerian crop produce exporters on their self-regulation status and experience of crop produce rejection. For the ethical consent, a letter of consent was written to the Association of Nigerian Exporters before the commencement of data collection. Each respondent was requested to read the consent form and sign to indicate that they have read and agreed to participate in the study.

Abbreviations

DEFRA	Department of Environment, Foods and Rural Affairs
EU	European Union
FDA	Food and Drug Administration
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
IPM	Integrated Pest Management
NAQS	Nigeria Agricultural Quarantine Service
RASFF	Rapid Alert System for Food and Feed

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Abdullahi, N. M., Huo, X., Zhang, Q. and Azeez, A. B. (2021a). Determinants and potential of agri-food trade using the stochastic frontier gravity model: Empirical evidence from Nigeria. Sage Open, 11(4), 1-12. https://doi.org/10.1177/21582440211065770

[2] Abdullahi, N. M., Aluko, O. A. and Xuexi, H. (2021b). Determinants, efficiency and potential of agri-food exports from Nigeria to the EU: evidence from the stochastic frontier gravity model. Agricultural Economics/Zemědělská Ekonomika, 67(8), 337-349.

[3] Alabi, O. O., Madaki, M. J., Sanusi, S. O., Umar, S. A., Omole, E. B., Olumuyiwa, S. A., David, H. S., Emeghara, U. U., Waziri-Ugw, P. R. & Shaba, M. G. (2022). Factors influencing export performance of Ginger (Zinbiger officinale) in Nigeria, International Journal of Agriculture, Environment and Food Sciences 6(3), 370-377.

[4] Alawode, O. O. (2025). Trend and Implications of Crop Produce Rejection in Nigeria. International Journal of Business & Law Research, 13(2), 8-17. https://doi.org/10.5281/zenodo.15175415

[5] Barreiro-Hurle, J., García-Alvarez-Coque, J. M., Martinez-Gomez, V. and Marti, L. (2024). Trade impacts of external border measures under the European Union's plant health legislation. Pest Management Science, 80(3), 1607-1614.

[6] Eze, E. I, Inyiama, O. I. and Ezugwu, I. (2023). Corporate Overheads and Operational Performance of Brewing Firms in Nigeria. International Journal of Business and Management Review, 11(9), 1-15.

[7] Khatami, F., Ricciardi, F., Cavallo, A. and Cantino, V. (2022). Effects of Globalization on Food Production in Five European Countries. British Food Journal, 124(5), 1569-1589.

[8] Lee, Y. S. (2021). Regulatory Autonomy under the WTO Agreement on Sanitary and Phytosanitary Measures: Implications of Korea–Import Bans, and Testing and Certification Requirements for Radionuclides. World Trade Review, 20(3), 321-342.

[9] Lengai, G. M., Fulano, A. M. and Muthomi, J. W. (2022). Improving Access to Export Market for Fresh Vegetables through Reduction of Phytosanitary and Pesticide Residue Constraints. Sustainability, 14(13), 8183.

[10] Okeke, I. C., Agu, E. E., Ejike, O. G., Ewim, C. P. and Komolafe, M. O. (2023). A Conceptual Model for Agro-Based Product Standardization in Nigeria's Agricultural Sector. International Journal of Frontline Research Review, 1(3), 1-17.

[11] Owolabi, I. O., Karoonuthaisiri, N., Elliott, C. T. and Petchkongkaew, A. (2023). A 10-year analysis of RASFF notifications for mycotoxins in nuts. Trend in key mycotoxins and impacted countries. Food Research International, 172(6), 1-10. https://doi.org/10.1016/j.foodres.2023.112915

[12] Ozhiganova, G. V. (2019). Self -regulation and self-regulatory capacities: Components, levels and models. RUDN Journal of psychology and pedagogics, 15(3), 255-270.

[13] Schunk, D., Berger, E. M., Hermes, H., Winkel, K. and Fehr, E. (2022). Teaching Self-Regulation. Nature Human Behaviour, 6(12), 1680-1690.

[14] Somorin, Y. M., Odeyemi, O. A. and Ateba, C. N. (2021). Salmonella is the most common foodborne pathogen in African food exports to the European Union: analysis of the rapid alert system for food and feed (1999–2019). Food Control, 123, 107895. https://doi.org/10.1016/j.foodcont.2020.107849

[15] Vatsa, P. and Baek, J. (2024). Does agricultural trade respond asymmetrically to oil price shocks? Evidence from New Zealand. Australian Economic Papers, 63(4), 553-569.

[16] Zhe Chen, X. L., Shohong, X. and Xianli, X. (2024). Individual Self-Regulation, External Monitoring and Farmer's Safe Production Behaviour: Evidence from the Kuan-Chung Plain, China. Journal of Environmental Management, 354, 120474.