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Estimating CH4 emission from paddy managed soils in southern guinea savanna zone of Nigeria using an integrated approach

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ESTIMATING CH4 EMISSION FROM PADDY MANAGED SOILS IN SOUTHERN GUINEA SAVANNA ZONE OF NIGERIA USING AN INTEGRATED APPROACH

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Methane is one of the most important greenhouse gases as it has the second greatest climate forcing potential. Paddy fields have been identified to be sources of methane and Nigerian paddies are not left out. In Nigeria, the guinea savanna region is regarded as the bread basket of the nation and this area is one of the major rice producing regions in Nigeria. Its location in the food basket region of the country makes this part a very important study site. However, since Nigerian paddies contribute to methane emission by how much do these paddies contribute to the emissions? Also, so far, there limited studies on methane from rice fields in West Africa thus making this study a very important start off point. To answer this huge question, methane emission will be estimated using an integrated approach in the North Central part of Nigeria. Land use change cultivated to rice was analysed using Remote sensing techniques to determine the changes in land cultivated to rice. Methane emission from these identified rice fields will be estimated using the IPCC Tier 1 set of equations. First relevant indices (Normalized Differential Moisture Index, Normalized Differential Wetness Index and Rice Growth Vegetation Index) were generated to aid classification of rice fields using LANDSAT data from the USGS. Next the LANDSAT datasets were analyzed for land use change cultivated to rice from 1990 to 2014 to generate rice field maps. ERDAS Imagine, ARCGIS and ENVI tools were used to meet these spatial needs. Methane emissions from this region will be estimated using the IPCC tier 1 set of equation. The generated spatial datasets will be linked to emission rates to estimate total emission from these rice fields. Results indicate a significant moisture decrease but with more areas being converted to rice fields. We conclude that current food demands due to increasing world population will necessitate increased food production and land use change and intensified rice production will directly be coupled with increased CH4 emission rates.