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Research Article

Identification of behavioral components of water literacy from the perspective of institutional stakeholders and key informants in the agricultural sector: A case study of the Agricultural Jihad organization in Qarchak county, Iran

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Extended Abstract

Introduction

Water literacy is a relatively new concept in water demand management research and serves as a tool for enhancing public awareness about water-related issues. It provides an estimate of the knowledge, attitudes, and behaviors of a community regarding water. This study aims to identify the behavioral components of water literacy among farmers in Qarchak, Iran, from the perspective of key stakeholders and informed individuals in the agricultural sector. The research employs a qualitative thematic analysis approach, using semi-structured interviews with 17 participants who have experience and knowledge about farmers' water literacy. The findings reveal ten overarching themes related to sustainable water management, including optimizing water resources, water storage, greenhouse farming technologies, equitable access to water, local participation, sustainable water productivity, reducing water waste, protecting freshwater resources, prioritizing wastewater treatment, and reducing water pollution. The results suggest that by leveraging these behavioral components of water literacy, it is possible to improve and reform agricultural practices in Qarchak, aligning them with available technologies, infrastructure, and capacities.

Materials and Methods

This study adopts a qualitative, descriptive, and cross-sectional research design. Thematic analysis was used to analyze the data, with interviews conducted with key stakeholders and informed individuals in the agricultural sector of Qarchak. The participants were selected using purposive sampling, and data collection continued until theoretical saturation was achieved. The interviews were transcribed and coded, with themes emerging from the analysis. The coding process involved identifying meaningful units, organizing them into base categories, and grouping them into overarching themes. The validity of the findings was ensured by incorporating direct quotes from the interviews.

Results and Discussion

The analysis of the interviews revealed ten main themes related to the behavioral components of water literacy among farmers in Qarchak:

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1. **Optimizing Water Resources in Agriculture**: This theme emphasizes the use of modern irrigation technologies, such as drip and pressurized irrigation, to reduce water consumption.
2. **Sustainable Groundwater Management**: Protecting groundwater resources through monitoring and reducing extraction was highlighted as a critical component.
3. **Water Storage and Management**: Improving water storage infrastructure, such as rainwater harvesting and artificial ponds, was identified as a key strategy.
4. **Low-Water Greenhouse Farming**: Shifting to greenhouse farming with low water requirements was seen as a sustainable approach.
5. **Equitable Access to Water**: Ensuring fair distribution of water resources among farmers was emphasized.
6. **Strengthening Local Participation**: Encouraging farmers to participate in water management decisions was identified as a vital component.
7. **Sustainable Water Productivity**: Reducing water waste and improving water use efficiency were highlighted as essential practices.
8. **Protecting Freshwater Resources**: Reducing the consumption of freshwater in agriculture through alternative water sources was discussed.
9. **Prioritizing Wastewater Treatment**: Treating and reusing wastewater for agricultural purposes was seen as a sustainable solution.
10. **Reducing Water Pollution**: Minimizing the use of chemicals and adopting organic farming practices were identified as ways to reduce water pollution.

These themes underscore the importance of behavioral changes in water management practices among farmers. The findings align with previous studies that emphasize the role of education, technology, and community participation in sustainable water management.

Conclusion

The study concludes that enhancing water literacy among farmers in Qarchak is essential for sustainable water management and agricultural productivity. By adopting modern irrigation technologies, protecting groundwater resources, and promoting equitable water distribution, farmers can improve their water use efficiency and reduce waste. Strengthening local participation and prioritizing wastewater treatment are also crucial for sustainable water management. Policymakers and agricultural organizations should design and implement comprehensive programs to promote water literacy through education, awareness campaigns, and the adoption of innovative technologies. This approach can help reduce pressure on water resources, increase agricultural productivity, and ensure environmental sustainability.

Keywords: Agricultural Jihad, Behavioral water literacy components, Farmers, Key institutional stakeholders, Qarchak county, Thematic analysis