

Assessment of waste disposal behaviors in Tsukuba University using GIS: A case study of non-biodegradable waste.

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1. Motivation

Non-Biodegradable Waste (NBW) poses a threat to public health and the environment if it is not disposed of properly. While, the University of Tsukuba has an established system on NBW disposal, it is imperative to assess the waste disposal behaviors in the University and determine the effectiveness of the system.

2. Introduction

Non-biodegradable waste is generally defined as waste that cannot be decomposed by biological processes. It is for this reason that disposal of non-biodegradable waste is a major concern. Thus, many NBW management systems are designed to separate different types of NBWs with the view of easy disposal and other best management practices (e.g. recycling) to protect the environment sustainably.

The University of Tsukuba has an established system for management of all waste. The system provides waste bins clearly labelled for people to dispose of different types of waste including NBW. Therefore, this study aims to assess the non-biodegradable waste disposal behaviors of people in the university to understand the effectiveness of the waste management system.

3. Study Area

This study was conducted at the University of Tsukuba, located in Tsukuba City, Japan. The central area of the University (Figure 1) was selected as it is one of the busiest areas in the University. The central area also contains the administration center area and several research areas as well as common/public eating places.

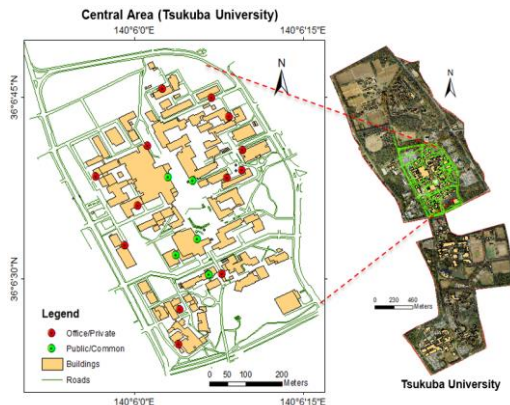


Figure 1: Study area; Central area of the University of Tsukuba

4. Methodology

The waste management system at Tsukuba University provides three types of NBW bins i.e. for bottles, cans and incombustibles. To assess the waste disposal behaviors 19 buildings were selected and a total of 114 waste bins were inspected. (i.e 6 in each bin). Waste behavior was recorded as either wrong or correct disposal respectively (Figure 2). Buildings were

selected based on two major attributes i.e. (1) type of building (office/private or common/public) and (2) reason for choosing the building (high population, location or random). Survey123 for ArcGIS which is a data gathering online application was used to record the attributes of buildings selected. All the data was analyzed in ArcGIS and Microsoft Excel.

5. Results and Discussion

Figure 2 presents a map showing the waste behavior (correct or wrong) in the different buildings selected for this study. Figure 3 shows a chart of the overall general waste disposal behavior. The results reveal that the waste disposal behavior around the university is generally very good. The results show that in all the types of waste (incombustibles, cans or bottles), over 80% of the waste bins inspected had correctly disposed of waste. However, it was observed that the wrongly disposed of waste was found in common/public areas such as restaurants where there are high numbers of people using the building. Even then the ratio of correctly disposed of NBW was higher. In conclusion, the NBW management system is still effective in the University of Tsukuba. However, care should be taken in common/public places.

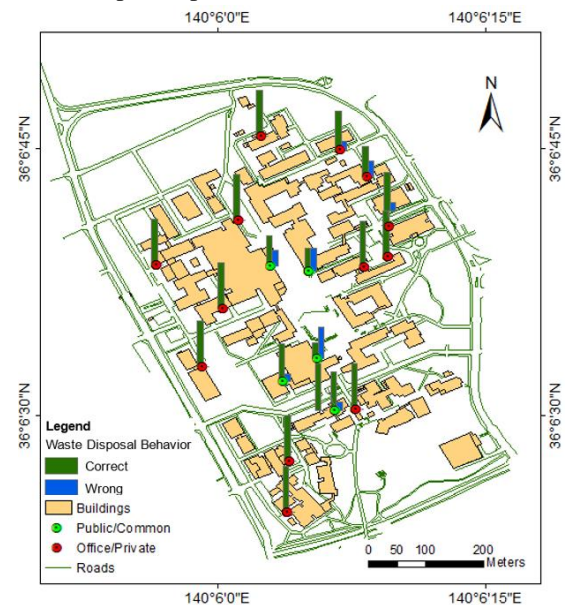


Figure 2. Waste behavior (bar charts) in buildings inspected

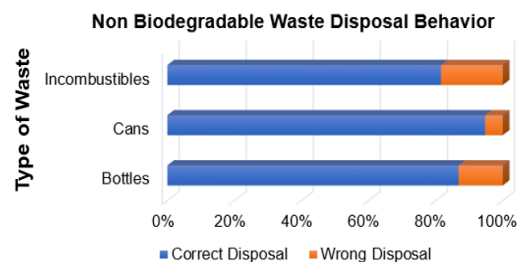


Figure 3. Overall waste disposal behavior results