A study on the conservation, restoration, reproduction and management of the water environment in the Ashida river basin

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1. Introduction

The research on the water environmental conservation and the management of the river basin also is important, and already has some river basin models in thinking about the symbiosis of natural environment and the man activity (SWAT and PWRI model, etc.). However, the analysis that considers a regional characteristic in the basin has not arrived though the space scale and accuracy are various, and the entire basin can be estimated roughly at a variety of water environmental information used. Then, the construction of the river basin model analyzed by setting the unit basin minimum extracted from DEM, calculating a variety of water environmental information as an attribute of each unit basin, and using GIS is tried. In this research, it reports on the case with the Ashida river.

2. Study Area

Extend to the Ashida river of originating the source in a Hiroshima Prefecture Mihara city Yamato-cho, the flow in Fuchu city matching the branch, and pouring in Fukuyama City into the Inland Sea It is a class A river of the 86km and 860km^2 in the basin area. The winding that originates in the fault structure is large though it flows from the northwest to the southeast in the Chugoku mountainous district south. Moreover, the basin extends over Hiroshima Prefecture and Okayama Prefecture, and the downstream region has developed as an industrial city of a heavy chemistry industrial subject that centers on the iron and steel industry. The problem of the generation of the colloidal sediment piling up and the red tide etc. is caused though the country constructed a river weir in the mouth of the river for the water for industrial use securing and the flood prevention in 1981.

3. Methods

The river system expressed in method and the topographical map of various reduced scales was arranged, and a unit basin that corresponded to the water line sign of 1/50,000 topographical maps was set compared with the drainage network extracted from DEM. Information on a variety of water environments, the population, land uses, and agriculture, etc. was totaled in each unit basins on that, and the pollution load in each basin of various scales was analyzed. In addition, the region where an environment at that time in 1975 and 1985 was restored by a similar technique, the difference with 2000 was extracted in each unit basin, and a remarkable environmental change took place was clarified.

4. Results

As for the DEM drainage network and the topographical map water line sign, the difference is seen in a surplus water current etc. excluding the downstream region with the passage change though it is corresponding well. There was a region where the area of the county increased to several times that of a unit basin in the mountanious village part, too and the necessity of the information analysis in a unit of the section of a village or each agricultural village became clear though two or more administrative units entered a unit basin in the urban area. A pollution load increase in an active upstream region of the downstream region and stock raising with a remarkable population an increase was clarified because of calculated the life system, the farmland system, and the pollution load of each unit basin of the total nitrogen and all phosphoruss of the stock raising system by the unit basin value method, and compared it in 2000 1985 1970.

5. Conclusion

The environmental restoration of a past water environment change is found to make the best use of this technique for the watershed management in the future in the end and after the analysis that applies accuracy or more high doing and the model is done, it is necessary to find the directionality to the water environment reproduction. In addition, it is necessary to provide the indicator of the watershed management, to execute the simulation, and to verify the effectiveness of the model.

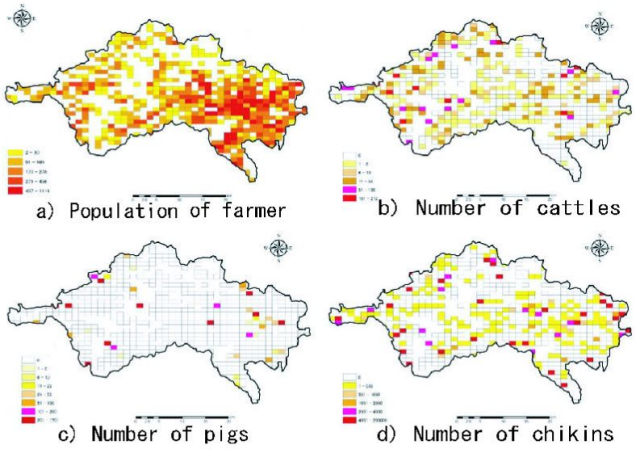

Fig.1 Distribution of agricultural index

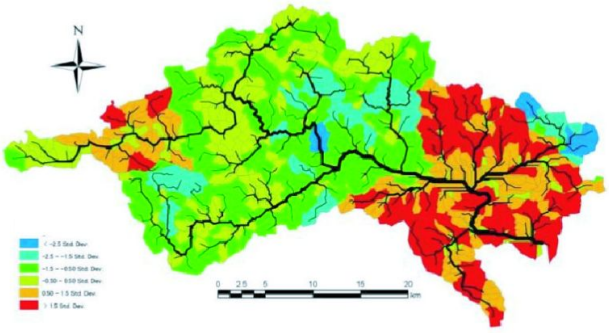

Fig.2 Change in nitrogen pollution load (1970-2000)