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AGRICULTURAL LANDS TOWARDS ENVIRONMENTAL SUSTAINABILITY AND URBANIZATION IN THE DIRECTION OF ENVIRONMENTAL DEGRADATION IN PAKISTAN

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ABSTRACT

This research aimed to investigate the economic determinants of agricultural land, urbanization, and its role in environmental degradation in Pakistan. The empirical findings have proved the Johansen Cointegration test based on the unit root test. The cointegration rank test with trace and eigen value has shown 5 each cointegration equations in the model and verified the long run presence. The long run empirical results have proved the early stage of the Environmental Kuznets curve. The inverted U shaped EKC is also established by the negative impact of GDP square on CO_2 emissions in the long run. The N shaped EKC is evidenced by the positive association among the cubic effect of economic progression and carbon secretions in Pakistan in the long run. Furthermore, urbanization and energy have positive and constructive relations with CO_2 emissions in the long run. On the other hand, agricultural land negatively impacts carbon releases and assists in maintaining environmental sustainability. The short run analysis has not proved the inverted U, and N shaped

Environmental Kuznets Curve hypothesis. The error correction model has reduced the error by about 47% and stabilized it in the long run. The diagnostic test evidenced the model as customarily distributed, serially uncorrelated, and homoscedastic. In the end, CUSUM and CUSUM square has verified the stability of the model of urbanization, economic growth, and environmental deprivation in Pakistan.

INTRODUCTION

Agricultural sector is crucial for ensuring environmental quality, while the land processes advancement and other land-related features are also crucial to help to maintain its contribution towards environmental sustainability. Regarding this, previous findings have shown the efficient role of agriculture in restricting environmental distractions (Liu et al., 2017; Orji et al., 2018). However, much reliance on agricultural productivity often discourages industrial expansions and assists in safeguarding from contamination and resource exhaustion. More and more people are becoming conscious of the need to protect the environment. As a result, farmers have adopted practices that make better use of their land and water while also being environmentally and socially responsible. Plants and trees used in agriculture can help collect rainwater and channel it to subterranean water supplies. Along with the apparent advantages of generating healthy crops, local employment, and an appealing environment, they serve as an essential instrument for lowering the incidence of floods and protecting against water pollution.

Despite agriculture's prominence in Pakistan, local ranchers use few modern contributions like improved seed, soil amendments, and other compounds. This is despite the fact that utmost hardship-reducing rural expansion in the area is expected to come mainly from the extended use of such innovations (Sheahan & Barrett, 2017). The practice of renewable energy in Pakistan has financial and environmental advantages. Despite the country's heavy reliance on agriculture, a large portion of the population still lacks access to essential services like running water and electricity due to the country's extreme poverty and inadequate development. Because of their low initial investment, low maintenance costs, and simple setup, renewable energy sources are often seen as a profitable energy option in the nation (Sims et al., 2003; Osabohien et al., 2018). A clean energy supply is also seen as helpful in reducing poverty and boosting a country's economy (World Bank, 2020). As a result, Pakistan is a pivotal case for researching the possible connection between energy usage and carbon emissions (Deichmann et al., 2011; Winarni et al., 2018).

Rapid urbanization in developing economies like Pakistan has caused serious environmental pollution. People rural to urban movment in search of employment opportunities is a substantial escalation in economic climate. The movement of industrial production, investment, and growth in chemical agriculture based on modern technology have transformed the country's natural resources. Continued unabated environmental quality high and the economy is the basis for long-term economic growth that is dangerous to the sustainability of urbanization. Rapid economic development is urbanization, including environmental conditions forced by forestry, fisheries, air pollution, water pollution, degradation of freshwater resources, and poor human health. The most crucial factor is the impact of the deteriorating economic expansion, as well as the environment and urbanization in developing countries, such as Pakistan's economy. Urbanization has measured the proportion of the urban population in the aggregate population. The speed of urbanization and its effects be at variance in many regions worldwide and Asia's urban population is twice predictable.

Most global environmental degradation is associated with air pollution and emissions of substances located in urban (Chaturvedi, 2004). The modes of transport, such as anxiety, cars, buses, and others, are more concentrated in rural areas than urban areas. In addition, food and other consumer goods are transported from one city to another city, which in turn should be passed to the environmental degradation in Pakistan. In computing, most factories and industries are located in urban areas. These illustrations show higher levels of pollution in the population growth rate have been maintained since the creation of Pakistan. Pakistan was at level 6^{th} in 2011 in high population growth, which was the 13^{th} position in the World in 1950. If this rate is maintained at that time in a row, Pakistan will become the fifth-largest country, increasing its population growth rate in 2050. In addition, from the countryside to the underlying liquidity of the country's urban areas were on the increase to their needs and to provide job opportunities for them, to limit supply.

Alam et al., (2007), Khan et al. (2007), Shahbaz (2010), Ikramullah and Rehman (2011), Anees and Ahmad (2011), Hussain (2012), Ali et al. (2015) elaborated crutial role of urbanization on the environment during the generation process of economic activities. Thus, the study ambitions to inspect the bearing of agricultural land on dreadful ecological conditions in Pakistan. The contemporaneous study explores the role of agricultural land and urbanization with economic progression in the structure of inverted U-N shaped relationship in Pakistan. The contemporaneous study contributes because no study has been conducted using the variables of agricultural land, urbanization, and economic activities on environmental pollution in both the U-shaped and N-shape Environmental Kuznets Curve in Pakistan.

LITERATURE REVIEW

Stern et al. (1998), Jalil and Mahmud (2009), and Shahbaz et al. (2010) investigated the effect of economic growth and environmental degradation. Different studies have different time periods and countries. While the findings of all these past studies have proved the early stages of EKC (the positive association of economic evolution and degradation of the environment) and inverted U shaped EKC (negative association). Chuku (2011) investigated the association between economic expansion and pollution in EKC suggestion for Nigeria through the period 1960-2008. The researcher applied three independents variable, such as economic growth and technological progress, in the modal. This investigation indicated an N-shaped of Environment Kuznets Curve association stuck between economic decay and pollution in Nigeria. The N shaped EKC is also proved by some past studies. (Connor et al., 2001; Gurluk and Karaer, 2004; Egli, and MartınezZarzoso and BengocheaMorancho, 2004). The consequences indicated an inverted U in the middle of economic evolution and carbon dioxide, which was also verified by

Ubaidillah (2011). Nasir and Rehman (2011) probed an inverted U EKC suggestion organization flanked by economic enlargement, power of consumption, carbon emission, and trade during the period 1972-2008 for Pakistan. They investigated a quadratic association between economic advancement and pollution in the presence of the EKC for Pakistan. The researchers concluded that the EKC hypothesis was a valuable tool for policymakers and sustainable economic development in the economy. Saboori et al. (2012) scrutinized the association flanked by pollution emission and real income growth for Malaysia's economy from 1980 to 2009 and evident the supposition of EKC. Results investigated there was an inverted U form association between pollution emission and real income growth in Malaysia. Moreover, the EKC hypothesis was confirmed in a short run analysis. Ahmad & Long (2012) have also proved the inverted U premise of EKC.

Khalid and Wei (2012) probed an inverted U- designed comparative between economic intensification and carbon dioxide in the short and long term. Moreover, population density and trade liberalization was positively associated with environmental degradation in Pakistan. Khan et al. (2013) traveled around casual association among economic growths, GHG, and consumption of energy in Pakistan during the period 1975-2011. They used Johansen co-integration to investigate for long run association among economic indicators. The results indicated that energy feasting positively affected the GHG in Pakistan. Moreover, unidirectional causality organizations ran from the consumption of power to GHG, while there was a closely association among the energy and economic progress in Pakistan. There was no association linking agricultural nitrous oxide emission and energy consumption in Pakistan. Allege and Ogundipe (2013) extended the association connecting economic growth and environmental for Nigeria's economy during the period 1970-2011 by smearing the fractional co-integration approaches. The fallouts examined that the first stage of financial enlargement emphasized the level of environmental dilapidation in Nigeria. The first stage and EKC inverted U shaped are also proved by Boutaba (2013). In addition, the trade openness was negatively practical on environmental degradation because of ecological dumping. Arouri (2013) investigated the study of EKC in the case of Thailand's economy through co-integration and causality analysis. The researchers collected the data during the period 1971-2010 and indicated a co-integration among economic indicators, affecting Thailand's economy.

Ahmad et al. (2014) explored the association linking deforestation and other explanatory indicators such as openness of trade, economic growth, population, and energy ingesting during the period 1985-2011 for Pakistan. The result confirmed co integration linking short and long run. There was a negative effect between income and deforestation in the long run and oneway causativeness for economic growth and consumption of power to deforestation, while bidirectional causal linked economic growth and consumption of power. Mulali et al. (2015) extended the animation of EKC analysis in Vietnam. The researchers collected data during the period 1981-2011. The method of autoregressive distributed lag of them was adopted. The results showed that pollution haven analysis, due to pollution emissions rising capital exist in Vietnam. The accumulation of annual imports of goods increased emissions; most imported goods are high energy consumption, and high pollution emissions, while exports did not increase pollution emissions. There were no significant impacts on the pollution emissions. Ali et al. (2015) explored the consequence of energy depletion measured by road sector diesel fuel consumption and electricity production forms such as oil, gas and coal sources, financial development and poverty on carbon dioxide in Pakistan. Poverty levels in Pakistan were concluded to exert negatively impress the environment. The authors concluded uni-sided connection from economic growth to carbon emissions in the short run analysis. Moreover, causality was observed between carbon emissions and other repressors in the model.

DATA AND METHODOLOGY

This section consists of data and methodology to measure economic determinants and their role in the environment of Pakistan. The time series data has been collected from World Bank (WDI, 2022) for the period of 1988-2018.

The description of variables following short forms, description, units, and sources are given below in the table:

Variables Form	Description	Units
END	CO_2 emissions	Metric tons per capita
EGW	GDP growth	Annual GDP %
EGW^2	GDP growth^2	Square of Annual GDP %
EGW^3	GDP growth^3	Cube of Annual GDP %
ENR	Energy Use	Kg of oil equivalent per capita
URN	Urbanization	Urban population % of the total population
AGL	Agriculture land	% of land area
Source: World Bank (WDI, 2022)		

Model Specification

The research is an endeavor to explore the influence of agricultural land, urbanization, and economic activities on environmental quality in Pakistan. Moreover, the research has focused on investigating economic growth in the environment to confirm the inverted-U and N-shaped EKC. EKC is theoretically explained in three stages. The first early stage of EKC has a positive association between two factors of interest. While in the second stage of the inverted U shaped, the doubled economic growth (GDP square) effect reduces environmental degradation. Contrary to the second stage, the thirst stage of N shaped EKC is similar to the early stage of EKC and has proved the positive association among economic growth and environmental degradation. To check for an Environment Kuznets Curve inverted U and N shaped hypothesis, the economic growth is taken as GDP, the square of GDP and the cube of GDP. The equations of the econometric model of urbanization, economic determinants and environment are given below:

$END_{,t} = f(EGW_t, ENR_t, URN_t, AGL_t)$ (1)

$$END_t = \gamma_o + \gamma_1 \log(EGW_t) + \gamma_2 \log(EGW_t)^2 + \gamma_3 \log(EGW_t)^3 + \gamma_4 \log(ENR_t) + \gamma_5 \log(URN_t) + \gamma_6 \log(AGL_t) + \varepsilon_t \quad (2)$$

The above equation 1 is showing the functioning equation of economic progression, urbanization, agricultural land and CO_2 emissions. The above second equation (2) is the estimated equation of the long run for further estimation by econometric techniques.

While the third equation (3) is based on VECM for short run analysis. This equation has an error correction model term, which is used for short run analysis and for the stability of long run analysis. Equation 3 is given below:

$$\Delta \log END_t = \sigma + \sigma_{1i} \sum_{i=1}^{p} \Delta \log (END_{t-1}) + \sigma_{2i} \sum_{i=1}^{p} \Delta \log (EGW_{t-1}) + \sigma_{3i} \sum_{i=1}^{p} \Delta \log (EGW_{t-1}^2) + \sigma_{3i} \sum_{i=1}^{p} \Delta \log (EGW_{t-1}^3) + \sigma_{4i} \sum_{i=1}^{p} \Delta \log (ENR_{t-1}) + \sigma_{5i} \sum_{i=1}^{p} \Delta \log (URN_{t-1}) + \sigma_{6i} \sum_{i=1}^{p} \Delta \log (AGL_{t-1}) + \omega ECT_{t-1} + v_t \quad (3)$$

Here, The ratio is the sum of exports plus imports to GDP. ε_t is the error term and ECT_{t-1} error correction model.

RESULTS AND DISCUSSIONS

This section of results and discussions is based on empirical analysis in which we have applied different techniques to investigate the relationship in the middle of agricultural land, urbanization, economic growth and environmental degradation in Pakistan. The core determination of this empirical analysis is to verify the inverted U shaped, and N shaped Environmental Kuznets Curve (EKC). At the start of empirical analysis, a stationarity test in the form of a unit root is applied to variables. This step is significant because it confirms the techniques applied to the model of economic growth and environmental degradation. The unit root test is based on ADF, DF-GLS and Phillips-Perron test. The result of the unit root test is placed on table 5.1. All three tests proved the stationarity at the first difference I(1) among all variables. Economic growth and environmental pollution have shown stationarity at the first difference and propose to Johansen Cointegration test.

Table 4.1: Unit Root Test Results

Variable	ADF Test			DF-GLS Test	Phillips-Perron Test	
	Level					
	C	Ct	C	Ct	C	Ct
L(END)	-1.81	-1.27	-0.97	-1.85	-1.81	-1.21
L(EGW)	-2.49	-2.60	-0.32	-3.57	-4.10***	-6.99***
L(ENR)	-3.51	0.24	-0.58	-1.56	-3.78	-0.84
L(URN)	-0.69	-3.08	1.16	-2.69	-3.00	-3.08
L(AGL)	-2.90	-3.26	-2.08	-2.99	-2.26	-3.22

Critical Value						
1% level	-3.65	-4.21	-2.60	-3.70	-3.60	-4.21
5% level	-2.91	-3.52	-1.95	-3.200	-2.99	-3.59
	1st Difference					
L(END)	-7.50***	-7.91***	-7.65***	-8.05***	-7.44***	-7.79***
L(EGW)	-6.10***	-6.21***	0.09	-1.60	-25.90***	-27.50***
L(ENR)	-1.61	-3.98**	-0.96	-4.09***	-4.99***	-6.39***
L(URN)	-2.96**	-1.80	-1.90	-2.09	-2.29	-2.03
L(AGL)	-6.82***	-6.71***	-5.05***	-6.30***	-8.89***	-9.04***
Critical Value						
1% level	-3.59	-4.22	-2.63	-3.80	-3.59	-4.30
5% level	-2.95	-3.54	-1.95	-3.20	-2.97	-3.49
***(**) indicate significance at 0.01(0.05) level.						

Table 4.1 above has proved the stationarity among variables at the first difference and advocated applying the Johansen cointegration technique to agricultural land, urbanization, economic growth and environmental degradation model. Before putting on the Johansen cointegration technique on economic growth and environmental degradation, the one crucial step is to verify the long run existence of johansen cointegration which is checked by the unrestricted cointegration rank test. The rank test consists of Eigen and Trace values. The values of Eigen and Trace should be greater than their critical values to reject the null hypothesis and to accept the alternative view. Taking the alternative view means that cointegration exists among variables and long run johansen cointegration relation can exist.

Table 4.2: Johansen's Cointegration Analysis Results

(Trace value)				
Null HP	**Eigenvalue**	**Trace**	**Critical V**	**Prob**
R ≤ 0	0.99	509.89***	187.47	0.00
R ≤ 1	0.95	329.40***	150.55	0.00
R ≤ 2	0.88	219.79***	117.70	0.00
R ≤ 3	0.83	150.40***	88.80	0.00
R ≤ 4	0.67	80.69***	63.87	0.00
R ≤ 5	0.38	35.96	42.91	0.19
R ≤ 6	0.27	20.01	25.87	0.27
R ≤ 7	0.18	7.51	12.51	0.29
(Maximum Eigenvalue)				
Null HP	**Eigenvalue**	**Trace**	**Critical V**	**Prob**
R = 0	0.99	180.05***	56.70	0.00
R = 1	0.95	109.99***	50.59	0.00

R = 2	0.88	80.08***	44.49	0.00
R = 3	0.83	66.07***	38.33	0.00
R = 4	0.67	39.96***	32.11	0.00
R = 5	0.38	18.03	25.82	0.42
R = 6	0.27	11.67	19.38	0.45
R = 7	0.18	7.57	12.51	0.29

Table 4.2 above shows the seven equations of trace and maximum eigen values to accept or reject the null and alternative hypothesis and prove or disprove the long run existence of the Johansen cointegration test. In the table of rank tests with trace value, the above five equations of null hypothesis from $R \leq 0$ to $R \leq 4$ and alternative hypothesis $R > 0$ to $R > 4$ have proved the existence of johansen cointegration by accepting the alternative hypothesis and rejecting the null hypothesis. The trace cointegration equation of $R \leq 0$ to $R \leq 4$ and $R > 0$ to $R > 4$ has greater trace values than critical values, proving that cointegration exists among variables. The respective trace values 509.89***, 329.40***, 219.79***, 150.40*** and 80.69*** are greater than the critical values, respectively 187.47, 150.55, 117.70, 88.80 and 63.87. This proves the acceptance of the alternative hypothesis (long run johansen cointegration exists) and rejection of the null hypothesis (long run johansen cointegration does not exist). On the contrary, the equation of null hypothesis $R \leq 5$ to $R \leq 7$ and alternative hypothesis $R > 5$ to $R > 7$ does not show cointegration among variables by accepting the null hypothesis. These equations have lesser trace values than critical values. Still, it is useless because the above five equations have already fulfilled the condition to accept the existence of johansen cointegration in the long run. At least one equation should be cointegrated, or at least one equation should have a more excellent trace value than a critical value (MacKinnon-Haug-Michelis, 1999).

The results of maximum eigen values are similar to trace values. In the rank test table of maximum eigen value, the above five equations as, identical to the trace value table (null hypothesis from $R \leq 0$ to $R \leq 4$ and alternative hypothesis $R > 0$ to $R > 4$), have rejected the null hypothesis and accepted the alternative hypothesis. In all five equations, maximum eigen values, respectively 180.05***, 109.99***, 80.08***, 66.07*** and 39.96***, are greater than respectively critical values 56.70, 50.59, 44.49, 38.33 and 32.11. The greater of maximum eigen values than critical values have proved the existence of cointegration among variables. While, the last three equations have accepted the null hypothesis and don't show cointegration among variables. But the condition of at least one equation should be cointegrated has fulfilled ((MacKinnon-Haug-Michelis, 1999). The empirical findings of table 4.2 has proved the long run existence of johansen cointegration which means the long run johansen cointegration can apply to the model.

Table 4.3: Normalized Cointegrating Coefficients

Dependent Variable: L(END)			
Variables	**Coeffs**	**Std.Err**	**t-val**
L(EGW)	0.625***	0.111	4.991
L(EGW)^2	-0.910***	0.116	-8.083

L(EGW)³	0.314***	0.033	10.027
L(ENR)	0.047*	0.025	1.864
L(URN)	0.380***	0.037	9.127
L(AGL)	-1.589***	0.093	-14.945
1%, 5% and 10% significance levels are denoted by ***, ** and * respectively.			

Table 4.3 shows the long-run cointegration in the middle of Pakistan's economic growth and environmental degradation. This analysis has proved the Environmental Kuznets Curve's (EKC) first-step hypothesis. In the first step, economic evolution and environmental degradation should be affirmative toward each other. The value of L(EGW) is 0.625, which is positive and significant at 1% means it positively affects the L(END). This proves the initial step of EKC hypothesis. While L(EGW) square value is -0.910, negatively affecting Pakistan's L(END) carbon secretions at 1 percent of significance. In detail, the doubled effective measures in economic expansion condense dreadful environmental conditions in the long run. This significantly proves the hypothesis of EKC inverted U shaped. This long run analysis has proved the first and second stages of EKC, in which the early stage has shown a rise in both growth and pollution. In contrast, the second stage of inverted U shape negatively affects economic expansion and environmental dilapidation, which is in line with past studies (Cole, 2004; Jalil and Mahmud, 2009; Shahbaz et al., 2010; Ubaidillah, 2011; Boutaba, 2013; Ahmad et al., 2014 and Ali et al., 2015). After fulfilling the EKC inverted U shaped hypothesis, the analysis has also proved the N shaped idea of Environmental Kuznets Curve (EKC) in the long run period of Pakistan. The value L(EGW) cube 0.314 is significant at 1 percent with CO_2 emissions. It means one unit increase in the cubic effect of economic expansion has enhanced the pollution in Pakistan and proven the N shaped EKC, which is in line with past studies (Connor et al., 2001; Gurluk and Karaer, 2004; Egli, 2004; Martınez-Zarzoso and Bengochea-Morancho, 2004 and Chuku, 2011).

The supporting variable L(URN) value of 0.380 has a constructive effect on environmental humiliation. This proves that the emanations of CO_2 are greater than before in Pakistan with the practical support of urbanization. The reason is that when the population is greater than before in urban areas, the environment is polluted much compared to before of this population density in urban areas. The other variable energy has a positive relation with carbon emissions. The values of L(ENR) are 0.047, indicating 10 percent significance which shows a small but destructive effect on the environmental conditions of Pakistan. Ultimately, agricultural land L(AGL) negatively affects Pakistan's carbon releases in the long run and assists with environmental protection. The overall results have proved this empirical analysis according to the theory. The inverted U shaped and N shaped hypotheses of EKC are contented by long run johansen cointegration.

Table 4.4: Vector Error Correction Estimates

Dependent Variable: D(Log(CO_2))				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Constant	0.061***	0.014	4.171	0.000
D(END(-1))	-0.636**	0.260	-2.445	0.028
D(EGW(-1))	0.042	0.153	0.275	0.786
D(EGW(-1))^2)	0.054	0.175	0.311	0.760
D(EGW(-1))^3)	-0.032	0.054	-0.597	0.559
D(ENR(-1))	-0.068	0.098	-0.692	0.500
D(URN(-1))	0.426	0.297	1.436	0.172
D(AGL(-1))	-0.280*	0.132	2.113	0.053
ECT(-1)	-0.474**	0.180	-2.628	0.019
1%, 5% and 10% significance levels are denoted by ***, ** and * respectively.				

The Table 4.4 above has an empirical analysis of the Vector error correction model (VECM) for short run outcomes. The findings proved the insignificant influence of Pakistan's economy's linear, squared and cubic growth on environmental deprivation in a short period. While the other supporting variables, such as energy and urbanization, also failed to affect the carbon releases for a short period significantly. In contrast, the most effective and most awaited outcomes of agricultural lands have made known some resistance to reduce Pakistan's dreadful environmental condition for a short period of time. At last, the error correction model has reduced the error from the short run and stabilized it in the long run. ECT(-1) value -0.474 has proved that the 47% of error is reduced in short run and stable in the long run. The negative sign shows the reduction in error in the short run with the help of the speed of adjustment tools term. ECT stabled the long run effect of agricultural land, urbanization and economic well-being on the environment of Pakistan.

Table 4.5: Diagnostic Tests

Tests	**JB-Statistic**	**F-statistic**	**Obs*R-squared**	**Decision**
Normality	1.280 [0.527]	-	-	Normally Distributed
B-Godfrey Serial Correlation LM	-	0.382 [0.689]	2.159 [0.339]	Serially Uncorrelated
Heteroskedasticity: ARCH	-	0.830 [0.445]	1.729 [0.421]	Homoskedastic
The values in [ ] are the p-values.				

The above table 4.5 is showing the diagnostic test to check the robustness of estimated statistical models. This diagnostic test is evidenced by the normal distribution, serial uncorrelation and homoscedasticity with the help of R-square, JB and F statistics values. The values proved that the estimated model is normally distributed. The estimated model is serially uncorrelated, which is checked by the Breusch-Godfrey LM test. ARCH test of Heteroskedasticity has proved the constant variance in the model. This test is proved Homoskedasticity by refusing the problem of Heteroskedasticity in the model.

Figure 4.1: Plot of Cumulative Sum of Recursive Residuals

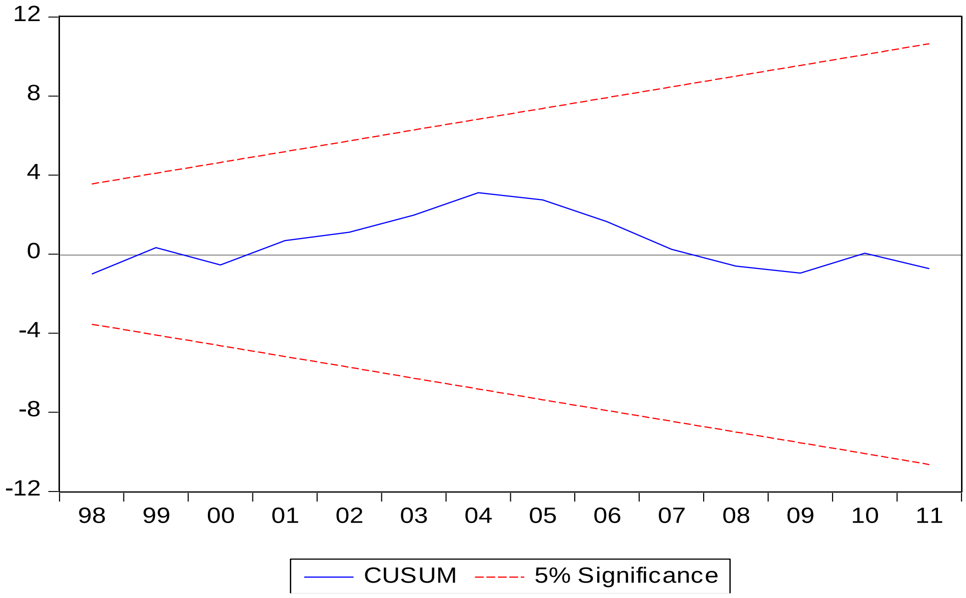
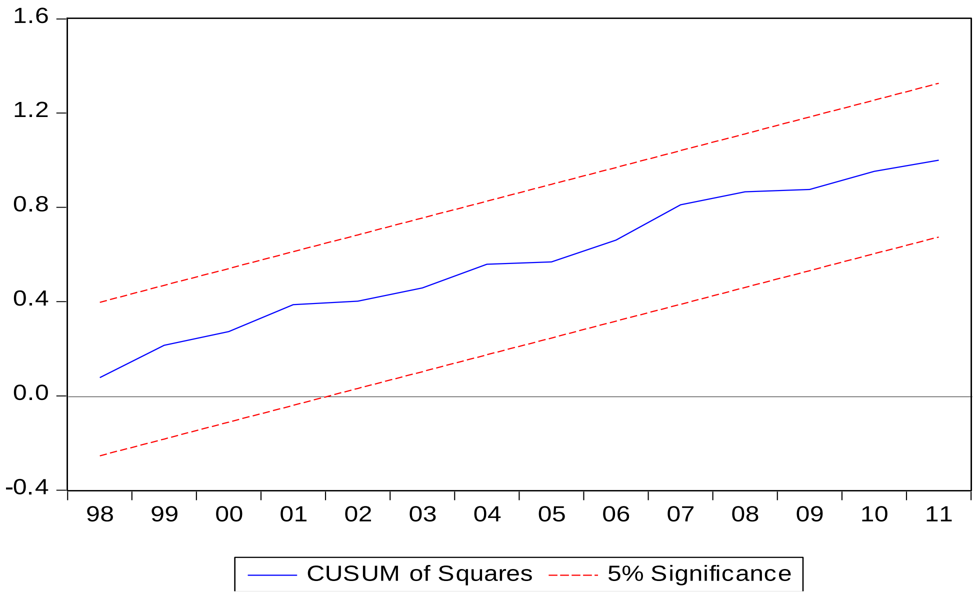


Figure 4.2: Plot of Cumulative Sum of Squared Recursive Residuals



In the end, figures 4.1 and 4.2 display the graph shows the lower and upper bound lines which are bounded at 5 percent significance level. Both the CUSUM and square of CUSUM have shown their lines in between the upper and lower bound lines and proved the stability in the model by rejecting the issuance of heterogeneity in the model.

CONCLUSION AND SUGGESTIONS

This study investigates the economic factors of agricultural land, urbanization and their role in environmental deprivation in Pakistan. During the annual time series, data was applied from 1988 to 2018. Analysis of agricultural land and urbanization and its associated degradation in the environment in the framework of the role of the environmental Kuznets curve between inverted U-type and N-type growth and carbon discharges will help understand the causes of environmental degradation in Pakistan. In the last few decades, Pakistan's economy has experienced a very high urbanization ratio and shown a higher rate of the urbanized area. Technology may have its environmental consequences. However, Pakistan’s economy still relies on agriculture, and its contribution is not negligible. Therefore, the empirical research investigated the bonding of agricultural land, urbanization, economic decay, and carbon emanations, in which energy also significantly influences. It is concluded that the economy of Pakistan has shifted from agriculture to industrial and services sectors, increasing growth and promoting urbanization. This shift and promotion of urbanization may cause consequences for the environment. The study also found that sustainable economic development, and the impact of urbanization and all the other socio-economic factors and demographic factors of both. The results mean that the linear and cubic effects of economic expansion, urbanization, and road sector diesel fuel form of energy played an active role in generating long-term environmental deterioration. On the other hand, squared growth and agricultural lands are playing negative squire pollution influence in the long run in Pakistan. After finding the long run association among the variables, VECM is estimated to examine the short run association among variables of concentration. The short run results examines, only few economic variable analyze significant impact on carbon emission are traceable to long run behavior of the variables. The error correction term has reduced the error about 47 percent in short run and stable it in long run. The robustness techniques in the form of JB-test, LM test and ARCH test of heteroskedasticity has proved the normality distribution, serially uncorrelated and constant variance in the model. Moreover, the stability is found in the model with the help of CUSUM and CUSUMSQ.

On the basis of this research results, policy makers and the government should control the rate of urbanization. Therefore, the impact of urbanization on the deterioration of the environment significant positive can be achieved. In achieving this positive impact, it is recommended to take the following measures to control urbanization. There are few reforms that could help to handle urbanization and these reforms are given as below:

Government should ensure the availability of basic infrastructure, like road, water and sanitation services, houses, health clinics, communication and public transportation.

The rural parts of the economy must be transformed into legitimate communities.

Agriculture sector must be accelerated by the government supportive policies. The government also announced a national policy, overseas Pakistanis and their family's welfare. The Government of Pakistan also recognized the environmental problems, and to take necessary and effective measures to combat environmental degradation. This study includes water and air pollution, protects forests, solid water, and faces the strategic objectives of these sectors and biodiversity. It is worth noting that practitioners have taken to deal with the complex problems of all those responsible for the deterioration of the environment. We hope that these measures will target generated.

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