



Investigating the social, economic, and environmental effects of water structures: A case study of Kellaroud reservoir dam

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Abstract

Introduction

The construction of dams has significant biological and social impacts, influencing the environment and local communities. The Kellaroud Dam project, located on the Kellaroud River in Mazandaran Province, represents a key developmental initiative aimed at addressing water scarcity in the region. This study investigates the social, environmental, and economic effects of the dam's construction on surrounding areas. The methodology is based on an analysis of existing resources and findings from the socio-economic studies conducted during the first phase of the Kellaroud Dam project. These studies utilized demographic data to forecast population growth and drinking water needs for the target year. The results indicate that the dam will have numerous positive impacts, such as water storage and regulation for cities like Babol, Babolsar, and Fereydunkenar, which currently face water shortages. The estimated population of these cities is approximately 419,493, with an anticipated drinking water requirement of around 40 million cubic meters by the year 1430. The dam is projected to meet 17 million cubic meters of this demand. Additionally, the construction of the Kellaroud Dam is expected to generate social benefits, including job creation, increased land value, enhanced community participation, improved health and social welfare, reduced migration, and the promotion of tourism in the area. However, negative impacts such as erosion, sedimentation, waste accumulation, forest destruction, wildlife displacement, air pollution, and noise pollution are also anticipated.

Materials and Method

The study area is located approximately 25 kilometers southwest of Babol, on the Kellaroud River, a significant tributary of the Babolrud River. The Kellaroud Dam, with a height of 62 meters and a reservoir capacity of 9.5 million cubic meters, aims to address the acute water needs of the region's urban and agricultural sectors. The research methodology primarily relies on existing socio-economic studies conducted by Ab-Niro Consulting Engineers, which included demographic analyses based on the latest census data from



1395. The study assessed the population growth and drinking water needs for the target year of 1430. The demographic characteristics of the affected areas were analyzed, including urban and rural populations, employment status, migration patterns, and cultural aspects.

Results and Discussion

The analysis revealed significant findings regarding the population dynamics of cities relying on the Kellaroud Dam for drinking water. Between 1335 and 1395, the population of Babol, Babolsar, and Fereydunkenar increased substantially, with projections indicating a need for 40 million cubic meters of water by 1430. The dam is expected to supply a portion of this requirement, contributing to local water security. Additionally, the dam's construction is anticipated to create jobs, enhance local income, and improve overall health and welfare in the region. The study highlighted that the increase in water availability could reduce migration pressures, as residents may find improved living conditions and employment opportunities. However, the construction phase poses environmental challenges, including soil erosion, waste generation, and habitat disruption for local wildlife. Mitigation strategies must be implemented to address these negative impacts while maximizing the benefits of the dam.

Conclusion

The Kellaroud Dam project represents a critical investment in regional water management, with the potential to significantly improve the quality of life for residents in Babol, Babolsar, and Fereydunkenar. The positive impacts include enhanced water supply, job creation, increased land value, and improved social welfare. Nevertheless, it is essential to recognize and manage the environmental consequences associated with the project. A balanced approach that prioritizes sustainable development and environmental protection will be crucial for the long-term success of the dam and the communities it serves. The findings of this study can inform decision-making processes for future dam projects and contribute to effective water resource management strategies.

Conflict of Interest

The author declares no conflict of interest regarding the authorship or publication of this article.

Data availability statement

The data and results used in this research will be available through correspondence with the author.