



Designing E-waste landfill as a landscape infrastructure: A case study based on public perceptions in Nanjing, China

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- Changes of the public perception of spatial distance from the landfill
- Determining the site with the minimal perceived value loss
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Introduction

Introduction



the purposes of this study are as follows:

- Evaluating public perceptions of economic, social, and ecological loss due to landfill construction and to minimize this perceived loss.
- Determining the best site of E-waste landfill in Nanjing City, Jiangsu Province on a quantitative basis with the minimal perceived value loss.
- Designing the E-waste landfill as a landscape infrastructure to improve the overall local ecological environment.

2

Methodology and date survey

Methodology and data survey

The research object of this paper is **Nanjing City**, Jiangsu Province, China. This paper applies three main methods: **Social investigation**, **GIS-based sliding box sampling technique**, and **scoring rules**.

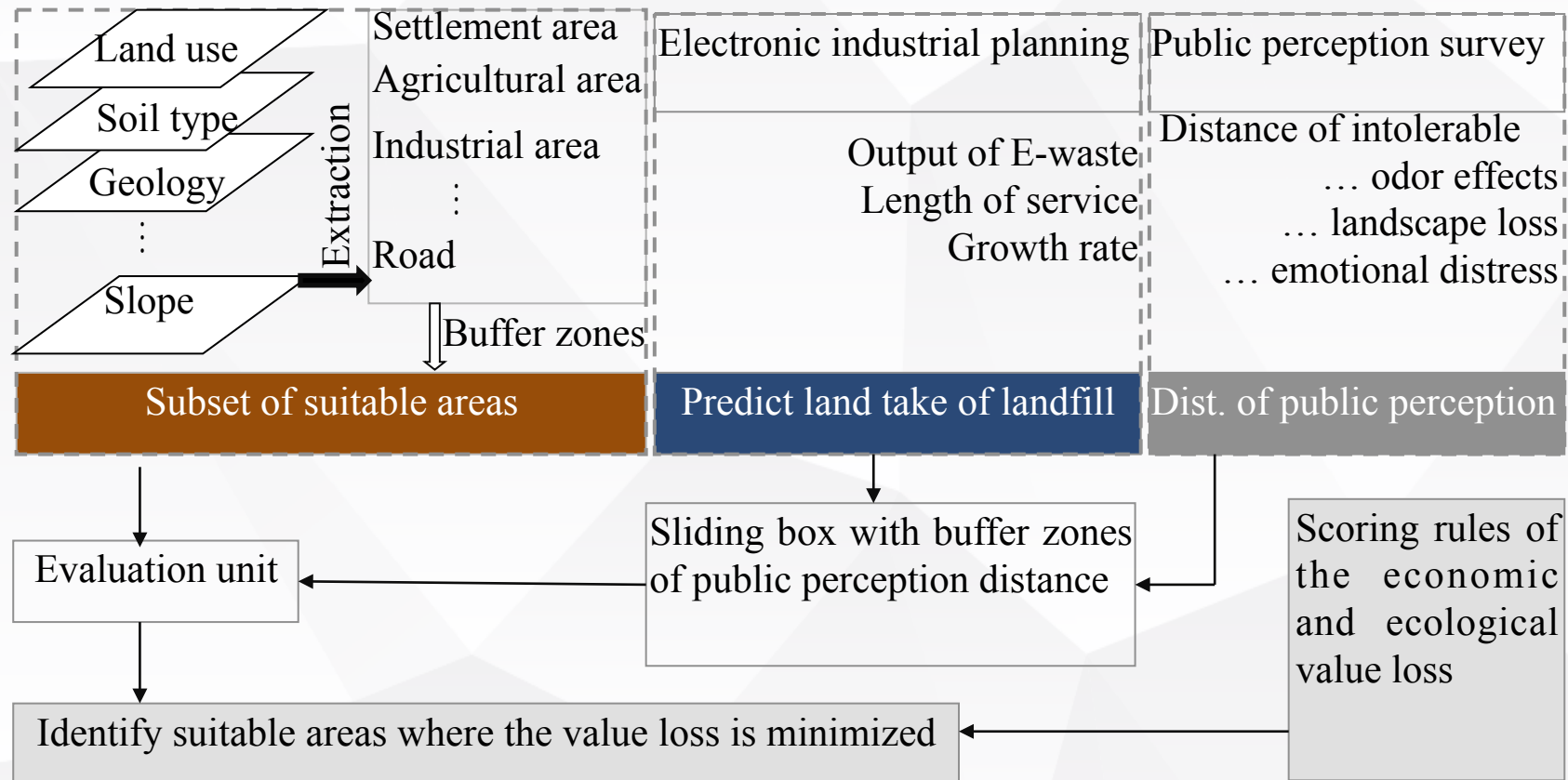


Figure 1. A flow chart for the siting of E-waste landfill based on the minimization of public perceived value loss.

Methodology and data survey

Table 1. Contents of the questionnaire survey on public perception of spatial distances from

commission	the Nanjing Environment Protection Bureau
date	from July to September 2015
the way of survey	face-to-face interview
investigator	the postgraduate students
the respondents	300 randomly interviewed respondents in downtown streets or public places
	200 randomly chosen interviewees in residential areas, office buildings, or enterprises near the existing domestic waste landfill.
	100 randomly chosen respondents in the unsupervised suburban waste dumping sites.

4	What is the landfill distance at which no impact will be produced on your daily life?	Last buffer zone	
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Besides the 1:10000 land use map, 1:50000 geologic map and soil type map, and QuickBird remote sensing images of July 29th 2015 (resolution 0.61 m) were collected as well.

3

Results

- **Changes of the public perception of spatial distance from the landfill**
- **Determining the site with the minimal perceived value loss**
- **Designing the E-waste landfill as a landscape infrastructure**

Results

- Changes of the public perception of spatial distance from the landfill

Table 2. Statistical characteristics of the perceived distance of odor

Variable	The perceived distance at which no disturbance exists	The perceived distance of odor has little impact on the cultural and gardening activities, but may be loathsome to human olfaction. Therefore, residential areas and industrial areas are the major sites of perceived value loss.
Mean (m)	Where there is minimal affects to the life and production activities by the landfill	
Standard deviation	low (and t impact.	
Effective samples	areas are the major sites of perceived value loss.	development zone are the major site of perceived value loss.

Table 3. Scoring rules of perceived value loss

Variable	First buffer zone	Second buffer zone	Third buffer zone	Last buffer zone
Evaluation objects	Agricultural and building area	Building area	Residence and office area	Residence and office area
Scoring rule	5	3	2	1

Results

➤ Determining the site with the minimal perceived value loss

This paper applied GIS and Analytic Hierarchy Process to determine the suitable sites of landfill.

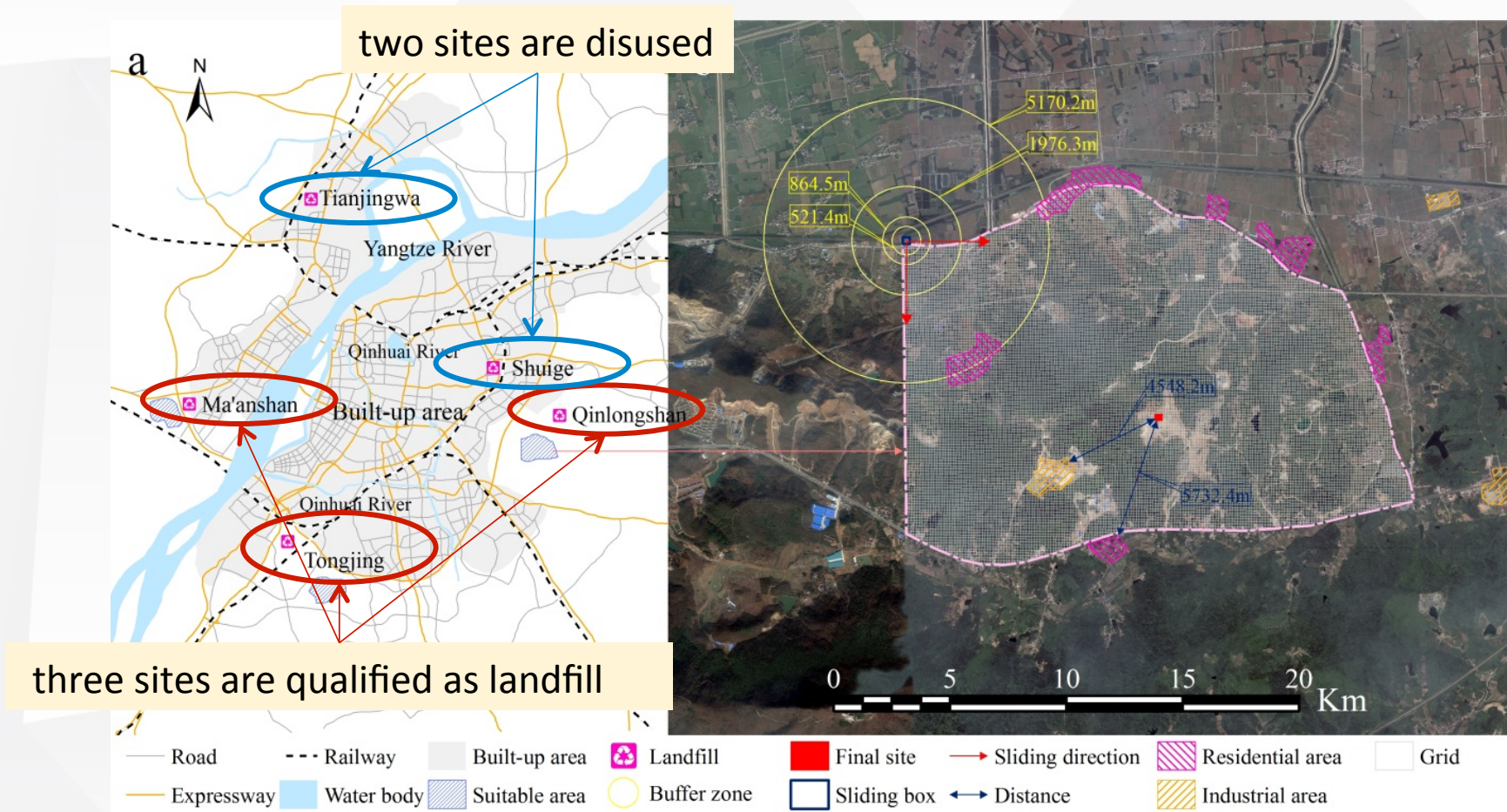


Figure 2. Location of the study area (a) and suitable site with the minimal perceived value loss (b)

Results

➤ Designing the E-waste landfill as a landscape infrastructure

When designing the E-waste landfill, the two priorities are controlling any possible pollutant diffusion and coordinating the relationship between man and nature.

The residual heavy metals in the soil and water can be very harmful

E-waste landfill must not be a "forgotten space"

The design of an E-waste landfill should adhere to the following principles:

1 Depending on natural conditions, it must build an overall development framework for the E-waste landfill.

2 It must design an ecological barrier for the burial of the electronic waste.

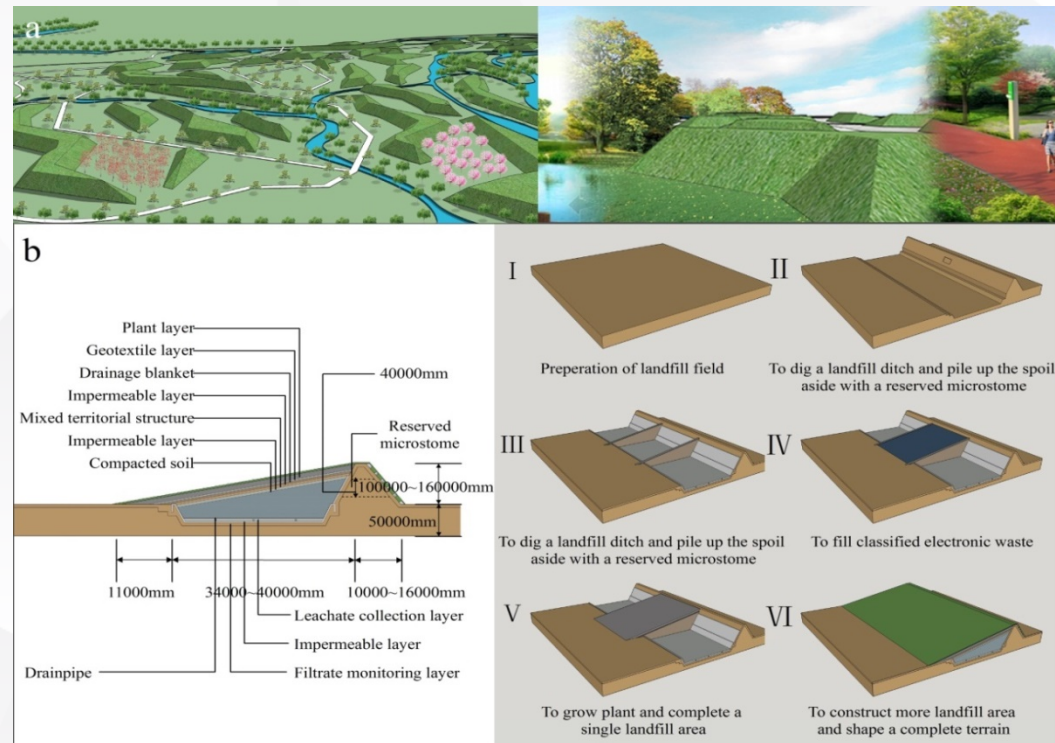


Figure 3. Designing an ecological barrier and E-waste landfill as a landscape infrastructure

Results

3

The landscape construction should be conducted stage by stage in the following steps.

- **First** the surrounding environment will be remediated.
- **Second** the E-waste landfill can be built and operated in linkage with the waste recycling industrial park.
- **Third** the road transportation network and infrastructure facilities should be perfected.
- **Finally** the greening system will be constantly extended outwards and linked with the existing urban green space.

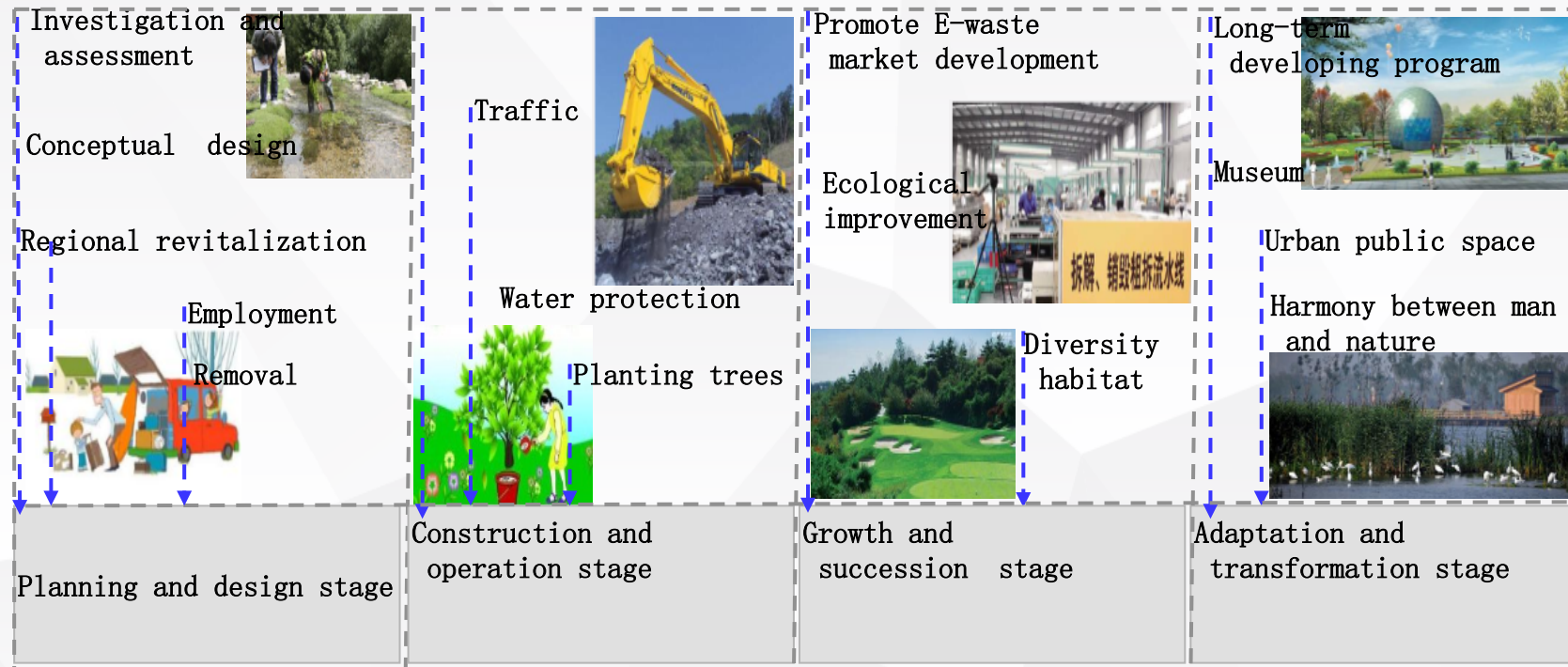


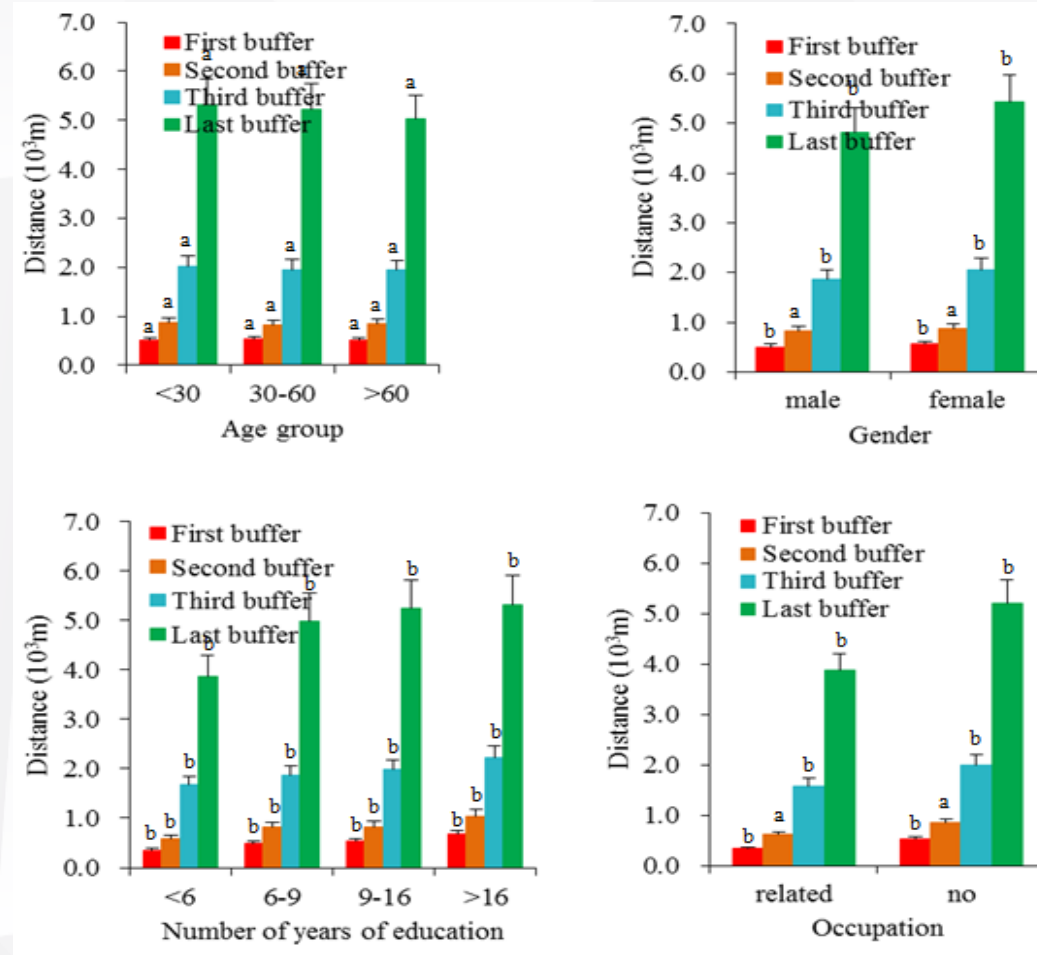
Figure 4. Development stages of E-waste landfill and landscape formation strategies

4

Discussion

Discussion

This study focused on the criteria for the siting of E-waste landfill based on the public perceived value loss.



- Perceived distance is not influenced by age.
- Females are more sensitive to the potential risks of E-waste landfill than males.
- The number of years of education is a significant influence factor.
- The landfill distance perceptions vary depending on occupation, and aside from the second buffer zone, the difference is of statistical.
- People who are engaged in waste disposal offer a much shorter perceived distance than those who are not.

Figure 5. Impact of respondents' age, gender, number of years of education and occupation on the perceived distance to the landfill. Error bars represent the standard error; different lowercase letters indicate significant differences at $p < 0.05$ according to Duncan's multiple range tests.

5

Conclusions

Conclusions

background

Electronic waste is the fastest growing type of garbage throughout the world. Burial after recycling seems to be the only destination of the E-waste. But E-waste landfill should not be the forgotten and wicked place in the city, and it must be integrated into the future urban space.

methodology

To identify the landfill site with the minimal public perceived value loss, we applied **GIS-based sliding box technique**, performed **social survey** on public perception of landfill distance, and formulated **the scoring rules** of perceived value loss.

purpose

In order to store the E-waste for reuse a separate ecological barrier was designed. By designing the E-waste landfill as a landscape infrastructure, the E-waste landfill will become part of the urban public green space.

suggestion

Our proposal provides inspirations for the transformation of landfills and urban development of the developing countries.

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**Thank you for your
time and attention**

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