Using A Nerlovian Model Approach to Estimate Rice Productivity in Sierra Leone.

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ABSTRACT

Rice grain is Sierra Leone's staple food, the country imports over 415,000 metric tons annually due to inadequate domestic production. Thus, the low level of rice cultivation in Sierra Leone is evident in persistent imbalance between domestic supply and demand. Consequently, the government spends substantial financial resources on rice imports that can otherwise be saved through increase domestic production.

This study examines the response of rice supply to changes in demand in Sierra Leone over the period 1996 to July 2026.

The Nerlovian adjustment model was employed to analyze the Sierra Leone rice dataset for the study period. The estimated trend equations revealed that time had a statistically significant effect on output, productivity (yield) and cultivated area (acreage) during the study period, generally at the 1 % level of significance.

The results tend to recommend that virtually the entire growth in output was due to an increase in area cultivated to the crop. The time trend variable that has been involved for government policy intrusion shows that there is no significant effect on the variables under contemplation in this research. Consequently, both the short-run and long-run price response are inelastic, as their estimated values were less than one.

Based on the above findings, instant policy actions are required to promote efficient growth in rice production.

To achieve this objective, the relevant government agencies should strengthen agricultural extension services and encourage farmers to adopt improved rice varieties, modern production technologies, and better cultivation practices to enhance rice production in Sierra Leone.

Keywords- Price elasticities, Trend Equations, Nerlovian Adjustment Technique, Rice supply response, Sierra Leone.

INTRODUCTION

There are several issues that seem to affect modern agricultural economics, nonetheless, supply response of agricultural produce mainly crops, seems to be the leading. One of the reasons forwarded by several researchers is owing to the responsiveness of cultivators to profitable incentives, which impacts the sector's input to the GDP of a nation. Positive intervention in agricultural sector, specifically in food pricing policy, also contributes greatly to maximizing agricultural production. In such a situation, Supply response becomes a leading aspect in understanding the dynamics of price system.

In developing nations such as Sierra Leone, the principal objective of state intervention in agricultural price policy among others are; income equity among cultivators, to reduce food prices for all its citizens and increase exports to receive huge foreign exchange.

Few key agricultural crops have been fixed beneath the global prices, and this is achieved by employing trade tailbacks as well as subsidies, which safeguard that prices and factors of local market limit real prices.

In the early 1960s and early 1980s[1], Sierra Leone was food independent and even export some key agricultural crops such as cocoa, coffee and rice to earn foreign exchange. In addition, rice cultivation was one of Sierra Leone's base sectors of agricultural production that gave the country a place in the mid-1960s for rice exportation in the global market. However, maladministration by state authorities resulted in over dependence on rice importation of this very considerable grain.

Also, the civil conflict that overwhelmed the entire nation in the early 1990s to 2002, also disrupted agricultural activities[2]. Consequently, there exist a wide food supply-demand gap[3] and increasing food imports cost[4].
Between 2020 and July 2026, the average domestic demand for rice was 1,500,200 metric tons while the average rice (milled equivalent) supply was only 670,120 metric tons. Therefore, the government needs to embark on rice importation to meet the requirement of its rising population

To increase rice output in the country, the government Sierra Leone has prioritized the agricultural sector as the most important sector of the national economy and a key driver of economic development. This priority is justified, as agriculture contributes approximately 55% of the country's Gross Domestic Product GDP and employs more than 85% of the national labor force.

Furthermore, achieving agricultural self-sufficiency is a key national policy objective and an essential component of sustainable economic development. This development strategy has significant implications for both the socioeconomic and institutional environments in which rice farmers conduct their farming activities. Agricultural researchers and extension experts have developed various technologies and support systems through which rice farmers can improve their productivity, efficiencies, and outputs.

However, despite the implementation of agricultural policies and socio-economic reforms that have taken place over the years, several important questions remained unanswered. what has been the rice farmers' normal response regarding to these policy changes in Sierra Leone? What has the impact of restrictions on rice imports and import embargoes introduced to promote self-sufficiency? Have these policies significantly influenced both the short-run and long -run supply response of rice producers? Furthermore, have the various agricultural policies successfully encouraged satisfactory growth in rice production? Finally, are output prices, non-price incentives, and other supply shifters significant determinants of rice supply response?

Rice in Sierra Leone is predominantly grown or cultivated in the upland regions, where the environmentally harmful slash and burn system of farming is still widely practiced despite been discourage by agricultural authorities. About 90% of the Sierra Leonean farmers inhabit in the rural communities where they derive their livelihoods from agricultural activities. And yet, each year the country does import about 43% of the staple food. Subsistence rice farming is the principal agricultural activity that is practiced by nearly 73% of the farming families. Although farmers do cultivate additional crops such as sweet potatoes, cassava and vegetables, rice is evidently the primary crop cultivated by most farmers.

Sierra Leone requires about 3,230,000 mt of milled rice[5] yearly to meet the consumption requirements of its population. The National paddy rice production was estimated at 1,020,000 mt in 2022 and 1,301,000 mt in 2024. The level of rice independence escalated from 61.38 percent in 2022, to 72.10 percent in 2025 and followed by 76 percent as of 25th July 2026. This implies the rest must be imported at a progressively expensive price in the occurring situation of high prices for foodstuffs including rice.

Seventy-four percent of the land area of the country, safeguarding 5.6 million hectares, is appropriate for cultivation. This area comprises 1.1 million hectares of lowland and 4.3 million of upland. About 88% of the lowland ecology is farmable and well suited for rice cultivation, and these encompass the fertile inland valley swamps that are found in all the farming communities in the country, the subterranean flooding riverain grasslands in the southern province, the less fertile saucer shaped Boli lands in the northern region and the tidal mangrove swamps of the North-Western coastal belt.

Enhanced rice vanities and modern rice cultivation techniques have been established and made known amongst most farmers in the country. Although there were low rates of implementation of upgraded agricultural techniques as well as improved rice varieties[6].

So, the population and demand for rice grain are on the increase in Sierra Leone without a subsequent increase in domestic output of the grain, importation of this grain inevitable. Also, high exchange rates can worsen the situation as import and debts servicing expenditures increase with their contrasting effects on domestic output since more public resources would be used to repay foreign debt. The importation of foodstuffs at higher prices could hardly be seen effective in resolving problems of nutritional requirements since increased in foreign costs would be transferred to higher retail prices of rice grain in the local market.

Therefore, the government should endeavor to find ways of decreasing foreign debts through a transforming interest in agricultural supply response approach. Subsequently, a clear consideration of the beliefs and issues influencing the forces of domestic rice supply and demand in Sierra Leone can create a thoughtful problem in its policy making. Hence, this study thought to be of direct application in rice cultivation policy outcomes in Sierra Leone and in other developing nations meeting a comparable circumstance.

A. Problem Statement and Research Questions

Recently, rice has become a staple food for both urban and rural consumers[7] throughout West African, including Sierra Leone. Yet, the West African region has observed a sharp drop in per capita agricultural food production over the past two decades. Conversely, attempts are ongoing to reverse this trend by drastically increasing food supplies for its growing population. Western Africa experienced slow- growth in the agricultural sector[8].

Rice production has been increasing more rapidly than population in many parts of the globe; however, Africa has been lagging, except for a few countries- such as Nigeria and Burkina Faso- that have seen improvements in food security. This gap between production and rapid population growth in Africa is causing harmful outcomes, including a heavy external debt burden. The World Food Program (WFP) reported that over 50% of its food aid delivery to Africa, assisting 36.4 million people in 2003[9], compared to 20 million in 1999[10]. As in many other economies, rice plays a central role in the economy of Sierra Leone, and its production status carries both political and socio-economic implications. The country was an exporter of rice until 1960s, and evidence shows that Sierra Leone was self-sufficient in rice[11], the national staple, during certain periods[12].However, this trend did not continue.

Sierra Leone's status has shifted from being rice exporter to an importer [13] .The inadequate state of rice cultivation in Sierra Leone has resulted in high prices and an annual increase in expenditure on importing various goods including rice grain.

This has created a critical issue regarding both the supply and demand for these commodities, as well as the depletion of foreign reserves for importing these supplies that could have been competitively manufactured or produced within the country. These variations in the annual domestic production of such crops are ascribed to the acreage cultivated and the output of these crops.

For this study, acreage allocation, productivity and crops outputs are the primary variables of interest. Consistent with other research, the need to increase food production in Sub-Saharan African has been emphasized in various meetings. Agricultural output and total annual food production in Sierra Leone are regrettably poor. The improvement in agricultural output quality is limited by its significance. There are various factors responsible for the low performance of the sector; however, as stated by Scherr et al[14], Soil quality contributes relatively more to agricultural output in low-input production environments.

The rate at which agricultural productivity is progressing in Sierra Leone is unsatisfactory. Moreover, low productivity for key agricultural crops is widespread in Sierra Leone[15], and this is mostly attributed to several factors, including a poor institutional environment. Variability in agricultural produce in Sierra Leone was higher between 2014 and 2019 than in 2010-2023[16]. Some short -term analyses carried out by the Sierra Leone Agricultural Research Institute and the ministry of Agriculture, Forestry and Food Security (SLARI-MAFFS., 2024) discovered that, the annual coefficient of variation for key agricultural crops in Sierra Leone was far below the expected[17] between these periods. From this observation, there is a need for long-term research on this variation.

In line with FAO (2025), the changeability between the rates of increase in total productivity (yield per hectare) and production (output) shows that on average, households cultivate slightly less than one hectare of fertile land[18]

Repetto et al[19], discoursed that low productivity and reduction in output and farming activities are as a result of the increasing use of minimal lands.

Hence, this study will investigate the following research questions:

1. In what way does productivity and cultivated areas previously influence the crops' output?
2. What are the major contributions of productivity and cultivated areas to the output of the crops?
3. Periodically, what is the status of the variations in these significant variables in the Sierra Leone rice cultivation?

Therefore, this study attempts to apply the Nerlovian adjustment model to rice cultivation in the Sierra Leone situation. The Nerlovian Adjustment model being most popular supply response model[20], has been chosen in explaining possible variations[21]. It is frequently use because it incorporates all significant variables[22].The Nerlovian model is a dynamic model, which state that output is a function of the expected price, output (area) adjustment, and some exogenous variables[23]. Specifically, this study assesses the response of rice cultivation to policies beginning from 1996(when policy was introduced) as well as estimating the price supply response elasticities[24] for rice, established the rate of adjustment of rice output with respect to policies, and to determine the main sources of development in rice cultivation.

METHODS AND MATERIALS

A. Sources of Data

Through the help of the internet and pursuit engines such as Google scholar, some data on rice yield, output and prices over the years were salvaged from Food and Agricultural Organization database (FAOSTAT, 2026).Additional data were sourced from government agencies in Sierra Leone, including the Ministry of Agriculture, Forestry[25] and Food security (MAFFS), the Sierra Leone Agricultural Research Institute (SLARI), Statistics Sierra Leone (SSL), International Financial documents, Organization of Islamic Cooperation(OIC)database, and the African Development Indicators (ADI) database..
Additionally, the study sourced information from published articles in reputable journals.
The dataset covers the period from 1996 to July 2026[26].

B. Technique of Data Analysis

To examine the response of rice cultivators to price changes, the study employed the Nerlovian Adjustment Model [27], which allows the adjustment to changes in the price to be distributed for over one year[28]. In recent years[29], this model has been widely adopted and applied in numerous studies on agricultural production[30] by many economists to data of various nations since producers are anticipated to adjust to different production and macro-economic environments[31].

In studies of rice production in Sierra Leone, output, acreage, and productivity are three distinct but closely related variables:

1. Output (Dependent Variable)

Refers to the total quantity of rice produced, usually measured in metric tons (MT).
It indicates the overall production level each year or region.

2. Acreage (Independent Variable)

Refers to the total land area cultivated with rice, usually measured in hectares (ha).

Increasing the cultivated area generally increases total rice output, assuming other factors remain constant.

3. Productivity (Dependent or Outcome Variable)
Refers to the amount of rice produced per unit of land, usually measured as tons per hectare (t/ha).

Relationship among the variables:

Output = Acreage × Productivity

If acreage increases while productivity stays the same, output increases.

If productivity increases while acreage remains constant, output also increases.

If both increase, output rises even more.

This framework is widely used in agricultural economics and production analysis because it helps distinguish whether changes in rice production are due to expanding cultivated land or improving yield per hectare.

Justification for Using the Nerlovian Approach in Time Series Analysis.

The Nerlovian approach, developed by Marc Nerlove, is widely used to analyze agricultural supply responses because it recognizes that farmers cannot adjust production instantly in response to changes in economic conditions. Instead, adjustments occur gradually over time due to biological, financial, institutional, and technological constraints.

The Nerlovian approach is justified for analyzing time series data on rice production in Sierra Leone for the following reasons:

Captures dynamic adjustment behavior: Farmers do not immediately change acreage or production following changes in prices or policies. The Nerlovian model incorporates partial adjustment, making it suitable for agricultural time series.

Reflects farmers' expectations: The model assumes that farmers make production decisions based on expected rather than current prices, which is more realistic because planting decisions are made before harvest prices are known.

Is appropriate for agricultural production: Rice production is influenced by previous production levels, expected profitability, rainfall, input availability, and government policies. The Nerlovian framework captures these dynamic relationships effectively.

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Accounts for production inertia: Agricultural production cannot be adjusted instantly because of fixed resources such as land, labor, irrigation facilities, and capital investments. The model explicitly accounts for these adjustment lags.

Is suitable for policy analysis: The approach allows researchers to estimate both short-run and long-run responses of farmers to changes in prices or other explanatory variables, making it valuable for evaluating agricultural policies.

Is widely accepted in empirical agricultural economics: The Nerlovian model has been extensively used in studies of crop supply response in developing countries, making it a credible and well-established methodological choice.

Application to Rice Production in Sierra Leone

For rice production in Sierra Leone, the Nerlovian approach is appropriate because farmers' decisions regarding cultivated area and output are influenced by previous production levels, expected rice prices, input costs, rainfall, and government support. Since these factors affect production with a time lag, the Nerlovian model provides a realistic framework for estimating how rice farmers adjust production over time and for assessing the likely impact of agricultural policies on future rice output.

The model is formfitting within the Nerlovian dynamic models framework[32], hence, it is expected that the desired rice output(Q^e) can be given by the succeeding long-run function:

$$LnQ_t^e = \alpha + \beta LnP_{t-1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where P represents the price of rice at time t

Ln is the natural logarithm

Again, from assumption, the actual rice output (Q) does not instantly tend to (Q^e) as P changes, instead its response is in accordance with the succeeding sequence:

$$LnQ_t - LnQ_{t-1} = \pi\left(LnQ_t^e - LQ_{t-1}\right) \ldots\ldots\ldots\ldots\ldots (2)$$

Where the adjustment rate (π), corresponds to

$$0 \leq \pi \leq 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Putting (2)' into (1)' and introducing the time trend(t) to justify such effects as improvements in agro-technology in accumulation to policy reformations on rice and including a disturbance error term(δ), then, the full model function can be reduced to:

$$LnQt = S_0 + S_1 LnQ_{t-1} + S_2 LnP_{t-1} + S_3 t + \delta t \ldots\ldots (4)$$

Where,

$$S_0 = \pi\alpha, \quad S_i = I - \pi, \quad S_2 = \pi\beta \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

and δ is assumed to obey the resulting expression

$$\delta t = \theta\delta_{t-1} + et \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Where, $E(e) = 0; \quad Cov(e) = \varepsilon^2 I \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$

Where, β is the long-run price elasticity[33] and S_t is the short-run price elasticity of supply[34] with respect to the dependent variable[35]. For this study, area (acreage=A), output and productivity (yield) are however used separately as dependent variables in diverse equations.

The diagnostic statistics of interest include the standard error of regression (SE), R^2, estimates of θ as well as π and Durbin- H statistics, since Durbin Watson's statistics are not applicable in this situation for comparison, the regression model is supposed to be re-estimated without involving the time trend; that is

$$LnQ_t = K_0 + K_1 LnQ_{t-1} + K_2 LnP_{t-1} + \sum t ....(8)$$

The time(t) trend symbolizes the post 1996 era as zero and one; otherwise, it represents the policy period on rice cultivation, this formulation is used to assess the response of rice cultivation without involving the trend variable (t).

C. Trend Equations

The generalized trend equations were estimated for each of the variables[36], with time (t) as the response variables in all the instances.

The generalized trend equation can be expressed as:

$$LnQ_t = c + \Re t + z ....(9)$$

This study aims at achieving the growth rate of the variable and this can be illustrated as:

$$\Psi = \left[(\exp \Re)^{-1}\right] \times 100 ....(10)$$

Where the growth rate decomposed (Ʀ) into the contributions to productivity (yield=Y) and output (Q) by area (acreage=A).

EViews software was employed in estimating the Nerlovian models as well as estimating the equations.

RESULTS AND DISCUSSIONS

Table I shows the results of the trend equations for all the variables of inclusion with respect to the given period. From Table 1, the output (Q) and the area (acreage=A) documented growth rates in all instances, while Productivity (yield=Y) only documented positive result in the 2011-2026(. However, it documented negative results for the periods 2012-2026 and over the whole period of 1996-2026.

TABLE I
VARIABLES GROWTH RATES

Growth rate (Ʀ)	Output(Q)	Area(acreage=A)	Productivity (yield=Y)
1996-2026	9.06	10.23	-0.94
2011-2026	10.12	8.09	3.16
2012-2026	5.10	10.01	-5.07

Source: Authors' analysis, 2026

Table II: comprises of the growth rate decomposition results

In period (1996-2026), the area (acreage=A) contributed approximately 96.0% of the output whereas Productivity (yield=Y) documented a reduction of 6.5 % regardless of the rice policy that was in operation in the country. During the pre-reform period (2011-2026), the area (acreage=A) contributed 82.4 % to the total output, and Productivity (yield=Y) accounted for approximately 26.1 % of the total output.

During the period (2012-2026), the area (acreage=A) was accountable for 198.0% of output with Productivity (yield=Y) recorded a reduction of 83.0% contribution to the output. However, time had a major effect on all variables of inclusion (in the trend equations). For the parameters, six were significant at the 1% level and the three were significant at the 5% level (Table VII).

Again, it should be understood here that time had a significant and positive effect on both output and area for these periods and positive effect on the Productivity (yield=Y) for 2011-2026 sub-period even though it had a significant and negative effect on the Productivity (yield=Y) for both 1996-2026 and 2012-2026 sub-periods.

Table III shows the regression estimates of the supply response[37], for rice with time trend as a response variable. All estimated coefficients for both lagged output (S_1) and price (S_2) have the expected signs and are reasonable; and the goodness of fit for the estimated equations[38] as measured by R^2 is reasonably good[39].

In all the instances, the value of R^2 ranges between 0.55 and 0.88 and the coefficients of the estimated lagged area variable are significant at the 1% level. The coefficient of the estimated price is negative and significant only for yield at the 10% level.

All the parameters that are involved in trend equations are not significantly different from zero. For the effort of comparison, this result inclines to support the estimation of a model that lacks this variable.
Table IV displays the results of the model that lacks the trend variable.
Here, all the coefficients of the estimated lagged output are positive and significant at the 1% level of significance[40]. It is however good to state here that all the coefficients of the estimated price are statistically significant at the 10% level of significance[41].

In comparing this second results to the first, one can deduce that the second model is better than the first.
Also, the R^2 for all equations in the second model are practically equivalent to those in the first model for all instances. Correspondingly, the standard errors of regression are nearly equivalent to those in the first model.

The coefficient of adjustment (π) for the variables is sufficiently close to one another. But, since they range between 0.30 and 0.34 (Tables III and IV) and all are less than 0.5, the rate of adjustment of production is slow. However, if $\pi \geq 0.5$, the rate of adjustment is regarded as faster.

A. Test of Autocorrelation:

Durbin-Watson (DW) statistic is a test statistic[7] used to detect the presence of autocorrelation in the residuals from a regression analysis[42]. It is the most renowned test for detecting autocorrelation[42], developed by Durbin and Watson[43].

Nevertheless, the test is valid only if the subsequent conditions hold; the study uses a time series data, there exist a constant in the equation, that autocorrelation is of the first order[43] and the equation does not include lagged values of the dependent variable[44] as regressor.

For this study, all the equations have lagged values of the dependent variable[45] as regressor; and since this is the situation, a modified of DW recognized as Durbin-H statistic is employed to perform the test. This test statistic can be expressed as follows:

$$H = \left(1 - \tfrac{1}{2DW}\right)\sqrt{n} / 1 - \left(nVar\beta\right) \ldots\ldots\ldots\ldots\ldots (11)$$

Where,

DW is the calculated DW statistic, Var (β) is the variance of the coefficient of the lagged dependent variable[46], and n is the sample size.

TABLE II
GROWTH RATES DECOMPOSITION RESULTS

Growth decomposition	Output(Q)	Area(acreage=A)	Productivity (yield=Y)
1996-2026	100	95.7%	- 6.5
2011-2026	100	81.9	26.1
2012-2026	100	197.6	- 83.0

Source: Authors' analysis, 2026

TABLE III
MODEL WITH TREND VARIABLE

Variable	S_0	S_1	S^2	S^3	R^2	SE	rho(θ)	H	π	β	DW
Output(Q)	2.98 (2.51)	0.72^{***} (5.19)	0.08 (0.87)	0.27 (0.55)	0.81	0.31	0.06	0.41	0.34	0.29	1.845
Area(acreage=A)	3.01 (1.64)	0.74^{***} (6.01)	0.06 (1.41)	0.09 (0.73)	0.88	0.27	-0.03	-0.44	0.31	0.31	2.082
Yield(Y)	2.89 (2.76)	0.64^{***} (4.88)	-0.08^{*} (1.55)	0.16 (1.08)	0.55	0.24	-0.26	-0.21	0.36	-0.18	2.367 Df= 34

Source: Authors' analysis, 2026, *** Significant at 1% & * Significant at 10%

TABLE IV
MODEL WITHOUT TREND VARIABLE

Variable	S_0	S_1^1	S^2	S_3	R^2	SE	rho(θ)	H	π	β	DW
Output(Q)	2.65 (2.21)	0.73^{***} (5.51)	0.10^{*} (1.02)	-	0.81	0.31	0.06	0.41	0.33	0.38	1.837
Area(acreage=A)	2.92 (1.61)	0.74^{***} (6.04)	0.09^{*} (1.51)	-	0.88	0.27	-0.01	0.35	0.31	0.40	2.071
Yield(Y)	2.77 (2.41)	0.70^{***} (5.12)	-0.05^{*} (1.76)	-	0.54	0.22	-0.32	2.69	0.30	-0.10	2.513 Df=34

Source: Authors' analysis, 2026, *** Significant at 1% & * Significant at 10%

The H statistics for both the output and area equations are respectively 0.41 and -0.44 for the trended equations. When these values are compared with the critical Z-score (Z=1.645) at 5% level of significance, we noticed that both H values are less than the Z value, therefore, the null hypothesis that θ = 0 (there is no autocorrelation in the equation [2]) is accepted. These results are in accordance with those of Gettis et al[47]. Hence, for these equations, the θ values are respectively 0.06 and -0.03. Nevertheless, for the trended yield equation, the H statistic is -0.21 with θ value of -0.26 and in absolute value, this is greater than 1.645. This implies that there exist a negative first-order autocorrelation[48] in its equation. A comparable result is also achieved for the untended equations. Here, the output as well as the area equations carry H statistics of 0.41 and 0.35 respectively. Therefore, the null hypothesis H: θ =0 is accepted in all the instances. Consequently, there is no autocorrelation in these equations. However, the yield equation revealed a negative first order correlation.

TABLE V
ESTIMATING PRICE ELASTICITIES USING POLICY DUMMY

Variable	Short run	Long-run	Differential
Output(Q)	0.04	0.16	0.12
Area(acreage=A)	0.07	0. 31	0.24
Productivity(yield=Y)	-0.06	-0.18	0.13

Source: Authors' analysis, 2026

TABLE VI
ESTIMATING PRICE ELASTICITIES IN THE ABSENCE OF POLICY DUMMY

Variable	Short run	Long-run	Variance
Output(Q)	0.06	0.25	0.19
Area(acreage=A)	0.09	0.40	0.31
Productivity(yield=Y)	-0.03	-0.10	0.07

Source: Authors' analysis, 2026

TABLE VII
ESTIMATED PARAMETER FROM THE TREND EQUATION.

Variable	Output(Q)	Area(acreage=A)	Productivity(yield=Y)
1996-2026	0.0815^{***} (18.134)	0.0594^{***} (5.9964)	0.0311^{**} (5.0011)
2011-2026	0.0794^{***} (7.0081)	0.0886^{***} (10.6542)	0.0512^{**} (10.9873)
2012-2026	0.0542^{***} (5.0765)	0.0910^{***} (23.8760)	0.0059^{**} (1.6786)

Source: Authors' analysis, 2026, *** Significant at 1% & **Significant at 5%

Tables V and VI display the estimates of price elasticities[49] for the models with drift as well as without drift respectively. We observed that there are small variations in the estimates for both the short-run and long-run models. However, the long-run estimates are relatively higher than the short-run estimates. Again, we can see that the short-run as well as long-run price elasticities are all less than one and thus, they are inelastic.

CONCLUSION AND POLICY RECOMMENDATIONS

From the analysis above, we noticed that in the short-run as well as the long-run, prices response elasticities are both less than one. The coefficients of adjustment are also less than 0.5 and therefore are regarded as inelastic.
From the findings, however, immediate actions that will lead to efficiency growth in rice cultivation or its production are required

To achieve this, the responsible agencies should provide leeway service schemes to cultivators as well as motivating them on the spousal of modern rice varieties and technology in their rice cultivation or production ventures.

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