



Mitigating the Impact of Rural Insecurity on Urban Food Security through Aquaponics in Nigeria

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Introduction

Rural insecurity in Nigeria, driven by insurgency, banditry, and kidnapping, has displaced many farmers, leading to reduced agricultural productivity and disrupted food supply chains. This has intensified food insecurity in urban areas, where demand has surged due to rural-urban migration. Over 31.8 million Nigerians currently face acute food shortages, driven by these security and economic challenges (Reuters, 2024). Aquaponics, which integrates aquaculture and hydroponics, presents a sustainable urban farming solution by enabling year-round production of fresh produce and protein within limited urban spaces (Oladimeji et al., 2021; Kasim et al., 2023). It conserves water, reduces dependence on rural agriculture, creates employment, and supports nutritional security. However, it faces challenges such as high start-up costs and technical skill requirements. This study aims to examine how aquaponics can mitigate the impact of rural insecurity on urban food systems in Nigeria. Specific objectives include assessing rural insecurity's impact on urban food supply and evaluating aquaponics, aquaculture, and hydroponics as strategies to enhance urban food security amid ongoing displacement and disruption.

Methodology

A descriptive survey design was adopted to collect quantitative data, offering a comprehensive analysis of rural displacement, urban food shortages, and urban farming practices. The study targeted urban households, displaced rural farmers, urban farmers, agribusiness owners, policymakers, and food security experts across five major Nigerian cities—Lagos, Abuja, Kano, Port Harcourt, and Ibadan. Using stratified random sampling, a total of 384 respondents were selected, with 77 respondents per city proportionally distributed among the four categories. Primary data were collected using structured questionnaires and key informant interviews, while secondary data came from scholarly articles, government publications, and FAO reports. The questionnaire covered demographics, effects of rural insecurity, awareness of aquaponics, and policy support. To ensure validity, the questionnaire was reviewed by experts and piloted with 30 individuals, achieving a reliability coefficient of 0.7 or higher using Cronbach's Alpha. Regression analysis was used for the inferential statistics.

Results and discussion

Regression analysis revealed that rural insecurity significantly reduces urban food security ($\beta = -0.542, p < 0.001$), while aquaponics ($\beta = 0.433, p < 0.001$), aquaculture ($\beta = 0.295, p < 0.001$), and hydroponics ($\beta = 0.217, p = 0.006$) all significantly enhance it. The model explained 52.1% of the variance in urban food security ($R^2 = 0.521; F(4, 379) = 103.13, p < 0.001$). These findings confirm that adopting integrated farming systems can effectively mitigate the adverse effects of rural insecurity and improve urban food resilience.

Conclusions

This study shows that rural insecurity significantly undermines urban food security in Nigeria by displacing farmers and disrupting food supply chains. Aquaponics, a sustainable, integrated system of aquaculture and hydroponics, offers a promising urban solution. Despite its benefits, adoption remains low due to high costs and technical barriers. Promoting aquaponics through supportive policies, financing, and training can enhance food resilience in urban areas and reduce dependence on rural agriculture.

Keywords: Rural insecurity, Urban food security, Aquaponics, Sustainable agriculture