# Supporting Information for:

## XXXX XXXX1, XXXX XXX2, XXXX XXXXXX3

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## 1 The current state of wastewater and sludge treatment in China

## 2 Methodology

### 2.1 Data Preparation

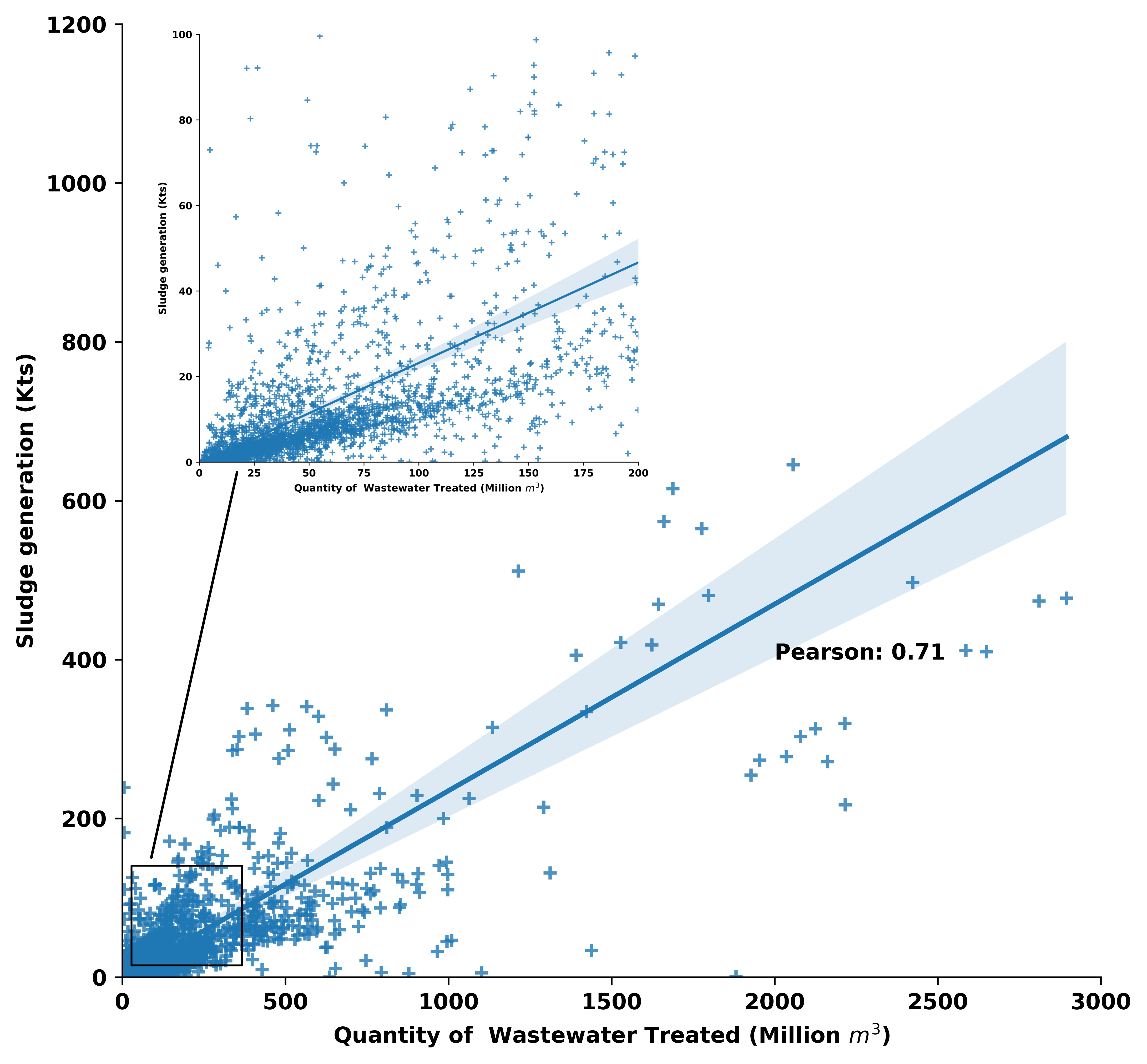
#### 2.1.1 Sludge data calculation

Sludge data in China are collected by the Ministry of Housing and Urban-Rural Development of the People’s Republic of China (MHURD). MHURD publishes *Urban Construction Yearbook* every year which has yearly sludge production in each city. However, some data from this *Yearbook* has an obvious bias. To eliminate the bias and inconsistency, we collected the information from *Urban Drainage Yearbook* which contains the yearly treatment data of all the wastewater treatment plants (WWTPs) in China. We used the name of WWTP to find its location (coordinate) through Baidu map. Identifying the city where the WWTP locates and summing all the sludge data of each WWTP in that city. Finally, we used our calculation to substitute the biased data in the *Urban Construction Yearbook* (Figure S1).

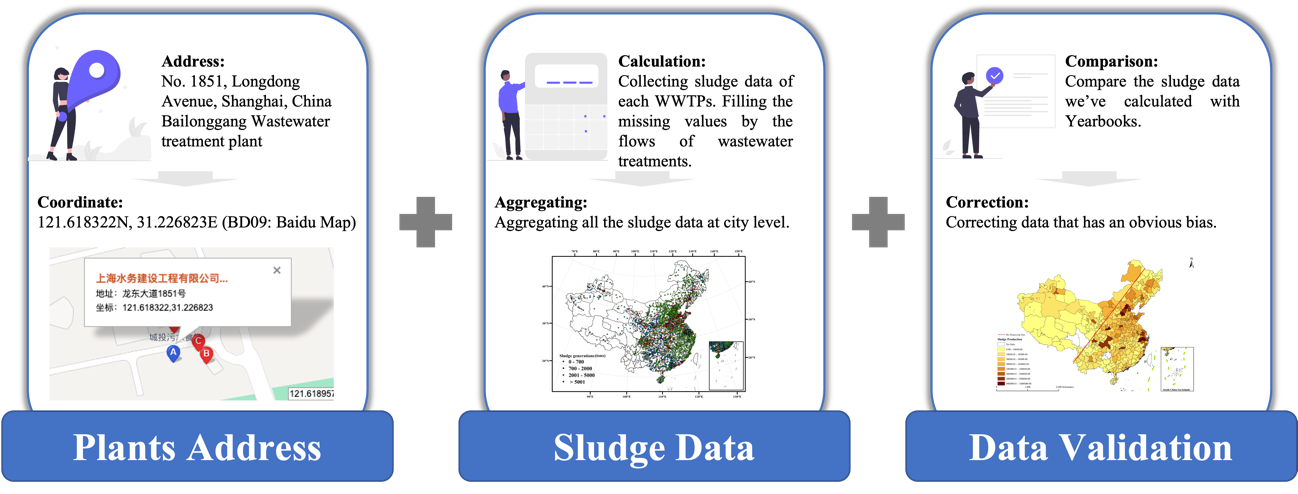
Sludge production highly correlate to the flow of wastewater treatment (Figure S2). Based on this correlation, we calculated the sludge production of each wastewater treatment plants in China with the following equation:

Where *Ds* represents dry sludge, *F* is the flow of wastewater treatments and *s* is the conversion coefficients which were obtained from *Urban Drainage Statistical Yearbook* (Table S1)*.*

We grouped sludge production data by prefecture level, calculating the sum of sludge production in a city. Compared our calculation with *Urban Construction Yearbook,* fixed its inconsistency.



**Figure S2.** Correlation between sludge generation and the quantity of wastewater treated



**Figure S1.** The workflow of collecting sludge data

### Sludge Projection

|  |  |
| --- | --- |
| **Province** | **s (t/10 Kts)** |
| Beijing | 7.31 |
| Tianjin | 5.95 |
| Hebei | 8.26 |
| Shanxi | 7.51 |
| Inner Mongolia | 6.98 |
| Liaoning | 4.61 |
| Jilin | 4.13 |
| Heilongjiang | 5.60 |
| Shanghai | 4.56 |
| Jiangsu | 6.43 |
| Zhejiang | 9.95 |
| Anhui | 4.61 |
| Fujian | 4.01 |
| Jiangxi | 3.07 |
| Shandong | 7.85 |
| Henan | 6.55 |
| Hubei | 4.65 |
| Hunan | 3.29 |
| Guangdong | 4 |
| Guangxi | 3.37 |
| Hainan | 3.48 |
| Chongqing | 6.04 |
| Sichuan | 5.31 |
| Guizhou | 3.56 |
| Yunnan | 4.77 |
| Tibet | 2.27 |
| Shaanxi | 7.83 |
| Gansu | 9.92 |
| Qinghai | 6.22 |
| Ningxia | 7.55 |
| Xinjiang | 7.91 |

#### 2.2.1 Production sector classification

The IO table in Xiamen contains 139 sectors (Table S2), with a water supply and production aggregated with wastewater treatment.

### Scenario analysis

### Sensitivity analysis

## References

CCNPS (Compilation Committee for National Pollution Survey). Household Discharge Coefficient and Use Instructions. China Environmental Science Press. 2011.(in Chinese)

GSC (General Office of the State Council). Pilot Work Plan for the Construction of Wasteless Cities. 2018. In Chinese.

Heijungs R and Lenzen M. Error propagation methods for LCA - a comparison. International Journal of Life Cycle Assessment. 2014, 19(7): 1445-1461.