

Generally, a watershed has a “nested” structure that encompasses the human activities that develop within it. For our investigation we chose the Lake Biwa watershed as an example of this kind of nested structure and defined it as a hierarchy consisting of three spatial levels: macroscale (the entire watershed), mesoscale (the regional community), and microscale (the local community). We focused particularly on ways of viewing the problems occurring in the watershed at each level, because differing views can cause conflicts of interest between levels and thus obstruct watershed management. In other words, the reason why watershed management is not working well is that active communication aimed at balancing competing interests is blocked, leaving a variety of stakeholders dispersed over the three levels.

In light of this background, our focus was on the turbid water discharged from rice paddy fields. The soil puddling performed in the first stage of rice farming causes turbid water to flow out of the paddy fields through medium and small rivers and finally into Lake Biwa. At the microscale level, this turbid water is regarded as causing a deterioration in the riparian environment surrounding the rural settlements by farmers (“feedback issue”). At the mesoscale level, however, it inflicts damage on the activities of coastal fishers: at this level the people doing the damage and the people suffering the damage are different (“causing/suffering damage issue”). Furthermore, the continuous outflow of turbid water produced by the regional community into Lake Biwa could accelerate the eutrophication of the entire lake on a macroscale level and raise concerns about the shift in water regime represented by a rapid deterioration of water quality (“global environmental issue”). The type of problem posed by the turbid water changes with the spatial level, moving up from the microlevel through the mesoscale to the macroscale, expanding the scales of space and time at which problems occur. Therefore, turbid water problems can be understood as combined problems of different types and scales that are linked to each other.

Analysis of the social/political factors from which such combined problems are generated is important, as well as the said sociological analysis of turbidity problems. In the background of these turbidity problems is an agricultural modernization policy that has been promoted nationally. Although this policy has improved agricultural productivity, it has unintentionally diminished the rural community’s ability to manage the aquatic environment, including paddy fields. In addition, the environmental load imposed by the turbidity from farming around Lake Biwa has left an external diseconomy. As yet, it cannot be said that counterstrategies have been effectively implemented. For example, Shiga Prefecture’s coordination of the environmental and agricultural policies for Lake Biwa has not been totally successful.

What kinds of activities or systems should be developed in social settings to solve these combined turbidity problems? We would like to propose a hierarchical watershed management system incorporating adaptive management, because we believe that governance by a variety of stakeholders on the basis of adaptive management at each spatial level is needed to achieve effective management of the watershed as a commons.