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24,400 ton , 1973

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, SS

243~424

mg/ , 418~515 mg/ , 245~328 mg/ , BOD

10.5~14.6 mg/ , 12.0~16.4 mg/ , 14.5~18.2 mg/

, COD 19.6~24.1 mg/ , 24.0~28.4 mg/ , 26.0~33.0

mg/ . T-N 16.67~24.52 mg/ , 18.16~21.23

mg/ , 18.95~19.57 mg/ , T-P 1.296~1.885

mg/ , 1.590~1.890 mg/ , 1.547~1.950 mg/ .

3)

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		(m ³ /d)	SS (kg/d)	BOD (kg/d)	COD (kg/d)	T-N (kg/d)	T-P (kg/d)
KA1		21,648	567.1	147.2	268.4	58.1	4.9
		983	303.6	14.7	32.4	19.0	1.7
		22,631	880.3	162.9	328.1	96.2	16.4

4.3%

(%)

SS 17.3%, BOD 4.5%, COD 5.2%, T-N 11.0%, T-P 7.4%
가 SS T-N, T-P

BOD COD

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SUMMARY

I. Title

“Research on reasonable land use plan in the Pal-dang lake basin”

. Objectives and necessity of this study

The Pal-dang lake is located in Gwangju-si, Toechon-myeon, Namjong-myeon, Gyeonggi-do province and is preserved and managed as a major water supply of Seoul. The total water volume of Pal-dang Lake was constructed in 1973 is 24,400 million tons. There are no fishery and amusement parks in Pal-dang lake basin. Water quality of the Pal-dang lake has been steadily degraded due to increases in potential pollution sources in the watershed. Pollution rates are high due to the influx of wastewater from Bukhan river, Namhan river, Kyongan river. Areas at the Pal-dang lake basin are classified as water preservation area, special water preservation , areas and nature conservation areas. The highest pollution production rates of the Pal-dang lake is Namhan river, followed by Bukhan river, Kyongan river and Hangang river. Also, the cultivated land of vinyl house crops contribute greatly to the pollution of the basin.

Typically, the cultivated land of vinyl house crops interrupt the natural environment. The cultivated land of vinyl house crops are high in fertilizer usage, because of the intensive cultivation of crops. In addition, pollutants are exposed greatly during the rainy season between July and August. Thus, increasing the pollution rates in river and Ground water. Vinyl houses are centralized in groups around the Pal-dang lake basin. For these reasons, it is likely that the vinyl house will impose a great negative effect to the quality of water in the Pal-dang lake basin.

The purpose of this research is to evaluate how crop cultivation by vinyl houses near Pal-dang lake affects the water quality of Pal-dang lake and to suggest permanent solutions for the reasonable use of riverbeds and water quality preservation.

. Content and range of this study

- 1) River site utilization actual conditions grasping in the Pal-dang Lake basin
Investigation of the status of the Pal-dang Lake basin
Land utilization status survey of the Pal-dang Lake basin river site

Farm utilization and produce status survey of the Pal-dang Lake basin

2) River site vinyl house cultivation water quality influence valuation of the Pal-dang Lake basin

Farm produce land under cultivation field grasping

Outflow form grasping of the pollutant

Outflow form for water quality survey rational river site application plan groping of the pollutant

Influence valuation and total pollution load computation with pollution concentration

3) Water quality improvement plan groping through river site application

Water quality improvement technology survey and applicability valuation through river site application

Influence and safety, ecological closeness, economical efficiency and technology valuation of the environment

Native and foreign application case survey of the water quality improvement through river site application

4) Requirement cost production and counterplan preparation with migration through vinyl house farm migration

Valuation necessity of migration consideration for water quality and environment

The requirement cost production with migration

Total counterplan preparation with migration

IV. Results

1) Research of the present state of vinyl houses in Pal-dang lake basin

The present states of the farmhouses located around the Pal-dang lake basin were evaluated. Along with the Pal-dang lake basin itself, the research of Bukhan river Namhan river, and Kyongan river basins, which are streams that flow into the Pal-dang lake took place mainly by field researches and satellite photo analysis. In the case of Kyongan and Bukhan river, it was found that big numbers of vinyl houses were centralized in groups near the Pal-dang lake basin. On the other hand, vinyl houses were settled in decentralized forms on the Namhan river along the river basin. No pollutant outflows were confirmed from these farmhouses in non raining periods. But under raining conditions it was confirmed that as rain water joined the surface outflows, polluted water flowed directly into the rivers, inducing

negative effects in the water quality of the Pal-dang lake.

2) Researches on water quality pollution by the rain-outflow from vinyl houses in the Pal-dang lake basin

The pollutant concentration of water quality value ranges by the rain-outflow from vinyl houses in the Pal-dang lake basin are as follows; concentration of SS : Bukhan river 243~424 mg/ , Namhan river 418~515 mg/ , Kyongan river 245~328 mg/ ; concentration of BOD : Bukhan river 10.5~14.6 mg/ , Namhan river 12.0~16.4 mg/ , Kyongan river 14.5~18.2 mg/ ; concentration of COD : Bukhan river 19.6~24.1 mg/ , Namhan river 24.0~28.4 mg/ , Kyongan river 26.0~33.0 mg/ ; concentration of T-N : Bukhan river 16.67~24.52 mg/ , Namhan river 18.16~21.23 mg/ , Kyongan river 18.95~19.57 mg/ ; concentration of T-P : Bukhan river 1.296~1.885 mg/ , Namhan river 1.590~1.890 mg/ , Kyongan river 1.547~1.950 mg/ .

3) Researches on pollution loading followed by the rain-outflow from vinyl houses in the Pal-dang lake basin

The affects of the rain-outflow from vinyl houses in the Pal-dang lake basin to the rivers were evaluated. The quality of the out-flows from the vinyl houses that flow into the rivers were evaluated under raining conditions. And also the quality differs before the river flowed into the lake and after the river flowed into the lake were compared. The pollution loadings were converted and are shown in the following table.

site	list	flux (m ³ /d)	SS (kg/d)	BOD (kg/d)	COD (kg/d)	T-N (kg/d)	T-P (kg/d)
	KA1	Upstream	21,648	567.1	147.2	268.4	58.1
Inflow		983	303.6	14.7	32.4	19.0	1.7
Downstream		22,631	880.3	162.9	328.1	96.2	16.4

The percentage of the in-flow from the vinyl houses were 4.3% from the total flux. The pollution loading contribution rates of the vinyl house outflows that were calculated based on the pollution loading were 17.3% SS, 4.5% BOD, 5.2% COD, 11.0% T-N and T-P 7.4% respectively. Thus above these results, it can be estimated that contribution rates of the SS, T-N, T-P pollution loadings from the vinyl farmhouses are relatively higher. It is estimated that such contributions were

due to the fertile soils and the fertilizer, nutrition matters that are settled around the vinyl houses. But the pollution loading contribution rates of the BOD and COD, which represents the quantities of the carbon organics matters in the soil were not obviously different from other common soils around the site. It can be concluded that if effective management of soil surface covering along with nutrition matter are not carried out in vinyl house farming, it can induce negative effects to the water qualities of the pal-dang lakes and its surrounding streams.

VI. Application plan

The water quality improvement contribution with vinyl house farm migration in the Pal-dang Lake basin

The application to basic data in the Pal-dang Lake basin management

The subject of river and lake management organs concerned and local government measure offer of drainage area management data

The drainage area actual circumstances application purification plan presentation for water quality in the Pal-dang Lake basin

The diversification of reduction technology with pollutant source characteristic in the Pal-dang Lake basin

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