

Application of the Von Thünen Model in Determining Optimal Locations to Transport Compost for Crop Production Outside of Yaoundé, Cameroon

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ABSTRACT This research developed and applied a non-linear von Thünen model to explore and determine optimal and profitable distances for transporting compost from the city-centre of Yaoundé, Cameroon to surrounding farm areas. Baseline model results indicate that Yaoundé's annual compost production (124,320 tons) is only profitable for farms located within a 79 km radius of the city. Those farms located within a 79 km (or less) radius of the city can be characterized as "beneficial farming zones"; they enjoy significant profits and have a positive shadow price value from the use of compost. However, farms located within an 80-400 km radius of the city incur losses and a compost shadow price that approaches zero. The losses of the latter farms indicate that it is not profitable to use compost for crop production beyond this radius range. As compost production increases and more of it is made available to farmers, the shadow price of the compost decreases. A lower shadow price translates into higher farm profits because lower costs are incurred for crop fertilization. Farms located at distances of 80 km, 70 km, 60 km, 50 km, and 45 km from the city-centre will attain a zero shadow price when compost availability increases by 25%, 50%, 75%, and 100%, respectively. Therefore, it is recommended that the city of Yaoundé amends its politics to help increase compost shipments to those farmers located farthest from the city-centre, so that these farmers may lower their overhead costs and increase their overall farm profits. Appropriate state actions could include appropriating funds for roads and transportation infrastructure, as well as encouraging the formation of farm cooperatives in order to transport bulk shipments of compost at lower rates.