



Adoption Dynamics and Economic Valuation of Urban Rooftop Gardening: Micro econometric Evidence from Bangladesh

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Abstract

Urban rooftop gardening is increasingly viewed as a practical response to food insecurity, rising urban temperatures, and environmental stress in South Asian megacities. Yet the household economics shaping adoption decisions and the potential demand for commercial rooftop gardening services remain insufficiently examined. This paper presents what appears to be the first integrated microeconomic analysis of rooftop gardening in Dhaka that jointly estimates household adoption behaviour, willingness to pay for professional services, and the factors associated with that willingness within a unified household production framework. The study uses original survey data collected from 445 households located in Dhaka North and South City Corporations. Household adoption is estimated through a Probit model grounded in Random Utility Maximisation, with HC3 heteroskedasticity consistent standard errors and a Firth penalised likelihood specification used for robustness assessment. Mean willingness to pay is estimated through a double bounded contingent valuation framework with bootstrap confidence intervals, while the determinants of willingness to pay are examined using a log normal interval censored regression model. The estimated mean willingness to pay for a professional rooftop gardening package is BDT 1765 per month with a 95 percent confidence interval ranging from BDT 1651 to BDT 1894. The findings reveal several notable asymmetries. Higher income households are less likely to engage in rooftop gardening directly, yet they display substantially higher willingness to pay for outsourced services. Neighbourhood gardening exposure increases the probability of adoption but reduces willingness to pay, suggesting the presence of localised free rider incentives. Social media exposure raises willingness to pay without generating a corresponding increase in adoption. Across both behavioural margins, rooftop water access emerges as the strongest predictor. The results point to a segmented urban market composed of self-producing households and service oriented consumers, with implications for municipal infrastructure planning and urban environmental policy.

Keywords: Contingent valuation; Dhaka; Household production; Rooftop gardening; Urban agriculture; Willingness to pay

