

Influence of new introduction of circulation irrigation on water quality in Inbanuma, Chiba, Japan

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Introduction

the new introduction of circulation irrigation has been advanced since 2010 in the Inbanuma as part of the update project of the irrigation facilities. In the present study, the change in the water quality before and after the introduction of the circulation irrigation was examined for an irrigation block.

Materials and methods

The investigation completed facilities update in 2014, selected the irrigation block that had been used in 2015, and executed the water quality and hydrological investigation during the irrigation period of this 2 years. Water samples were taken at ①division works of irrigation canal, ②drainage canal, and ③drain pump station. The water analyses item was TOC, SS, TN, NO₃-N, NO₂-N, NH₄-N, TP, and PO₄-P in the regular water investigation executed about once a month. Besides regular investigation, water samples were taken once a day (8:00AM or noon) by the automatic water sampler at site ① and ③ and SS and T-P were analysed. The turbidity and water level were measured every ten minutes by using data loggers at site ① and ③. The values of the obtained turbidity were converted into the concentration of SS and TP by using the regression curve.

Result and discussion

The clear trend had not been understood though the SS concentration seems to have risen in 2015 from the result of the regular investigation. It seemed that TN concentration had decreased at site ① and site ③ while TP concentration had increased. The N/P ratio decreased to 7.9 and 6.6 at site ① and ③ respectively in 2015 though the N/P ratio was 14.1 and 22.5 in 2014. It was thought that a decrease of TN was an effect of the improvement of the nitrogen removal function of the rice field by the introduction of the circulation irrigation. A more detailed examination is necessary for consideration though the influence of an increase of the phosphorus loading by the repetition use for rainwater was thought as for an increase of TP. When we paid attention to the converted data from the turbidity sensor, the SS concentration in 2015 was lower than the SS concentration in 2014. Similarly, uptrend of the TP concentration was confirmed with beginning of the circulation irrigation.

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