

Thesis Abstract

No. _____

Registration Number:	☐ "KOU" ☐ "OTSU" No. *Office use only	Name:	プーデル ナミータ
Thesis Title: Exploring the Challenges and Opportunities of Urban-Rural Linked Water Systems in the Kathmandu Valley, Nepal			
Thesis Summary: Drinking water scarcity has been observed in various cities around the world, and water security is crucial for achieving SDG Goals 6 and 11. Some cities rely on rural water resources to meet urban demand. Kathmandu Valley, the capital of Nepal, has long suffered from chronic water scarcity. The valley's drinking water resources depend on foothill sources and rural areas, making urban-rural water connections essential. However, past disasters, particularly the 2015 earthquake and the 2021 Melamchi flood, severely damaged water infrastructure and had a significant impact on communities. The 2021 flood caused extensive damage to water infrastructure, including rural households, highlighting the urgent need for sustainable water management in Kathmandu Valley. This includes building resilient water infrastructure, strengthening community resilience, and addressing both urban and rural water challenges. Despite ongoing government efforts to solve Kathmandu's long-standing water crisis, it remains a persistent societal problem affecting the entire city. Existing research has identified urbanization and pollution management as major challenges in urban areas. However, since Kathmandu's water supply is linked to rural areas, an integrated research approach is needed, one that considers both urban and rural challenges, including disaster impacts. Current studies highlight urban issues but often fail to delve deeper into the root causes of these challenges. Moreover, while some research acknowledges rural connections, it only scratches the surface of the problem. There is a lack of understanding regarding why these issues persist and what rural communities need to support a sustainable water system. This research aims to explore both urban and rural challenges, including disaster impacts, for a sustainable water system. To achieve this objective, a mixed-methods research design has been employed, combining qualitative and quantitative approaches. Data collection methods include face-to-face interviews, focus group discussions, paper and online surveys, and secondary data analysis. The collected data is analyzed using thematic coding, SPSS, and Excel. The results reveal that PUMI (Pollution, Urbanization, Management Issues, and Investment Issues) is a major challenge for water security in Kathmandu Valley. Under PUMI, key issues include pipe leakage, illegal connections, donor-driven projects, lack of public			

awareness, weak penalties and incentives, and building permit-related challenges.

On the rural side, findings indicate that water scarcity is linked to food system disruptions, livelihood impacts, and demotivation due to the absence of benefit programs. Additionally, the resilience status of rural households remains unknown, making it difficult to assess their capacity to cope with disasters and support the water system. To address this, household resilience indicators were developed to measure resilience levels across three different areas. The results show that rural areas are significantly less resilient to disasters, leading to frustration and reluctance to contribute to the water system. Rural household resilience is low, with very less coping capacities. Proposed resilience indicators show rural households score between 1.8 and 2 (4 = resilient, <4 = moderate/low resilience) in both urban and rural areas.

Furthermore, an analysis of policy and institutional frameworks reveals that the current water operator, Kathmandu Upatyaka Khanepani Limited (KUKL), is heavily in debt, indicating an urgent need for increased revenue. Interestingly, survey results show that around 60% of respondents are willing to pay more for water if its quality and availability improve.

Based on these findings, recommendations have been proposed, including the implementation of benefit programs, improved government transparency, and better stakeholder coordination between urban and rural areas. While technical aspects of water infrastructure were beyond the scope of this research, the results emphasize the need for immediate policy action, effective implementation strategies, and benefit-sharing mechanisms that connect both urban and rural stakeholders to ensure a sustainable water system in Kathmandu Valley

Key Words: Water system, Water scarcity, Disaster Urban-Rural, Challenges, Kathmandu