Applying GIS Geographic Weighted Regression Analysis to Assess Local Factors Impeding Smallholder Farmers from Participating in Agribusiness Markets: A Case Study of Vihiga County, Western Kenya

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Abstract : Smallholder farmers are important drivers of agriculture productivity, food security, and poverty reduction in Sub-Saharan Africa. However, they are faced with myriad challenges in their efforts at participating in agribusiness markets. How the geographic explicit factors existing at the local level interact to impede smallholder farmers' decision to participates (or not) in agribusiness markets is not well understood. Deconstructing the spatial complexity of the local environment could provide a deeper insight into how geographically explicit determinants promote or impede resource-poor smallholder farmers from participating in agribusiness. This paper's objective was to identify, map, and analyze local spatial autocorrelation in factors that impede poor smallholders from participating in agribusiness markets. Data were collected using geocoded researcher-administered survey questionnaires from 392 households in Western Kenya. Three spatial statistics methods in geographic information system (GIS) were used to analyze data -Global Moran's I, Cluster and Outliers Analysis (Anselin Local Moran's I), and geographically weighted regression. The results of Global Moran's I reveal the presence of spatial patterns in the dataset that was not caused by spatial randomness of data. Subsequently, Anselin Local Moran's I result identified spatially and statistically significant local spatial clustering (hot spots and cold spots) in factors hindering smallholder participation. Finally, the geographically weighted regression results unearthed those specific geographic explicit factors impeding market participation in the study area. The results confirm that geographically explicit factors are indispensable in influencing the smallholder farming decisions, and policymakers should take cognizance of them. Additionally, this research demonstrated how geospatial explicit analysis conducted at the local level, using geographically disaggregated data, could help in identifying households and localities where the most impoverished and resource-poor smallholder households reside. In designing spatially targeted interventions, policymakers could benefit from geospatial analysis methods in understanding complex geographic factors and processes that interact to influence smallholder farmers' decision-making processes and choices.