

Research Trends and Results

Efficiency Increase in Sewage Treatment Systems under the Condition of a Falling Population

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1. Introduction

Sewage treatment systems include sewerage, agricultural community effluent, human waste treatment facilities, etc. Local governments have adopted the sewage treatment system according to the characteristics of their regions, and the country's percentage of population connected to public sewerage (end of FY2014) reached 89.5%. Meanwhile, the overall population of Japan, which was increasing until around 2010, has been declining, and is expected to fall from the present level of about 130 million to about 87 million in 2060 according to the median value estimate by the National Institute of Population and Social Security Research ¹⁾ (see Figure 1).

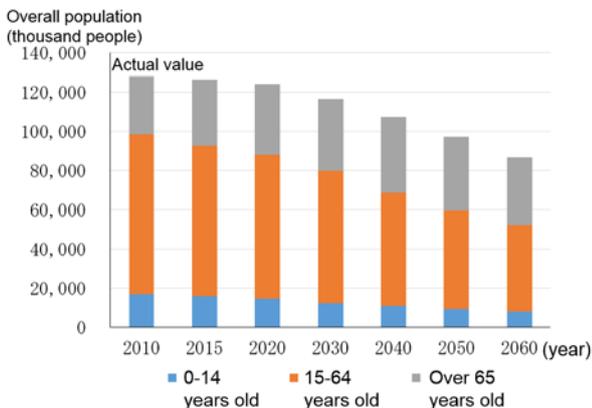


Figure 1: Population Estimate ¹⁾

Since sewage treatment systems have the issue of decline in the operating ratio and profitability of treatment facilities due to the decrease in the required performance of facilities and usage fee as a result of reduced amount of sewage treatment in accordance with population decrease and to the increase in the cost of reconstruction / renewal of aged facilities, etc., the NILIM has been studying the efficiency increase of sewage treatment system under the condition of a falling population.

2. Efficiency increase in sewage treatment system

To increase efficiency in sewage treatment systems, the following three main methods are considered. (i) Scale down existing facilities to the level of required ability. (ii) Utilize the capability of existing facilities and conduct intensive treatment of sewage and sludge in a single sewage treatment system including those from other areas to close the facilities in other areas (e.g., Treatment Facility B in the example of sewage collection

and the sludge treatment facility in Treatment Facility B in the example of sludge collection in Figure 2). (iii) Implement the method ii) above for different sewage treatment systems and close the systems merged.

In order to carry out the foregoing methods for efficiency increase in sewage treatment systems, it is essential to consider multiple aspects including reconstruction / renewal plan utilizing existing facilities, cost, energy, and long-term estimate of future population and is necessary to provide the concept of planning with technical consistency and establish an assessment method. In addition, sewerage is likely to be chosen as the center of concentration since its scale is larger than other sewage treatment systems, so it is necessary to clarify input conditions for collecting human waste, sludge, etc. into sewerage as well as technical issues for receiving them and response policy.

The NILIM has been organizing the data on cost and energy focused on the operating ratio of facilities, which would be necessary in studying various issues, and going to study technical issues in receiving human waste, sludge, etc. and response policy and establish an assessment method, etc.

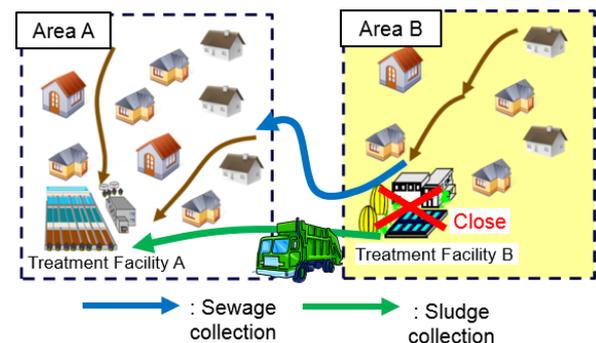


Figure 2: Example of efficiency increase in sewage treatment system

3. Future development

The NILIM promotes maintenance and efficiency increase of sewage treatment systems under the condition of a falling population by preparing technical material for local governments to study / evaluate an efficient sewage treatment system for their regions.

[Reference] 1) National Institute of Population and Social Security Research: Population Projections for Japan (estimated in January 2012), March 2012