

Survey Study for Reconstruction of Water Cycle in Sagami River Basin

Whole term

2001.7 to 2003.3

1. Background and Purpose of Research

At the Sagami river basin, the problem of the water pollution has aggravated with the progress of the rapid Urbanization since Showa 30s. For the purpose of the improvement of the living environment and water quality from Showa 44, the Sagami River-basin sewerage has been promoted, and the sewerage processing population diffusion rate reached about 88% (at the end of the Heisei 13 fiscal year), which is higher than 63.5% of the national average. This sewerage contributes to the water quality conservation of the Sagami Kawamoto River significantly, and has caused the hygienic living environment to many citizens. Although the "produced" water from a sewage treatment plant has value sufficient as a water resource, in the Kanagawa prefecture, the resurgent water which is more than about 200 million tones every year is discharged to the public water body. The contribution for actual water supplies as rinse water, revival and generation of the water cycle and the water environment, are expectable in this resurgent water. At the place where the utilization of treated wastewater is desired, the necessity for utilizing the potential which sewerage obtains to a waterfront-environment improvement is increasing. For instance, by performing the advanced treatment according to application, the conversion of the resurgent water only discharged to the public water body to "usable water" is needed for the improvement for waterfront-environment.

2. Creation of Healthy Water Cycle and Good Water Environment

As one of the factors which are changing the water cycle system in the urbanized watershed, the decreasing of infiltration capacity and the water retention capacity, which the river basin originally had, can be considered.

Promotion of the rain-water circulation measure which uses a rain-water infiltration tank in order to revive the osmosis lost at the watershed, and the function of a water-retaining are needed for new water cycle reconstruction.

It is also desirable to develop the resurgent water circulation project which carries out the effective use of the resurgent water by using the advanced treatment for the purpose, "revival of a stream" of water amenity and the landscaping which citizens can directly realize as an environmental improvement effect.

The effects on the revival of osmosis and the water retention capacity by comprehensive measure which is mainly based on the measure of the rain-water circulation and the resurgent water circulation in watershed were quantitatively estimated by the water cycle analysis model. Moreover, after adding qualitative judgment, the feasibility of the examination was evaluated.

3. View of New Water Cycle Reconstruction

In this examination, the target area is the Mekujiri River basin, which is a tributary-stream of the Sagami River. The projects in connection with the related water-environment improvement of cities and towns were combined, and the lack of the water cycle of the watershed and the needs for the watershed were comprehended by arranging the requests from citizens to each city or town.

Moreover, the cases in the primary river basin were made as menus, and the scenario in the watershed was set up.

In the future scenario of water cycle reconstruction, the measure for wastewater from miscellaneous sources and the measure for preservation of forest, agricultural area, and parks will be continuously performed. The effects of future measures were quantitatively analyzed, which are on resurgent water circulation by effective utilization of a treated wastewater and rain-water circulation from rain-water storage penetration and reservoir water.

4. Deployment and Effect of Comprehensive Measure

The optimal amount of enforcement of an independent measure, and the combination of the measure were examined by the quantitative criterion of the judgment which acquired from the independent effect prediction of the water cycle reconstruction measure and qualitative bases of selection, such as geographical features and geography conditions, and the feasibility of a measure. It was assumed that the effective water quantity obtained by performing these-synthesized measures that consists 20% of the water quantity which will flow back to the river basin in the future. In the effective water, the resurgent water circulation contributed about 20%, and the role which sewerage plays in future water cycle and water environment clearly turned out to be large.

In this examination, the outcome indicator of the water cycle and the water environment was not shown previously, but the effect of developing realizable measures was verified. Therefore, it was emphasized to make intelligible the information about the effects of water cycle reconstruction measures based on citizens' participation in municipal affairs.

5. Summary

Although the Sagami River is called "river of the sweet fish" which means the clear river, it has been strongly influenced by urbanization in recent years. Sewerage has contributed to improve water quality so far, when considering natural environment and the city life in the future. The role which sewerage must play in the 21st century is important. This examination made the direction of the sewerage clear toward future water cycle and water environment in the 21st century. The future water cycle and the water environment should be considered by collaborating with citizens, based on the actual proof results of the resurgent water use experiment which is currently conducted in the Shinomiya treatment plant.

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Key words

Water cycle, Water environment, Regional sewerage system, Reclaimed water cycle, Rain water cycle