

# Analysis of Spatial distribution of garbage collection centers in the university premises and find alternative accesses for them in an emergency situations using ARC GIS software.

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## Motivation

Garbage is an important component in the daily activities of everybody in the society. The University of Tsukuba is one of the most prominent universities of Japan and it is worth to examine its cleanliness and environmental sanitation.

## Introduction

This study aims to identify and analyze data related to garbage collection centers in the university premises and find alternative accesses for them in an emergency situations using ARC GIS software. In this study, emergency defines that traffic block situations, tree felling and disaster situations.

## Study area

Study area of this study is the area of the University of Tsukuba. Within this area there are more than 45 garbage collection centers and all of them are located in the compactor accessible places.

## Methodology

In the data collection session, every garbage collection centers that could be identified within the university premises with the GPS (GARMIN-Etrex HC) instrument (no.15) was attended and got the way points. In this task, the Tsukuba city office (SIATSO) waste management staff organized a compactor to facilitate to trek the access to every garbage collection centers in the university area. The routes were examined according to the compactor routes, and the place of disposal of the garbage. Then data was collected from the cleaning centre of Tsukuba city office. A literature survey was conducted to get aware of the studies which were carried out in the past. Similarly, searched about time of garbage collection, point wise and collected data of the schedules which are of the garbage collecting compactors perform daily. Alternative access was concerned within the 5 meters buffer zone.

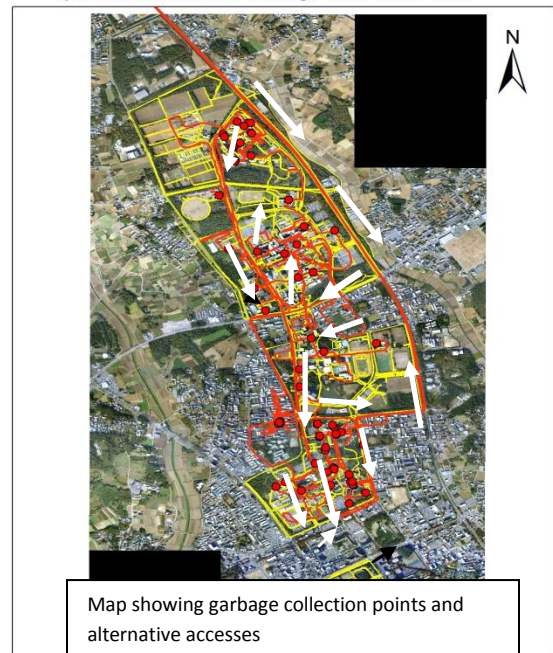
## Results and discussion

Data analysis was done using Arc GIS software and found alternative access for the most of the garbage collection centers.(white color arrows in the map).

Finding out alternative access to the garbage collection points in the university was a great challenge and there should be proper system especially in an emergency to manage them. One of the factors which should be considered is, the periodical fluctuation of disposal and therefore results might be varied according to the period concerned. Therefore, this study was conducted during a

selected period of time (07.02.2016 to 15.02.2016). According to the results that could be gained, the alternative accesses for the garbage disposal centers are as follows;

Spatial Distribution of Garbage Collection Points



No	No. of alternative accesses	No. of centers
1	1	35
2	2	9
3	3	1
4	More than 3	0
Total		45

Figure-1

Figure-1 shows the number of alternative accesses for the garbage collection centers and according to the results , most of the garbage collection centers(35) have one alternative access and 9 have two alternative accesses. Only one center has 3 alternative accesses. According to the density of garbage collection centers, Ichinoya area, Hirasuna area and Oikoshi area have much weight but according to the results, alternative accesses for those areas are limited. But central area has more alternative accesses.

Finally, it can be decided that finding alternative access is important as a study.