The vulnerability of Nigeria’s agricultural sector to climate change could be of particular interest to policy makers because agriculture is a key sector in the economy. Like other developing nations, Climate Change affects Nigerian agriculture in a number of ways. For example, uncertainties in the timing of the farming season, due to changes in seasonal characteristics, can lead to an unanticipated sequence of crop planting and replanting which may result in food shortages due to harvest failure. Extreme weather events such as thunderstorms, heavy winds, and floods, and extreme temperatures and can lead to crop failure. Pests and crop diseases migrate in response to Climate Changes and variations (e. g. the boll weevil has extended its range northward and will potentially pose a threat to cotton in the drier northern areas. It is estimated thereby 2010; Nigeria and other West African countries are likely to have agricultural losses of up to 4% of GDP due to climate change (Mandelkern, 2004; PNAS). The extent of country that experienced soil erosion and operate rain-fed agriculture could have a climate-driven yield growth of up to 5% between 2000 – 2020 due to increasing impact of climate changes (Agoumi, 2003; IPCC). A recent research has shown that rice can be used to offset the major impacts of climate change because of its potentials and unique properties. The crop is currently grown in more than 70% of the states in the country. Nigeria governments have invested more to increase rice production than other cereals. In 2009, the nation raises more than 10 billion Naira in public-private partnership schemes to improve the irrigator systems and set up about 17 rice growing processing Mills (Adeyemo et al. 2002 and FAO, 2004). The major problems associated with rice production include shortage, floodings, suffocations and extreme temperature, all of which are expected to worsen with climate change. Drastic changes in rainfall patterns and rise in temperatures will introduce unfavorable growing conditions into the cropping calendars thereby modifying growing seasons which could subsequently reduce land value.

The main objective of this study therefore is to analyze the economic impact of climate change on value of land for rice farming and farm level adaptations that rice farmers make to mitigate the potential impact of such climate changes. This is important because agriculture should be encouraged. Further investments are therefore required to resuscitate the irrigation systems both in terms of facilities and manpower.

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ECONOMIC IMPACT OF CLIMATE CHANGE ON VALUE OF IRRIGATED RICE FARMS IN NIGERIA: THE RICARDIAN APPROACH

The Ricardian model is often called the standard Ricardian model using land rent as the dependent variable. Several studies have used the Ricardian model to evaluate the economic impact of climate change on land rent for rice farms in Nigeria. The main assumption of the model is that the value of land is a function of its characteristics and the agricultural use to which it is put. The model can be expressed as:

\[ LV = f(D, Z, F, G, M) \]

where \( LV \) is the land rent, \( D \) is the characteristics of the farm, \( Z \) is a vector of soil variables, \( F \) is a vector of climate variables, \( G \) is a vector of socio-economic variables and \( M \) is a vector of market variables.

The results of our regression analysis suggest that the use of irrigation has proved to be an effective adaptation measure to reduce the harmful effects of climate change on rice agriculture. The results have some implications for the relevance of irrigation as an adaptation technique. The simulation results for the irrigated rice farms are shown in Table 5. The simulation results for the irrigated rice farms are shown in Table 5. The marginal impact analysis shows that dry land rice rent (full as an average of 6677.31) per 1°C rise in temperature (Table 5). On the other hand, land rent per hectare for irrigated rice farms increases with increase in temperature. Agriculture of hot areas by definition shows April and the high temperature was helpful in land rent per hectare for dry land farming while October temperature was particularly beneficial to irrigated farms. The irrigated effects of precipitation on land rent per hectare also varied across farms types. For instance, increasing precipitation on irrigated rice farms for irrigated land increases land rent by 40.9% per annum while reduced by 0.005% per degree.

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