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城市生活垃圾产量影响因素的路径分析——以厦门市为例

Path analysis of influencing factors on municipal solid waste generation: A case study of Xiamen City

关键词：城市生活垃圾 产量 影响因素 路径分析

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摘要：城市生活垃圾产量日益剧增,已成为制约我国城市健康和可持续发展的瓶颈.深入开展城市生活垃圾产生量的影响因素研究有助于揭示垃圾产生机制,把握其动态变化趋势,从而指导生活垃圾可持续管理及调控.因此,以厦门市为例,基于1979—2010年生活垃圾清运量及经济、生活水平、城市发展水平、社会人口学特征、自然等方面的时间序列数据,运用路径分析方法,开展了城市生活垃圾产量影响因素研究.结果表明,所构建的路径分析模型拟合优度很高,相比较简单的相关分析,很好地解释了因素与垃圾产量的因果关系;城市规模、人均可支配收入、城市化率、GDP的直接影响系数分别为0.58(p<0.001)、0.55(p<0.001)、0.52(p<0.001)、0.51(p<0.001),均大于0.5,说明正影响作用很大;家庭特征直接影响系数为-0.40(p<0.001),为较大负影响;GDP通过旅游人次、城市规模通过家庭特征对垃圾产量有间接作用,影响系数分别为0.13(p<0.001)、0.31(p<0.001);各因素总影响系数排序为城市规模(0.89,p<0.001)>GDP(0.64,p<0.001)>人均可支配收入(0.55,p<0.001)>城市化率 (0.52,p<0.001)>家庭特征(-0.40,p<0.001)>旅游人次(0.19,p<0.001)>年均温度(0.09,p<0.001);旅游人次影响作用为中等偏弱,温度只引起生活垃圾产量的年内变动而不影响年际变化.

Abstract: The increasing amount of municipal solid waste (MSW) has imposed great challenges to healthy and sustainable development of the cities. Study of the relationship between influencing factors and MSW is crucial to explore the metabolism of MSW generation and forecast its dynamic trend, which is fundamental in guiding the sustainable management and regulation of MSW. To investigate the relationship between factors and MSW generation, a case study of Xiamen city was conducted by employing path analysis based on time series data of MSW, economy, residents' living standards, urban development, socio-demographic and natural characteristics from 1979 to 2010. The results showed that the proposed path model exhibited good fit indices and could explain the causality between factors and MSW compared with simple correlation analysis. The direct effects of city size, per capita disposable income, urbanization rate and GDP were 0.58 (p<0.001), 0.55 (p<0.001), 0.52 (p<0.001), and 0.51 (p<0.001) that were all greater than 0.5, which indicated their significant positive effects. Household characteristics had a relatively significant negative direct effect (-0.40, p<0.001). GDP had a positive indirect effect (0.13, p<0.001) through tourist population, and city size had a positive indirect effect (0.31, p<0.001) through household characteristics on MSW generation. Total effects of variables were ranged as city size (0.89, p<0.001) > GDP (0.64, p<0.001) > per capita disposable income (0.55, p<0.001) > urbanization rate (0.52, p<0.001) > household characteristics (-0.40, p<0.001) > tourist population (0.19, p<0.001) > mean annual temperature (0.09, p<0.001). Tourist populaiton had weak positve effects and temperature can only influence inner-annual variation of MSW generation rather than inter-annual changes.

Key words: municipal solid waste generation factors path analysis

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