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Designing a Demarketing-Based Learning Model for Sustainable Development of Water Resources

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ABSTRACT

Education and learning, as one of the fundamental pillars of sustainable water governance, play a decisive role in creating knowledge, changing attitudes, and modifying consumption patterns. The aim of the research is to design a learning model based on water resource conservation for sustainable development. This research is applied-developmental in terms of its purpose and qualitative and exploratory in terms of its research method. In this research, data were collected through semi-structured interviews with experts and specialists in the water field and analyzed using thematic analysis and MAXQDA software. The results of data analysis led to the extraction of initial concepts and themes, and by organizing the initial themes, 36 main components were finally identified, and after merging, refining, and integrating, 6 main dimensions were formed, which were considered and analyzed as the main strategies in water consumption conservation. The findings showed that the realization of water consumption conservation requires the coordinated interaction of economic, cultural, social, educational, technological, managerial, and political factors. And these results can be used as a model or practical framework for policy-making, planning and management of water consumption and provide the basis for promoting responsible consumption behavior, increasing public awareness and sustainability of water resources. **©authors**

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Introduction

Water is one of the most essential resources for life and one of the most important components of sustainable development in human societies; however, the protection and sustainable use of this valuable resource cannot be achieved solely through the development of technical infrastructure and management policies, but also requires raising awareness, continuous learning, and the formation of responsible behaviors among citizens and stakeholders. From this perspective, education and learning, as one of the fundamental pillars of sustainable water governance, play a decisive role in creating knowledge, changing attitudes, and modifying consumption patterns. In recent decades, population growth, urbanization, expansion of industrial and agricultural activities, climate change, and inappropriate consumption patterns have significantly increased the pressure on water resources, making the need for educational and learning-based approaches to manage demand and protect water resources more evident than ever before (Water, 2020; UN-Water, 2021).

In many countries, especially in arid and semi-arid regions, decreasing rainfall, declining groundwater resources, and increasing consumption demand have created complex challenges in water resource management. In such circumstances, promoting water literacy, developing a culture of learning about responsible consumption, and designing effective educational programs for different groups of society have become one of the requirements for achieving water resource sustainability. Evidence shows that the continuous decline in renewable water resources, drying up of wetlands and rivers, land subsidence, increasing social and environmental tensions related to water, and threats to food security, in addition to environmental and economic consequences, indicate the need to strengthen educational and social learning systems in order to change consumption behaviors and institutionalize a culture of water resource conservation (World Bank, 2017).

In the past decades, water resource management has been mainly based on supply-oriented approaches. Implementation of projects such as dam construction, inter-basin water transfer, development of water supply facilities and exploitation of new resources have formed an important part of water management policies. However, implementation experiences have shown that relying solely on increasing supply, without paying attention to demand management, raising awareness and modifying consumer behaviors, will not be able to sustainably solve the water crisis (OECD, 2015; OECD, 2021). Therefore, in recent years, researchers and policymakers have emphasized demand-driven approaches more than ever before, in which education, continuous learning and changing consumer behavior have been considered as prerequisites for sustainable water resource management (Russell et al., 2017).

In this framework, deterrence as one of the emerging approaches in marketing science, in addition to the capacity of demand management, can be used as a platform for designing educational and learning-based interventions to guide consumer behavior. Unlike traditional marketing, which aims to increase consumption and market development, deterrence focuses on reducing, controlling, or directing demand in conditions of resource constraints or adverse consumption outcomes (Lee & Kotler, 2020; Blythe &). Achieving this goal requires developing knowledge, promoting water literacy, social learning, and creating responsible attitudes among individuals and organizations. Therefore, educational, communication, cultural, social, political (governance), and technological tools, along with economic tools, play an important role in facilitating learning, changing attitudes, and institutionalizing sustainable behaviors. For this reason, deterrence has received increasing attention in recent years in areas such as environmental protection, energy management, public health, and natural resource management with an education and behavior change approach (Lee & Kotler, 2020; Hesse, 2023).

Despite the increasing importance of prevention, a review of the research literature shows that studies conducted in this area have mainly focused on commercial goods and services or topics such as tobacco, harmful beverages, and public health. Also, a significant part of the

existing research is theoretical in nature and has less focus on designing educational and learning models for changing behavior in managing the consumption of vital resources. In the field of water consumption management, although limited research has been conducted, a comprehensive framework that can explain the dimensions of education, learning, knowledge management, water literacy, and the mechanisms that affect the implementation of prevention strategies in an integrated manner has not been presented. This theoretical and practical gap reveals the necessity of conducting the present study. The present study, with the aim of identifying and explaining the impact of prevention strategies on the sustainability of water resources, is based on the assumption that learning, education, and knowledge development play a mediating and facilitating role in the effectiveness of these strategies. Therefore, the research, using a mixed approach and relying on field data, seeks to provide an applicable model for designing educational and learning-based interventions in water demand management. It is expected that the results of this research, in addition to developing the scientific literature on prevention, can provide a basis for educational policy-making, promoting water literacy, planning social learning, and designing effective educational programs to modify consumption behaviors and achieve water resource sustainability.

Given the increasing pressure on water resources, the persistence of unsustainable consumption patterns, and the limitations of conventional supply-oriented approaches, there is a growing need for innovative models that can simultaneously influence consumption behavior, strengthen water governance, promote social responsibility, and support the long-term sustainability of water resources. Although previous studies have examined demarketing as a mechanism for reducing excessive consumption, its integration with learning, behavioral change, governance, economic instruments, and sustainable water-resource management remains insufficiently explored. Therefore, developing a comprehensive framework that uses demarketing principles as a learning-oriented mechanism may provide a new pathway for transforming individual and collective water-consumption behaviors toward sustainability. Accordingly, the central question of the present study is: How can a demarketing-based learning model be designed to promote the sustainable development and effective management of water resources?

Literature Review

Demarketing is a relatively new approach in the marketing literature that, unlike traditional marketing, focuses on managing and controlling or reducing demand. This concept refers to a set of activities and strategies that are used to reduce or direct demand for specific goods, services, or resources (Kotler & Levy, 1971). In situations where resources are limited or increased consumption has adverse economic, social, and environmental consequences, demarketing can serve as an effective tool to balance supply and demand. Blythe, 2019; Hesse, 2023). Although deterrence was initially discussed more in the field of market management and demand control for goods and services, its application gradually expanded to the fields of public health, environment, energy, and natural resource management. In this approach, instead of using only restrictive and prescriptive tools (hard tools), a set of cultural, educational, communication, economic, and social mechanisms (soft tools) is used to modify consumer behavior. The main goal of deterrence is not to eliminate demand, but to direct it towards a responsible, conscious, and sustainable consumption pattern. (Kotler & Lee, 2020; Lawrence & Mekoth, 2023). On the other hand, studies show that consumer behavior is one of the most important factors affecting water consumption (Dolnicar et al., 2012; Russell et al., 2017) and policies based on supply development alone are not able to sustainably solve this crisis. Therefore, paying attention to behavioral mechanisms and Social determinants of water use have gained a special place in the literature on water resources management. Water conservation can be defined as a set of targeted actions and strategies that, by utilizing economic, cultural, social, educational, technological, and political (governance) tools, seek to reduce unnecessary water consumption and guide consumer behavior towards sustainable

consumption patterns. This approach, while emphasizing social responsibility, can help improve the efficiency of demand management, promote public awareness, and protect water resources. (Afify, 2024; Salem & Ertz, 2023; Salem & Dalloul, 2024).

Table 1. *Comparison of major types of marketing - Source Hesse (2023)*

Type of Demarketing	Short definition	Overarching goal	Level of intervention	Main logic	Common tools
General Demarketing	Reducing demand in the entire market or society to control consumption and protect the public interest	Preserving resources and collective benefits	Macro/Policy	Community-level demand management	Public campaigns, standardization, pricing, public restrictions, monitoring technologies
Selective Demarketing	Reducing demand in a specific group or segment	Optimal allocation and targeting of high-consumption items	Group/Sector	Differential targeting	Ratio step-down pricing, targeted messaging
Appearant Demarketing	Appearing reduction in demand with the aim of strengthening the brand and increasing perceived value	Perception and prestige management	Market/Brand	Scarcity and monopoly	Limited access, artificial scarcity, packaging design
Involuntary Demarketing	Reducing demand unintentionally due to marketing or policy errors	Avoiding negative consequences	Multilevel	Unintended consequences	Inappropriate messaging, bad customer experience, poor policy design
Simultaneous Demarketing	Smoothing demand to match capacity and scheduling	Reducing peak consumption	Temporal/Operational	Peak management	Time-based pricing, reduced advertising in the courier, service restrictions
Reciprocal Demarketing	Reducing demand for a harmful product or behavior through social messages	Reducing harm	Macro/Social	Attitude and norm change	Notification, warning, advertising restrictions, social participation
Social Demarketing	Division by intensity of intervention (passive, active, complete)	From adjustment to complete elimination	Medium to Macro	Intensity of intervention	Low-harm alternatives, marketing mix restrictions, complete exit from the market

Since its initial introduction by Kotler and Levy, demarketing has evolved from a limited concept in demand management to a multidimensional approach in guiding consumer behavior, consumption management, and resource sustainability. In the classical definition, demarketing is considered a set of actions to reduce, control, or direct demand, especially in conditions of imbalance between supply and demand (Kotler, 1973). However, in the new literature, this concept is no longer simply a strategy to reduce consumption, but a tool to modify consumption patterns in line with the long-term benefits of society and the environment (Bradley & Blythe, 2019). In this view, the main goal of demarketing is not to eliminate consumption, but to shape a kind of learning in the consumer that leads to more conscious and responsible behavior.

In this regard, Hesse (2022; 2023) considers demarketing as part of the transition of societies towards sustainable patterns of production and consumption and believes that in conditions of limited natural resources, relying solely on increasing supply is not enough and demand management becomes more important. From this perspective, education, awareness-raising and shaping consumer perceptions take a central place alongside economic tools. Lawrence and Mekoth (2023) also consider demarketing as part of a sustainable governance system in which changing consumer behavior through awareness and learning plays a fundamental role in creating a balance between economic, social and environmental requirements. The results of Pham et al. (2023) also show that the social responsibility of organizations can increase the effectiveness of demarketing programs, because when consumers understand the social and environmental goals of these programs, they show greater acceptance and support for demand management policies. Armstrong Soule and Reich (2015) and Huang

and Jiang (2024) have also shown that demarketing, when used in conjunction with cultural, educational, and communication tools, can enhance environmental awareness and promote sustainable consumption behaviors.

This theoretical development is particularly important in the field of water resources, because the water crisis in many countries is the result of both supply constraints and increased demand, and relying solely on infrastructure development or increasing water supply capacity is not a sustainable solution. Therefore, many water resources management experts have emphasized the need to shift from a supply-driven to a demand-driven approach (OECD, 2015; OECD, 2021; Pahl-Wostl, 2015). In such a context, demarketing can play a role as an effective tool for demand management, reducing unnecessary consumption, and protecting water resources.

Empirical studies have also examined different aspects of this approach in various contexts. Kigan and Villiers (2024) showed that in demarketing situations, commitment is the most important predictor of customer loyalty, and trust and commitment mediate the relationship between satisfaction and loyalty. This finding suggests that even in demand-control situations, customer loyalty can be maintained through strategic relationship management. Afifi (2024) showed in the field of household water consumption in Egypt that social marketing campaigns, targeted educational messages, and the use of diverse communication channels can change people's attitudes towards water conservation and increase their participation in demand management. Widikusyanto et al. (2024) also showed, focusing on demarketing of smoking behavior, that the reference group plays the strongest role in changing actual consumer behavior compared to other components, highlighting the importance of social norms in the success of demarketing. In the field of tourism, Elsetouhi et al. (2023) showed that the demarketing mix can affect tourists' perceptions and their intention to reduce revisiting protected areas, and thus be a tool to combat overtourism. In the field of water resources, Salem and Ertz (2023) showed that reducing water consumption cannot be achieved by single-dimensional tools such as pricing alone, but requires a comprehensive program that simultaneously includes product, price, place, promotion, and people. They also emphasized that promotion and communication play a more effective role in shaping consumer attitudes than price. Similarly, Salem and Dalloul (2024) found that all components of the demarketing mix have a significant effect on consumer attitudes towards domestic water consumption, and among them, "place" or equitable distribution and access control is the most important factor. Also, Salem et al. (2021) showed in the field of electricity consumption that continuous promotional and information activities increase consumer awareness, and psychological and demographic variables also play a moderating role in the effectiveness of these strategies.

Despite these advances, a review of the literature shows that demarketing research has mainly focused on goods and services that have negative individual or social consequences, such as tobacco, harmful beverages, drugs, overcapacity tourism, and energy consumption (Shiu et al., 2009; Al-Shibly et al., 2020; Hall & Wood, 2021; Nassè et al., 2023). Therefore, the application of demarketing to the management of critical resources, especially water resources, has still received less attention. Furthermore, many studies have focused on only one or a few demarketing tools and have rarely provided a comprehensive framework including economic, social, cultural, educational, communication, technological, and policy factors (Bradley & Blythe, 2019; Hesse, 2023; Lawrence & Mekoth, 2023). Also, the dominance of quantitative approaches and the focus on predetermined variables have led to the dimensions of demarketing being less exploratoryly identified in real and diverse social and cultural contexts. On the other hand, consumer behavior has also often been examined in a unidimensional manner, while the consumption of vital resources is influenced by a network of individual, social, institutional and environmental factors (Ajzen, 2020; Kotler & Lee, 2020; Pham et al., 2023).

In addition to these gaps, one of the most important shortcomings of the existing literature is the lack of a link between demarketing and learning processes. Although the study evidence, especially in the studies of Afifi (2024), Salem and Ertz (2023) and Salem et al. (2021) show that the effectiveness of demarketing depends on awareness, attitude change, message comprehension, social acceptance, and internalization of new behaviors, but these processes are less well explained in a learning framework. In fact, sustainable reduction of water consumption is not simply the result of restrictions or price increases, but requires cognitive, social, and behavioral learning among consumers. From this perspective, demarketing can be considered not only a management intervention, but also an educational-learning process that helps individuals rethink their consumption, accept new norms, and internalize more responsible behaviors towards limited resources. Accordingly, explaining demarketing of water consumption in relation to learning mechanisms and sustainable behavior change can contribute to the theoretical enrichment of this field and the design of more effective interventions for water demand management.

Method

The present study is an exploratory qualitative approach in terms of its purpose and its nature and data collection method. The main research strategy was thematic analysis. The qualitative approach was chosen due to the exploratory nature of the subject and the necessity of identifying the dimensions, components, and conceptual relationships of factors affecting water consumption deterrence. Since no comprehensive model and framework has been presented so far to explain water consumption deterrence strategies, the use of qualitative methods seemed necessary to discover and explain the dimensions of the phenomenon under study. The research community in the qualitative phase included experts and executive managers in the field of water resources management and policymaking. Participants were selected using purposive sampling. The selection criteria for individuals included having specialized knowledge, managerial, research, or executive backgrounds related to water resources management, and familiarity with water consumption and demand issues. The sampling process continued using the snowball sampling method until theoretical saturation was achieved. Finally, 15 experts participated in the research. Theoretical saturation was achieved when no new data or new themes were added to the research findings in the final interviews. Research data was collected through semi-structured interviews. For this purpose, an interview guide was first designed based on the literature and research objectives. Then, interviews were conducted individually and in person with experts and carefully implemented. Interview questions were designed in a way that would allow the experts to identify their views on the dimensions, components, strategies, challenges, and consequences of water consumption prevention.

After the interviews, the interview transcripts were fully implemented. Then, the data analysis process was carried out using thematic analysis method and using Maxqda software. In the first stage, initial concepts and themes were extracted from the interview transcripts. Subsequently, common and similar themes were categorized into new concepts and categories. Finally, from the aggregation and organization of the categories, the main dimensions were identified as water consumption prevention strategies:

1- Demand management strategies
2- Supply management strategies
3- Governance and policy tools
4- Economic tools
5- Social and cultural tools
6- Implementation challenges and obstacles

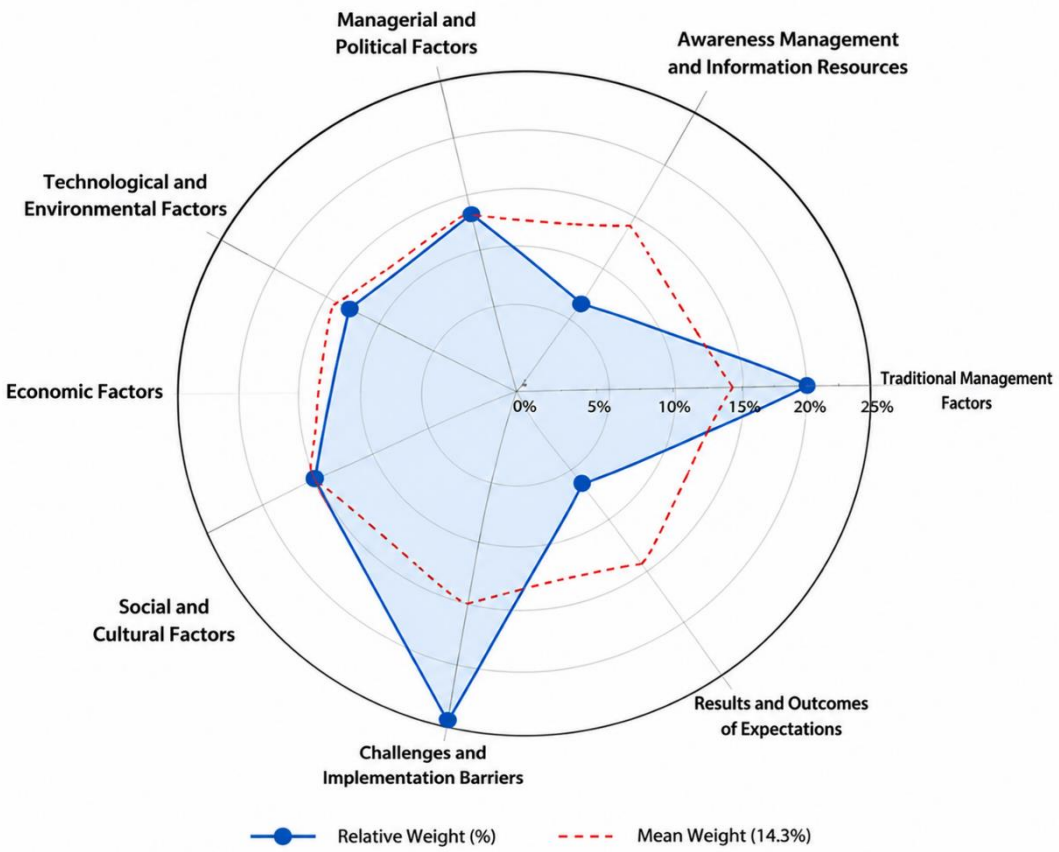

Figure 3. *Radar chart comparing the six main water consumption containment strategies based on relative importance*

Dimension 1: Demand Management Strategies

The findings from the interview analysis showed that "demand management strategies" are the most important and broadest dimension of water consumption containment. This dimension emphasizes reducing consumption, increasing productivity, and modifying water use patterns in different sectors. The research experts believed that in conditions of limited water resources, demand management should be a priority for water management policies, because increasing supply alone will not be able to sustainably solve the water crisis. In this dimension, six main categories were identified, which are: modifying and optimizing the cultivation pattern, modernizing irrigation methods and agricultural technology, developing alternative jobs and livelihoods for farmers, optimizing and reducing consumption in the industrial sector, separating drinking water from sanitary water and unnecessary uses, and managing and optimizing water consumption in urban green spaces.

Dimension Two: Supply Management Strategies

The second dimension extracted from the data analysis is "Supply Management Strategies and Alternative Resources." This dimension focuses on measures that allow for reducing pressure on conventional water resources by increasing the productivity of existing resources, reusing water resources, and controlling unauthorized withdrawals. The research experts believed that water crisis management is not possible only through consumption control, and at the same time, solutions to improve supply management and the use of alternative resources should be considered. This dimension includes three main categories: recycling, treating, and reusing wastewater; controlling and blocking unauthorized wells; and installing smart meters and accurately monitoring consumption. The data showed that reusing treated wastewater can meet part of the needs of the agricultural, industrial, and green space sectors and reduce dependence on freshwater resources. Also, controlling

unauthorized withdrawals and establishing smart consumption monitoring systems are considered, from the experts' perspective, to be among the most important requirements for effective water governance and preventing resource waste.

Dimension Three: Governance and Policy Tools

Governance and policy tools are the third dimension identified in the water consumption prevention model. This dimension addresses the role of policymaking, legislation, and institutional coordination in water consumption management. The findings showed that many of the problems in water management are not simply due to a shortage of resources, but rather to weaknesses in the water governance system, lack of coordination between responsible and responsible agencies, and legal shortcomings. In this dimension, five categories were identified, including integrated and coordinated management of water resources, reforming and strengthening laws and executive guarantees, applying punitive and fine instruments, creating and developing a water market and water fee exchange, and land planning based on water capacities. Experts believed that without reforming governance structures and strengthening enforcement guarantees, many water management programs will not be successful. Integrated water resources management and coordination between responsible institutions are also considered to be the most important prerequisites for realizing water consumption prevention.

Dimension Four: Economic Instruments

The fourth dimension is economic instruments. The results of the study showed that the use of economic mechanisms can play an important role in reforming consumer behavior and increasing motivation for optimal water consumption. According to the experts' view, inappropriate pricing and the large gap between the real value of water and the price paid by consumers are one of the important factors in the continuation of suboptimal consumption patterns. This dimension includes four main categories: real pricing and economizing the value of water, providing financial incentives and targeted subsidies, ensuring the market and purchasing strategic water-saving products, and government investment in water consumption optimization infrastructure. The findings showed that a combination of economic incentives and disincentives can provide the necessary context for changing consumer behavior and adopting energy-saving technologies. Economic support for low-consumption subscribers and operators was also considered an effective strategy for reducing pressure on water resources.

Dimension Five: Social and Cultural Tools

The research findings showed that social and cultural tools are one of the most fundamental dimensions of water consumption demarketing. Experts believed that an important part of the water crisis is rooted in consumer behavior patterns, attitudes, and beliefs, and that without changing the consumption culture, achieving sustainable water management will not be possible. From this perspective, water consumption demarketing is not simply a technical or economic issue, but rather a social and cultural process. This dimension includes four main categories: culture building, public education, and attitude change; attracting stakeholder participation and trust; clarifying information and providing accurate information to the public; and changing lifestyles and individual consumption patterns. A review of the experts' views showed that increasing public awareness about the status of water resources, promoting social responsibility, involving stakeholders in decision-making, and strengthening public trust in water management policies can provide the basis for changing consumer behavior. Continuous and targeted education in schools, universities, media, and social institutions was also recognized as one of the most important tools for institutionalizing a culture of optimal water consumption.

Dimension Six: Implementation Challenges and Obstacles

The sixth extracted dimension is implementation challenges and obstacles. This dimension has the largest number of categories among the dimensions of the model and reflects the complexities in the implementation of water consumption demarketing policies. The findings showed that the success of any water consumption management program is largely influenced by structural, economic, social, technical, and political obstacles.

In this dimension, nine categories were identified, including the crisis of resource and consumption imbalance (water bankruptcy), unsustainable development and implementation of wrong policies, environmental consequences, social and security tensions and conflicts over water, lack of coordination and conflict of interests between agencies, technical and infrastructural limitations, social and cultural resistance to change, economic and budgetary limitations, and lack of political will and government support. The experts emphasized that the water crisis is the result of the accumulation of water governance decisions and policies, and therefore its solution requires a comprehensive, cross-sectoral and long-term approach. From their point of view, social resistance to changing consumption patterns, weak institutional coordination and economic constraints are considered to be the most important obstacles to the implementation of water consumption demarketing policies.

Findings

The main goal of the current research was to identify strategies and components effective on demarketing of water consumption and sustainability of water resources. The results showed that the demarketing of water consumption is a multidimensional phenomenon and its realization requires simultaneous attention to managerial, economic, social, cultural, political and executive factors. Also, the findings of the research showed that demarketing of water consumption does not simply mean reducing consumption, but it is considered a comprehensive approach to guide the behavior of consumers, increase the efficiency of consumption and achieve the sustainability of water resources:

Semi-Structured Interview Questions

1. How do you define effective water marketing, and what role do you believe it plays in improving water resource management?
2. What demand management strategies do you consider most effective for reducing water consumption in agricultural, industrial, and urban sectors?
3. How can governance mechanisms and public policies strengthen the implementation of water marketing initiatives?
4. What economic instruments, such as pricing policies or financial incentives, could encourage more efficient water use?
5. In your opinion, how do public awareness, education, and cultural attitudes influence water consumption behavior?
6. What technological innovations or alternative water supply solutions have the greatest potential to support sustainable water management?
7. What are the most significant barriers that hinder the implementation of water marketing policies in practice?
8. How can coordination among government agencies, local communities, and private stakeholders be improved to achieve better water management outcomes?
9. What indicators should be used to evaluate the success of water marketing programs in terms of sustainability and resource conservation?
10. Based on your professional experience, what additional strategies or recommendations would you propose to enhance the effectiveness of water marketing in the future?

The first important finding of the research was the central position of demand management strategies in the demarketing model of water consumption. The results showed that experts consider demand management to be the most important axis of sustainable water management. Categories such as cropping pattern modification, development of new irrigation technologies, optimization of industrial consumption and management of green space consumption were included in this dimension. The importance of finding demand management strategies can be seen as a result of changing the water resources management approach from a supply-oriented model to a demand-oriented model. In the past, the dominant response to the increase in water needs was the development of water supply infrastructure and increase in supply; However, the limitation of water resources, the increase in supply costs and the aggravation of environmental crises have challenged the efficiency of this approach. Therefore, demand management has been considered as a long-term and sustainable strategy. This finding shows that the demarketing of water consumption is based more than anything on the modification of consumption behaviors and increasing productivity. This result is in line with studies that have emphasized the priority of demand management over supply development in sustainable water resources management (OECD, 2021; Russell et al., 2017).

The second finding of the research emphasizes the importance of supply management strategies and alternative resources. The results showed that experts consider water recycling, reuse of wastewater, control of unauthorized withdrawals and the development of intelligent consumption monitoring systems as complementary parts of demand management strategies. This result shows that the demarketing of water consumption is not only focused on limiting consumption, but also emphasizes on the optimal use of existing resources and increasing the productivity of water resources. In other words, reducing consumption and increasing resource efficiency are two complementary components in achieving sustainable water management.

The third finding, which was one of the most important findings of the research, is the emergence of water resources governance and policy tools as an independent dimension in the demarketing model of water consumption. Categories such as integrated management of water resources, amendment of laws and regulations, development of water market, strengthening of executive guarantees and land preparation were included in this dimension. This finding indicates that the water crisis is not only caused by the behavior of consumers, but also depends on the quality of policy, institutional coordination, and the governance of water resources. In fact, even the most effective educational and economic programs will not be successful in the case of weak water governance and lack of coordination between the responsible institutions. From this point of view, water governance provides the implementation platform for other demarketing policies.

The fourth finding was the impact of economic factors on water consumption. The results showed that real water pricing, providing financial incentives, supporting water-efficient activities, and investing in productive infrastructure can influence consumer behavior. The importance of this dimension indicates that a significant portion of consumer behavior is influenced by economic stimuli. When consumers understand the real cost of water consumption and at the same time receive incentives for optimal consumption, the likelihood of behavior change increases. Therefore, the use of economic instruments can be an effective complement to cultural and management policies. This finding is consistent with the results of Afifi's (2024) research on the role of economic instruments in modifying consumer behavior and managing demand. The fifth finding of the study is the determining role of social and cultural instruments in the success of water consumption demarketing. Experts placed special emphasis on culture building, public education, trust building, information transparency, and stakeholder participation. This result shows that the water crisis is not just a technical or management issue, but has deep roots in beliefs, attitudes, and social norms.

For this reason, changing consumer behavior will not be possible solely through economic means or legal restrictions. This finding shows that culture building and continuous education can provide the basis for the acceptance and effectiveness of other demarketing policies. In fact, social and cultural tools play a fundamental role in the success of other dimensions of the model. This result is in line with the findings of Salem and Ortz (2023) on the importance of social and cultural factors in the success of demarketing programs and changing consumer behavior. The sixth finding, which is one of the most prominent findings of the present study, was the identification of implementation challenges and barriers as the broadest dimension of the model. The placement of the largest number of categories in this dimension indicates that water industry experts consider implementation barriers to be the most important factor limiting the success of water consumption demarketing policies.

The most important barriers identified were resource-consumption imbalance crisis, unsustainable development, conflict of institutional interests, economic constraints, social resistance, and lack of political will. This finding shows that the water issue is a complex and multifaceted phenomenon, and its management requires a cross-sectoral and long-term approach, and the success of demarketing programs does not depend solely on the quality of policy design, but also on the ability of the executive system to remove existing barriers.

The seventh finding showed that experts do not consider water consumption demarketing simply as a tool for reducing consumption, but rather as a strategy for achieving water resource sustainability, promoting social cohesion, reducing water-related conflicts, and improving the environmental situation. This finding indicates that water consumption demarketing has effects beyond consumption management and can also play an effective role in achieving sustainable development goals and protecting natural resources.

The eighth finding, which is one of the most important theoretical implications of the findings of the present study, is that the issue of water consumption should be analyzed within the framework of demand management, not just supply management. Water management policies in the past have always focused on resource development, drilling wells, building dams, and transferring water, but the continuation of the water crisis has shown that supply-oriented solutions alone have not been able to create a sustainable balance between resources and consumption.

The findings of this study also confirm the fact that modifying consumer behavior and demand management should be considered as one of the main pillars of water policymaking. This result is in line with the views of the OECD (2015, 2021) as well as new theories of water governance that emphasize the need to transition from traditional supply management to smart demand management. And the last important finding of the present study is the simultaneous importance of soft and hard tools in water consumption management. The results show that none of the pressure strategies, including increasing water rates or penalties based on consumption, nor cultural, economic, educational or political strategies, are able to solve the problem alone, and that real effectiveness is achieved when these tools are used together and in the form of a coherent and complementary system. This indicates that water consumption demarketing should be designed and implemented as a multifaceted policy package, not a set of scattered and fragmented measures.

It also confirms that water consumption demarketing is not simply a communication or marketing technique, but a comprehensive management approach to changing consumer behavior, managing demand and promoting water resource sustainability.

Final framework for water consumption demarketing

Based on the results of the content analysis, the final water consumption demarketing model and framework, resulting from the organization, refinement and integration of the initial themes and concepts, led to the identification and explanation of 36 main indicators and ultimately 6 strategic dimensions for water consumption demarketing.

Table2. *Components of the Water Marketing Framework*

Dimension	Key Components
1. Demand Management Strategies	Modern irrigation methods; Empowering farmers through knowledge and skills; Water-saving optimization in agriculture; Separation of potable and non-potable water uses; Urban water consumption optimization
2. Governance and Policy Instruments	Integrated water resource management; Implementation of water laws and regulations; Regulatory and supervisory mechanisms; Development of water markets and water rights exchange; Land-use planning based on watershed management
3. Social and Cultural Instruments	Education, culture, and behavior change; Community participation and empowerment; Transparency and timely information sharing; Lifestyle and individual consumption pattern changes
4. Economic Instruments	Realistic water pricing; Financial incentives and targeted subsidies; Promotion of water-efficient products; Government investment in water infrastructure
5. Supply Management and Alternative Resources	Wastewater treatment and reuse; Control of unauthorized groundwater extraction; Smart metering and consumption monitoring
6. Implementation Challenges and Barriers	Imbalance between water resources and consumption; Unsustainable development and past policy failures; Environmental consequences; Social tensions over water scarcity; Weak intersectoral coordination; Technical and infrastructure limitations; Social and cultural resistance to change; Economic constraints and budget limitations; Political commitment and governance support
Expected Outcomes of Water Marketing	Reduced overall water consumption; Conservation and sustainability of water resources for future generations; Reduced conflicts and stronger social cohesion; Environmental restoration and improved ecological conditions

In this model, water consumption demarketing is considered as the central core and the six dimensions are placed as an interconnected system interacting with each other around the central core. The results showed that the implementation of water consumption demarketing requires the simultaneous integration of demand management strategies, supply management, governance tools, economic tools, social and cultural tools and management of implementation challenges. The results of this process will be achieving sustainability of water resources, reducing consumption, and promoting social and environmental resilience.

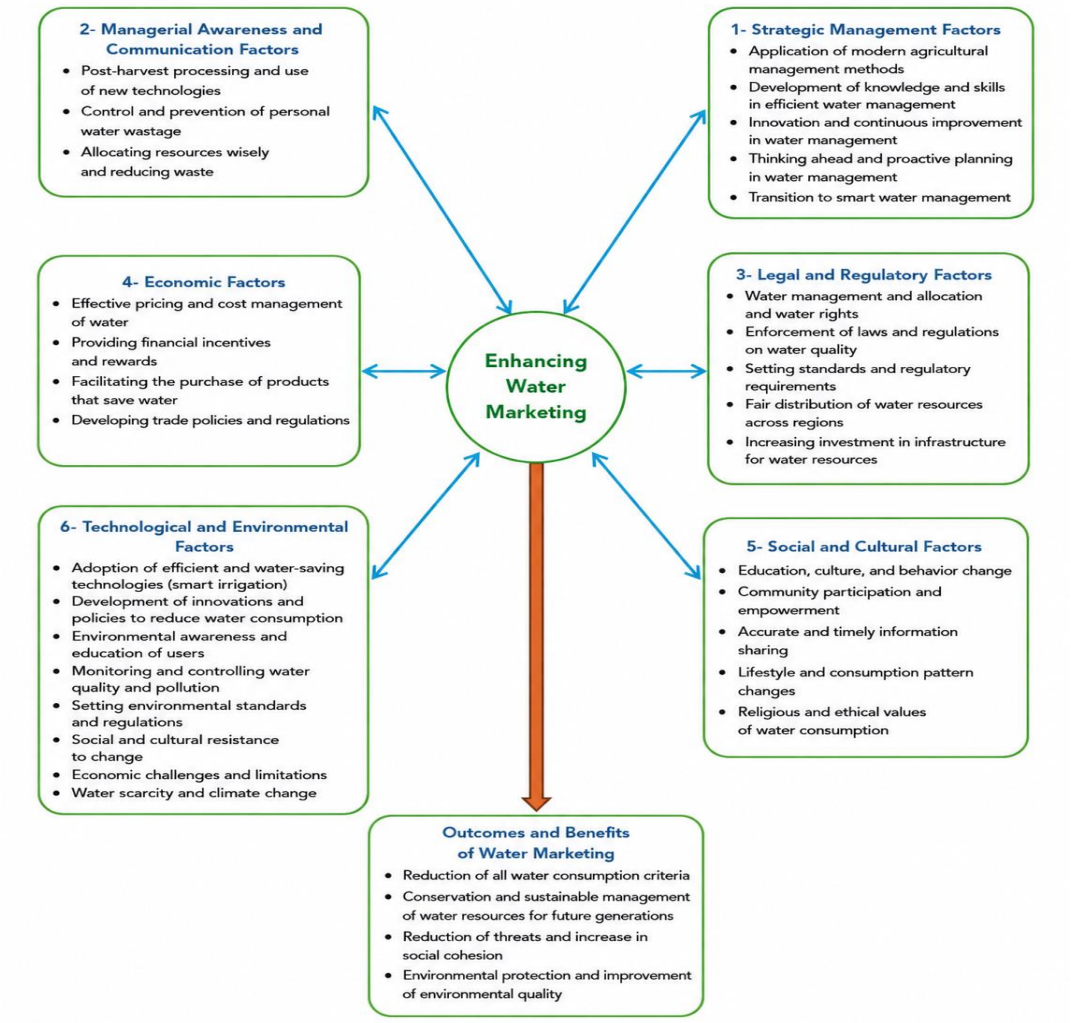

Figure 3. *Diagram identifying and explaining strategies for preventing water consumption and its impact on the sustainability of water resources*

Table3. *Validity and Reliability of the Water Marketing Framework*

Criterion	Method Used
Content Validity	The initial coding framework was developed through a comprehensive review of the literature and refined based on expert feedback in water resource management and environmental policy.
Face Validity	The conceptual framework was reviewed by academic experts to ensure the clarity, relevance, and appropriateness of the identified dimensions and components.
Credibility	Credibility was enhanced through expert review, iterative coding, and continuous comparison of codes and themes during the analysis process.
Dependability	A systematic coding procedure and an audit trail were maintained to ensure consistency throughout the thematic analysis.
Confirmability	Coding decisions were documented, and themes were derived directly from the collected evidence to minimize researcher bias.
Transferability	Detailed descriptions of the themes and their components were provided to facilitate the application of the framework in similar contexts.

To assess coding consistency, inter-coder reliability was evaluated using established agreement measures. The validity of the proposed Water Marketing framework was established through content validity, face validity, and expert review. The coding framework was developed from an extensive literature review and refined through iterative evaluation by specialists in water resource management. Reliability was assessed using inter-coder agreement measures, yielding acceptable levels of consistency, including Holsti's Coefficient (0.887), Scott's Pi (0.755), Cohen's Kappa (0.725), and Krippendorff's Alpha (0.817). These values indicate substantial to high coding reliability and support the robustness of the thematic analysis.

Discussion

The findings of this study demonstrate that the proposed water marketing framework extends the conventional concept of demarketing from a primarily communication-oriented approach toward a comprehensive and integrated water demand-management framework. The model identified six major dimensions, namely demand management strategies, governance and policy instruments, social and cultural instruments, economic instruments, supply management and alternative resources, and implementation challenges and barriers, which ultimately contribute to reduced water consumption, long-term water-resource conservation, reduced social conflict, and ecological restoration. This multidimensional structure is consistent with the argument that contemporary water management requires simultaneous attention to behavioral, institutional, economic, technological, and governance mechanisms rather than relying exclusively on consumer-oriented demarketing campaigns.

The first dimension, demand management strategies, emphasizes modern irrigation methods, farmer empowerment, water-saving optimization, separation of potable and non-potable uses, and optimization of urban consumption. These findings are strongly supported by Dolnicar et al. (2012), who demonstrated that water conservation is closely associated with household perceptions, behavioral patterns, and conservation practices. Similarly, Russell and Fielding (2010) argued that water demand management should incorporate psychological determinants of consumption rather than concentrating exclusively on technical supply-side solutions. The present findings extend these perspectives by connecting behavioral demand management with agricultural and urban water-use optimization. The emphasis on modern irrigation and water-saving technologies also complements the broader water-security perspective of the World Bank (2017), which stresses the need to manage demand and improve the efficiency of water use in water-stressed regions.

The findings concerning governance and policy instruments are particularly consistent with Pahl-Wostl (2017) and OECD (2015). Pahl-Wostl (2017) emphasizes that sustainable water governance requires a transition from fragmented management toward adaptive and integrated governance systems. Similarly, the OECD (2015) highlights effective water governance, policy coherence, stakeholder engagement, and institutional coordination as essential components of sustainable water management. The present model reinforces these

arguments through integrated water-resource management, water laws and regulations, regulatory supervision, water markets and water-rights exchange, and watershed-based land-use planning. Thus, the findings indicate that water marketing should not be interpreted simply as discouraging consumption; rather, it should operate within a governance architecture capable of regulating demand, allocating scarce resources, and coordinating actors across sectors.

The social and cultural instruments identified in this study are also consistent with the behavioral foundations of demarketing. Ajzen (2020), through the Theory of Planned Behavior, emphasizes that attitudes, social norms, and perceived behavioral control influence behavioral intentions and subsequent actions. The present findings similarly indicate that education, cultural transformation, community participation, transparency, information sharing, and changes in lifestyles and individual consumption patterns are central to reducing water demand. This finding is further supported by Russell and Fielding (2010), who demonstrated the importance of psychological factors in water-demand management. Therefore, effective water marketing should move beyond simply informing consumers that water is scarce and should instead seek to reshape social norms, individual habits, and collective perceptions of responsible water consumption.

The importance of social participation is also consistent with the broader logic of demarketing research. Kotler and Levy (1999) originally conceptualized demarketing as a deliberate attempt to discourage or restrict demand when demand exceeds desirable levels. Shiu et al. (2009), in their examination of tobacco demarketing, similarly demonstrated that governmental policies can use the traditional marketing mix to discourage undesirable consumption. However, the present findings indicate that water scarcity requires a broader approach than traditional product-focused demarketing. Unlike tobacco or unhealthy products, water is an essential resource. Consequently, the objective is not to eliminate consumption but to encourage efficient, equitable, and sustainable consumption. This distinction represents an important theoretical contribution of the present framework.

The fourth dimension, economic instruments, including realistic water pricing, financial incentives, targeted subsidies, promotion of water-efficient products, and government investment in infrastructure, is compatible with the demand-management perspective of OECD (2021). Economic instruments can influence consumer and producer decisions by changing the relative costs and benefits associated with water use. The findings also complement Kotler's broader marketing perspective (Kotler, 1973) by demonstrating that marketing instruments can be applied to influence demand in socially desirable directions. Importantly, the present model combines restrictive mechanisms such as realistic pricing with supportive mechanisms such as subsidies and infrastructure investment. This combination suggests that water marketing should not rely solely on increasing the cost of consumption, because price-based interventions without social protection may generate inequitable outcomes for vulnerable groups.

The supply management and alternative resources dimension provides another important extension of existing demarketing research. Wastewater treatment and reuse, control of unauthorized groundwater extraction, and smart metering and consumption monitoring indicate that reducing water demand should occur simultaneously with improving the efficiency and sustainability of available supplies. This finding corresponds with the integrated approach advocated by Pahl-Wostl (2017) and the water-security perspective of the World Bank (2017). It also complements UN-Water (2020, 2021), which emphasizes the interconnectedness of water security, climate change, sustainable development, and resource management. Consequently, the present findings support a shift from a narrow "consume less" approach toward a broader "consume efficiently, reuse, monitor, and protect" paradigm.

The findings are particularly comparable with recent studies that have applied demarketing to environmental and sustainability challenges. Armstrong Soule and Reich (2015) found that

green demarketing can encourage consumers to reduce consumption and can potentially support sustainability. Lawrence and Mekoth (2023), in their review of demarketing for sustainability, similarly emphasized that demarketing can contribute to sustainability when organizations and policymakers deliberately discourage excessive consumption. Huang and Jiang (2025) further demonstrated that green demarketing can influence consumers' responses to luxury brands, while Shao et al. (2025) showed that individual characteristics affect consumers' evaluations of green marketing and demarketing messages. The present findings are consistent with this stream of research but broaden its scope by demonstrating that sustainability-oriented demarketing in the water sector requires not only consumer communication but also institutional, economic, technological, and infrastructural interventions.

The findings also correspond with evidence from tourism and heritage-resource management. El Sadek et al. (2022) showed that demarketing can be used to sustain heritage sites in Luxor by controlling excessive demand, while Elsetouhi et al. (2024) demonstrated the potential of a tourism demarketing mix to reduce revisits to Egyptian nature reserves. Hall et al. (2021) similarly discussed tourism demarketing as a possible mechanism for addressing sustainability and degrowth. These studies support the fundamental logic of the present model: when unrestricted demand threatens the sustainability of a valuable resource, marketing principles can be strategically employed to redirect or reduce demand. However, the present study goes further by incorporating water governance, pricing, infrastructure, alternative resources, and social conflict into the framework, thereby adapting demarketing to a critical natural resource rather than a tourism destination.

The results are also consistent with studies examining demarketing of harmful or excessive consumption. Al-Shibly et al. (2019) found that demarketing could contribute to reducing energy-drink consumption among Jordanian youth. Al-khazraje (2024) similarly examined demarketing as a mechanism for reducing consumer addiction and encouraging greener consumption. Salem and Dalloul (2024) reported the relevance of demarketing strategies to consumer behavior toward unhealthy products, while Salem and Ertz (2023) applied demarketing principles to breastfeeding promotion. Shiu et al. (2009) demonstrated the application of governmental demarketing policies to tobacco consumption, and Nassè et al. (2023) considered demarketing as a preventive mechanism for alcohol abuse. Collectively, these studies establish that demarketing can influence undesirable consumption behaviors. The present research extends this literature by demonstrating that water consumption requires a different conceptual orientation because the objective is not simply to discourage a harmful product but to optimize consumption of an essential resource.

The study's emphasis on implementation challenges and barriers is another significant finding. Resource-consumption imbalance, unsustainable development, environmental consequences, social tensions, weak intersectoral coordination, technical limitations, cultural resistance, financial constraints, and insufficient political commitment reveal that water marketing cannot succeed through isolated interventions. This finding is strongly compatible with OECD (2015), which emphasizes institutional coordination and governance capacity, and with Pahl-Wostl (2017), who identifies institutional transformation and adaptive governance as important prerequisites for sustainable water management. The results also reinforce the concerns of the World Bank (2017) regarding water scarcity and governance challenges in the Middle East and North Africa. Therefore, the effectiveness of water marketing depends not only on the quality of proposed interventions but also on institutional capacity, political support, financial resources, and public acceptance.

The expected outcomes of the model—reduced overall water consumption, conservation of resources for future generations, reduced conflicts and stronger social cohesion, and environmental restoration—provide a broader interpretation of demarketing effectiveness. These outcomes are consistent with UN-Water (2021), which places sustainable water management within the broader framework of SDG 6, and with UN-Water (2020), which

emphasizes the relationship between water and climate change. The inclusion of reduced social conflict is particularly important because water scarcity is not merely an environmental or economic problem; it can also generate competition among users, sectors, and communities. Thus, the present framework suggests that successful water marketing may produce both environmental and socio-institutional benefits.

At the theoretical level, the findings confirm the fundamental proposition of Kotler and Levy (1999) that marketing can be used not only to stimulate demand but also to deliberately manage or reduce it. However, the present model develops this proposition into a sustainability-oriented water marketing framework. Unlike traditional demarketing studies that frequently concentrate on communication, consumer attitudes, or specific products, the proposed framework integrates demand management, governance, social transformation, economic mechanisms, alternative supplies, and implementation barriers. In this sense, the study is closer to the sustainability-oriented perspective proposed by Lawrence and Mekoth (2023) and Hesse (2022, 2023), while simultaneously incorporating the institutional and governance dimensions emphasized by OECD (2015) and Pahl-Wostl (2017).

Finally, the results can be interpreted as evidence that water marketing should be understood as an integrated demand-governance strategy rather than a conventional demarketing campaign. The findings of Afify (2024) and Salem and Al-Ethawi (2023), which specifically examined demarketing and household water consumption, provide direct empirical support for using demarketing to influence water-consumption attitudes and behavior. Nevertheless, the present model expands these contributions by demonstrating that behavioral change must be accompanied by governance reform, economic instruments, technological monitoring, alternative water resources, and institutional coordination. Therefore, the main contribution of the study is to bridge the literature on demarketing with the literature on integrated water-resource management and sustainability. The proposed framework suggests that sustainable water consumption is most likely to be achieved when behavioral change, institutional governance, economic incentives, technological efficiency, and social participation operate simultaneously. This integrated perspective provides a stronger theoretical and practical foundation for addressing water scarcity than approaches based solely on consumer persuasion or conventional supply expansion.

Conclusion

In recent decades, the water crisis has gone beyond the level of a technical and infrastructural challenge, especially in developing countries, and has become a complex issue with economic, social, cultural, managerial, and environmental dimensions. The experience of supply-side development policies has shown that relying solely on solutions such as building dams, transferring water, drilling wells, and developing water supply infrastructure has failed to create a sustainable balance between resources and consumption. Hence, the need to pay attention to demand management and modifying consumption patterns has become more apparent than ever.

The present study, with the aim of investigating, identifying, and explaining water consumption demarketing strategies and their impact on water resource sustainability, attempted to identify and explain the effective dimensions and components of water consumption demarketing and its relationship with water resource sustainability by utilizing a qualitative approach and using the perspectives of water experts. The results of the study showed that water demarketing is a multidimensional phenomenon and its success requires simultaneous attention to demand management strategies, supply management strategies and alternative resources, governance and policy tools, economic tools, social and cultural tools, implementation challenges and barriers, as well as expected outcomes and achievements. The findings of the study indicate that water consumption management is not possible solely through the application of legal restrictions or pricing policies, but rather requires a coordinated combination of educational, cultural, communication, economic, institutional

and managerial measures. In fact, water demarketing can lead to a sustainable reduction in water consumption when, in addition to reforming policy-making mechanisms, it also affects citizens' attitudes, beliefs, social norms and consumption behaviors. The results of the study also show that water demarketing can be considered as a comprehensive demand management approach that aims not only to reduce consumption, but also to guide consumer behavior towards responsible and sustainable consumption patterns. In this framework, demarketing goes beyond a mere marketing tool and becomes a mechanism for sustainable governance of water resources; a mechanism that, through the integration of economic, social, cultural and management policies, provides the basis for creating a balance between human needs and the limited capacity of water resources.

From a theoretical perspective, the results of the present study also contribute to the development of the demarketing literature in the field of critical resource management and show that the capacities of this approach are not limited to the market for goods and services. From a practical perspective, the proposed model can be used as a guiding framework for policymakers, managers and planners in the water sector and provide a basis for designing demand management programs, promoting a culture of consumption, increasing social participation and improving the effectiveness of water consumption management policies and sustainable development.

In summary, it can be concluded that sustainably confronting the water crisis requires a transition from traditional supply-oriented approaches to modern demand-oriented approaches. Meanwhile, water consumption demarketing can play an important role as one of the strategic tools of demand management in modifying consumption patterns, protecting water resources, and achieving the goals of sustainable development of water resources.

Considering the research findings and the dimensions identified in the water consumption demarketing model, the following practical suggestions are presented for policymakers, managers, and institutions related to water resources management:

First, it is essential to consider the demand management approach as one of the main axes of water policymaking in countries. Focusing solely on developing water supply resources cannot meet the increasing trend of consumption; therefore, it is necessary to pursue consumption management and consumer behavior modification programs alongside supply development policies.

Second, it is suggested that companies and organizations related to water and the water industry replace short-term and ad hoc measures with long-term educational and cultural programs. Raising public awareness of the status of water resources and the adverse consequences of excessive consumption, and the role of citizens in protecting water resources can pave the way for the formation of sustainable consumption behaviors.

Third, it is essential to utilize the capacity of mass media, social networks, the educational system, and non-governmental organizations to promote a culture of responsible water consumption. The active participation of these institutions can play an effective role in changing attitudes, strengthening social norms, and increasing public sensitivity to the water crisis.

Fourth, a review of the water tariff system and the use of economic mechanisms for demarketing for unnecessary consumption are suggested. Designing tiered and targeted tariffs in a way that supports conventional consumption while reducing unnecessary consumption can be an effective tool for demand management.

Fifth, the development of consumption management technologies, including the installation of smart meters, real-time consumption monitoring systems, consumption-reducing equipment, and water recycling technologies, should be on the agenda of responsible institutions. Combining technological tools with cultural and economic strategies can increase the effectiveness of demarketing programs.

Sixth, strengthening coordination among water institutions, promoting transparency in decision-making, and stakeholder participation in the policy-making process are

prerequisites for the success of water consumption demarketing programs. Achieving integrated water governance can pave the way for more effective implementation of demand management policies.

Declaration of Competing Interest

The author declares that he has no competing financial interests or known personal relationships that would influence the report presented in this article.

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