

# **Current status and issues of water resources management in rural areas of the Philippines - From the viewpoint of residents living in Carmen village located in upper stream of Laguna Lake basin southern Luzon -**

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## **1. BACKGROUND AND PURPOSE**

Urbanization, accelerated by economic growth, has brought various challenges to water resources and rural areas in the Republic of the Philippines. Environmental deterioration of river basins due to lack of infrastructure, increase of floods caused by land use change, water scarcity, the increasing cost of land, and disputes over land ownership are some of the current issues. The Laguna lake basin, which includes the study site, especially faces these challenges. While previous research has taken efforts to study these issues, improve them, and predict future outcomes, not many have explicitly focused on the situation of residents living in the basin and the state of water resources in rural areas. The purpose of this research is to clarify the current situation and problems of water resources in rural areas under development. It focuses on the perspective of residents and how social factors are affecting these issues, and presents considerations for the sustainable use of water resources.

## **2. RESEARCH AREA AND METHOD**

The study site, Carmen, is a rural village located in the upper reaches of Laguna Lake in southern Luzon. While more than 90% of the village is covered by farmlands, the surrounding areas are developing at a rapid rate. Emerging residential areas, large shopping malls, and a factory zone are causing a significant environmental gap between the village and its surroundings. The investigation periods were three months from September 25 to December 27, 2016, and three weeks from July 7 to 27, 2017. The survey contents were water resource use by residents living in Carmen and the surrounding areas, and the social factors influencing them. The methods are participant observation, questionnaire surveys, semi-structured interviews, and unstructured interviews.

## **3. RESULTS AND DISCUSSION**

**(1) Water resources:** In Carmen village, various water sources such as rivers, wells, springs, rain, purchasing water, drainage, are used in addition to the groundwater supply system, and water use differs between consumers based on their socio-economic background. The management of supply systems vary between villages. Water sources for daily usage have been shifting from river to joint management sources by villages, and to sources managed by individuals or corporations. This has caused the exclusiveness and competitiveness of such water sources to increase. The supply conditions differ depending on management entities, and the water facilities managed by individual owners living in the areas function relatively well in terms of fee / supply time.

**(2) Social environment:** Over 90% of the land of Carmen has already been sold to developers, and now many residents live without land rights. This situation is due to social and historical issues, such as the surrounding development, increase of land prices, and a lands and titles system that is a remnant of the colonial era, and they create a fundamental challenge for sustainable living itself. Population increase due to peripheral development, land conversion, political factions in and outside the village are also obstacles to water resource management.

**(3) Overall consideration:** As a case study, it became clear that complicated social backgrounds affect resource management in rural areas that are exposed to development. Such backgrounds also exist in other rural areas of the Philippines, and this research highlights the importance of drawing on them when considering future water resource management.