MRS Journal of Arts, Humanities and Literature
Abbriviate Title- MRS J Arts humanit Liter
ISSN *(Online) 3049-1444*
Vol-1, Iss-1(December-2024)

From Awareness to Action-Motivating Pro-Environmental Behaviour in Water Management within Circular Economy Frameworks

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Article History

Received: 20 / 11 / 2024

Accepted: 01 / 12 / 2024

Published: 03 / 12 / 2024

Abstract: *Water scarcity and pollution in the world are worsening; sustainable management of water resources in relation to the circular economy demands new amounts of imperativeness. This chapter explores the connected factors: awareness, motivation, and action regarding promoting pro-environmental behaviour among stakeholders in water management-to formulate a fully comprehensive roadmap for their activities across sectors. Having developed an understanding of pro-environmental conduct as being vital in circular economy, the chapter moves into the lacuna in literature about entities' motivation towards sustainable water practices. This takes a theoretical lens that draws on both Theory of Planned Behaviour and the Value-Belief-Norm Theory as it tries to unwind the underlying drivers of pro-environmental behaviour and how this plays the crucial role in making it an effective mitigator for water-related environmental challenges. It is in these contexts that circular economy principles can be integrated into water management paradigms-thematically portrayed by case studies that present ideal examples of a successful conservation, reuse, and recycling initiative. The intrinsic and extrinsic factors of motivation, taking the forms of monetary incentives, regulatory pressures, and societal norms, will be discussed in this chapter as they dissect the motivational factors that align to shape organizational and individual behaviours to adopt sustainable water practices. Apart from this, the chapter discusses communication strategy and behavioural interventions and suggests nudge techniques in an effort to induce effective behavioural changes. By giving a broad overview of common barriers impeding pro-environmental behaviour, the chapter outlines a way forward in countering challenges through technological innovations, policy reforms, and stakeholder engagement. Drawing on a range of sectors, the chapter provides compelling case studies and best practices, distilling actionable insights for future ventures. Finally, it underscored the call for multi-stakeholder collaboration and policy support in achieving sustainability in the management of water and was clear on the symbiotic relationship between awareness, motivation, and action in moving forward toward a resilient and water-secure future.*

Keywords: *Sustainable water management, Circular economy frameworks, Pro-environmental behaviour, Motivational factors, Behavioural interventions and multi-stakeholder collaboration.*

Introduction

Human development and the urge to dominate the globe have depended more on natural resources (Amankwaa et al. 2021a; Chapagain et al. 2022; Chuma et al. 2022). The empirical domain of human development in terms of water has seen the integrity of the resource compromised, abused, and stretched beyond limit, which has in turn led to pollution and scarcity-related problems (Jiang 2009; Gleeson et al. 2012; Schewe et al. 2014; Han et al. 2016; Mekonnen & Hoekstra 2016; Amankwaa et al. 2021b). Pro-environmental behaviour in the management of water has increasingly been at the center of the discussion on environmental sustainability in recent years under broader circular economy models. The drivers of sustainable water management include concerns over growing water scarcity and pollution issues, which continue to challenge global ecosystems and human welfare. In response to these challenges, there is a need for concerted efforts toward adopting practices that emphasize environmental preservation and resource efficiency. Since the concept of a circular economy encompasses the sustainable development goals, it encompasses both environmental, economic, and social dimensions. Quality education and searching for good health and

well-being in the long run have been provided by the UN 2030 Agenda for SD ("Sustainable Development Goals-SDGs-The United Nations," 2020) as instruments for reaching SD. Pro-environmental behaviour about water management is increasingly considered more important in the context of circular economy practices. Therefore, the circular economy concept gives attention to the principle of minimizing waste and effective use of resources in closed-loop systems wherein materials are utilized, recycled, or restored for other purposes and not wasted after a single use. Water management is a critical component for this purpose since water is a limited and vital element necessary for life and ecosystems. The area of water management in the environment is arguably one of the most sensitive topics that cut across the entire concept of circular economy frameworks. As the world population continues to grow and resources become increasingly scarce, a stronger emphasis on pro-environmental behaviour in water management is witnessed. A circular economy aims to be waste-free and increase the utility of resources by recycling, reusing, and regenerating. Under this framework, water is regarded as a resource to be managed appropriately so as to provide it for the current and future generations.

Pro-environmental behaviour in water management is very crucial. Water is one of the resources most fundamentally used in human life, directly contributing to health, agricultural products, industrial operations, and the functionality of ecosystems. However, aspects such as population growth, urbanization, industrialization, and climatic changes all exert unprecedented demands on water, which pose the likes of water scarcity and deteriorating quality for both fresh and brackish water bodies. Therefore, the integration of pro-environmental practices in behaviour terms to water management will actualize more sustainability approaches and minimize adverse impacts of water scarcity, pollution, and climate change. Water scarcity is one of the global issues which is facing an increase due to certain factors, such as population growth, urbanization, and climate change. Predicting a significant rise of over 20% in the demand for water by 2050, the United Nations further states that with shift in precipitation patterns and melting glaciers, the useful reserves of fresh water would decrease by as much as 30%. In such a scenario, the above pro-environmental behaviour becomes indispensable to protect water resources and ensure equal quality of clean water availability to the generation of the present times and in the years to come. Water pollution is now a day's world issue, and it demands the ongoing evaluation of water resource policy to mitigate this problem. Deaths and diseases are caused worldwide due to water pollution and approximately 14000 people die every day due to water pollution. (Letchinger, 2000, Larry, 2006). Further, it causes substantial risks to human health, ecosystems, and biodiversity. Industrial effluent, agricultural runoff, and untreated sewage discharge contaminants of water bodies through eutrophication, habitat degradation, and spread of waterborne diseases. This requires embracing pro-environmental behaviour practices, such as reducing chemical inputs, promoting sustainable agriculture techniques, and increasing investment in wastewater treatment technologies.

The linear model of water use and disposal that has long served us is no longer tenable in this new circular economy that we have adapted to without failure. Increasingly, people realize that there is a need for a more circular approach to water management, where water is "valued as a recycled, reused, and restored resource wherever possible.". The shift in thinking must also coincide with the changes in human behaviour and attitudes of water conservation and stewardship, while technology progresses. Moreover, this paradigm shift of the circular economy shifts from the existing linear "take-make-dispose" model to a closed-loop system where resources are conserved and reused. For water management purposes, this might mean optimizing efficiency use, promoting water recycling and reclamation, and embracing decentralized water treatment solutions. By adopting pro-environmental behaviour practices, like rainwater harvesting and greywater reuse, communities reduce their reliance on finite freshwater resources and the generation of wastewater. The incorporation of other nature-based solutions, such as constructed wetlands, minimizes the generation of such wastewater.

Pro-environmental behaviour in water management encompasses a set of activities aimed at the minimisation of water losses, pollution and inefficiency. These activities entail efforts such as the reduction of water consumption, application of water-saving technologies, treatment and reuse of water supply, restoration of natural water systems, and procreation of sustainable water practices amongst individuals, communities, and institutions. This embracing of pro-environmental behaviour in water management brings forth a myriad of benefits to societies. First of all, it somehow mitigates water scarcity through conserving available resources. Secondly, it reduces pollution and safeguards aquatic ecosystems with resultant biodiversity and resilience to ecosystem change. Thirdly, it fosters economic growth and innovation through opportunities in water recycling, resource recovery, and developing sustainable water technologies and industries. However, it goes on to show that pro-environmental behaviour in water management fosters broader goals in terms of sustainability, such as mitigating climatic change, providing social equity, and building resilient communities. Societies will thus be able to move towards more sustainable regenerative water systems that meet people's needs while protecting the environment.

Water management is one of the most important threads in the global tapestry of sustainability, closely woven with environmental preservation and social welfare. While scarcity and pollution of this essential resource continue growing unabated, the need for sustainable answers increasingly assumes a near-urgent profile. The new face of the circular economy paradigms brings to the forefront the need for an integrated approach to be implemented not only to correct this environmental degradation but also to augment resilience and productivity in the management of water resources. However, in this context, one key lacuna remains in the literature- a general lack of understanding and the motivation involved within individuals and organizations concerning pro-environmental behaviour within the domain of water resource management. This gap not only handicaps our ability to implement effective strategies but also retards progress towards a harmonious balance between human needs and ecological integrity. Therefore, it is important to fill the void created and take us from mere awareness to concerted action in protecting our most precious resource for future generations.

Understanding Pro-Environmental Behaviour:

Environmental problems are becoming more severe. Reports from science disciplines converge into one conclusion: natural

environment degradation has accelerated, and the capability of natural systems to counter such decline has been compromised (IPCC, 2013, 2014). Pro-environmental behaviour is a behaviour exhibited by people and communities in ways that contribute positively to the preservation, conservation, or restoration of the natural environment. Such activities can be as simple as recycling and energy saving, or as complex as organizing campaigns for policy changes or cleaning litter from the streets of a community. Pro-environmental behaviours are generally defined as the overall domain of individual behaviours that contribute to environmental sustainability. Pro-environmental behaviours have been defined as "individual behaviours contributing to environmental sustainability (such as limiting energy consumption, avoiding waste, recycling, and environmental activism)" (Mesmer-Magnus et al., 2012: p. 160). The examples of these behaviours include public actions, including riding public transportation, attending an environmental rally, and private actions like composting or not running the home air-conditioning on a hot afternoon. Relating to water environmental issues, pro-environmental behaviour is key in reducing the problems of water pollution, scarcity, and ecosystem degradation.

Three basic resources make it possible for human beings to survive on Earth: water, air, and soil, which are the precious gifts of nature. Among these, water is the most important constituent, as it forms the basic medium for the origin of life. The demand for water increased six-fold during 1900-1995 in comparison with more than two-fold growth of population (Postel, 1997). The first serious attempt to pay heed to the environmental problem at the international level was made in U.N. Water is a basic resource required for maintaining life and serving ecosystems. However, human activities, such as industrial processes, agriculture, and urbanization, have caused severe deterioration of water quality and availability. Conference held at Stockholm in June 1972, which was projected towards human environment. After that these concepts like the environment, sustainability and carrying capacity of Earth have been regarded as the central theme for policy making across the world (Gupta, 2001). The global studies have been done on many resources of water by Gleick (1993). In his research Falkenmark (1993) has expressed pure water and its significance in the near future. A multidimensional aspect of water has been studied by Edwards et al. (1989). Chemical and biological aspects and their interactions in polluted water have been discussed in the work of Dugan (1972). Urban civilization requires more water as compared to rural areas and also the quality of discharged water of the urban area is chemically more toxic (Bandy, 1984). India's water pollution has become critical.

Almost every Indian river system has now become substantially polluted. In the words of scientists at Nagpur's National Environmental Engineering Research Institute (NEERI), almost 70% water in India has become polluted (Martin, 1998). Chemical pollution along with plastics and untreated wastewater is seriously threatening the aqua habitats, as well as terrestrial as well as aquatic organisms' health. Excessive extraction of water resources for potable and irrigation purposes worsens the situation more due to scarcity, particularly during the drought period and areas with limited access to pure water. Pollution in the river Ganga has been studied by a considerable number of scientists. Physico-chemical characterization of the same was studied in Mirzapur by Shukla (1989) and in Varanasi by Shukla et al. (1989). Both the studies conclude at a common end which states that the physico-chemical attributes of the Ganga water have degraded incessantly and even in the present time, it follows the same pattern. Bacteriological pollution of river Ganga was investigated by Shukla et al. (1992) and of river Varuna by Shukla et al. (1988). The reports support the occurrence of a huge amount of pathogenic as well as non-pathogenic microorganisms in much more than their excess limit.

In such a scenario, pro-environmental behaviour will emerge to be an essential requirement to address water-related environmental issues. Water conservation practices can take the form of cut usage of wasted water, use of eco-friendly products, proper disposal of waste, and several other measures that help to reduce pollution in freshwater ecosystems. Not to forget is the impetus towards water conservation and restoration of habitats to ensure water resources are managed in a sustainable manner and the biodiversity is protected. Collectively, actions of individuals can add up to having the potential for huge impacts positively on the environment. For instance, water-saving technologies taken up on vast scales both inside homes and businesses will add up to huge differences in water consumptions and resultant energies consumed for water treatments and distribution processes. For instance, other community-led activities such as river clean-up or reforestation of water bodies can improve water quality, enhance habitat connectivity, and build resilience to climate change impacts.

Collectively, besides changing personal practices, action and advocacy are indispensable towards systemic change and battling the deep-rooted causes of water-related environmental problems. Environmental activism that ensures policies call for water conservation and pollution prevention also plays a critical role in pro-environmental behaviours; holding industries and governments responsible for their environmental responsibilities is also a combination of such behaviours.

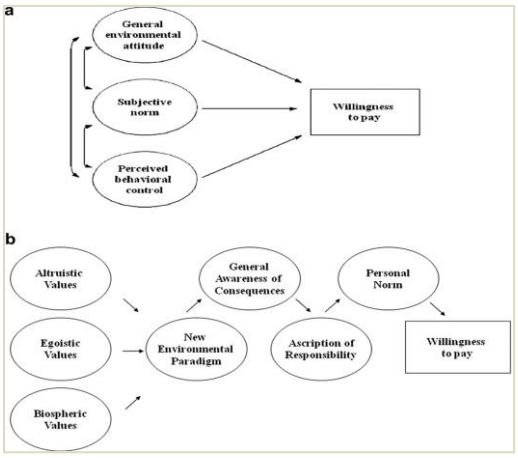

Figure 1: Fig. 1. a. Model of WTP based on the Theory of Planned Behaviour Model. b. Hierarchical model of WTP based on the Value-Belief-Norm Model.

The TPB model

The TPB is an extension of the theory of reasoned action Ajzen and Fishbein, 1980 made necessary by the original model's limitations in dealing with behaviours over which people have incomplete volitional control Ajzen, 1991. The TPB model states

that Behavioural intentions are the most immediate predictors of behaviour, which are, in turn, predicated on (a) attitude: This is an indication of how individuals perceive and evaluate the desirability or otherwise of a given behavioural option; (b) subjective norm This indicates social influence from other members of the reference group to either perform or not perform the behaviour; (c) perceived behavioural control; this refers to the individual's belief about whether or not the behaviour in question will be easy or difficult to perform. Such intentions, as a general rule, will strengthen the more a person has a positive attitude and subjective norm and perceives greater control of the behaviour under consideration (Ajzen, 1991; Liebe et al., 2011). It has so far been used appropriately in a number of environmental studies of different behaviours, including environment and political participation (Ford et al., 2009; Wauters et al., 2010) and environmental conservation (Mannetti et al., 2004; Tonglet et al., 2004; Kaiser et al., 2005; Oreg and Katz-Gerro, 2006; Fielding et al., 2008). Only a handful of studies have tested the impact of attitudinal factors on WTP for use or conservation of various natural resources. Prominent among those include Kotchen and Reiling, 2000; Cooper et al., 2004; Bernarth and Roschewitz, 2008; and Spash et al., 2006.

The VBN Model

The VBN theory of pro-environmental behaviour developed by Stern and colleagues (Stern et al. 1995; Stern, 2000) is one of the direct extensions of three other theories. For instance, Schwartz and Bilsky's Universal Theory of Human Values adopt the traditional conception of values as variables that guide and determine action and attitudes toward objects and situations Rokeach, 1968). Schwartz's Normative Influence Model, from 1970 and 1977, explains the mechanism that leads people to behave in an altruistic manner. And, beliefs inherent in the New Ecology Paradigm (New Environmental Paradigm) of Dunlap et al. (2000), measure social awareness of the biosphere and how it is affected by human action. Therefore, the VBN model of attitudes towards the environment and also towards others conceptualizes them to be a process where personal values play a key role in the cognitive cost-benefit analysis of possible action plans (Payne et al., 1992). Starting from these theories, the VBN theory assumes a hierarchical model where individual value orientations directly influence beliefs, and by doing so, attitudes and behaviour are also being filtered through the information to be evaluated. More fine-grained analysis of each of the variables involved in this theory reveals that, at one level, value orientations focus on classification as biospheric, social or altruistic and egocentric or selfish. These value orientations provide stimuli for the development of the general beliefs individuals hold concerning nature and their associations with the environment. The more deeply rooted these general beliefs are, the deeper an awareness of the consequences of their behaviour towards the environment. This awareness implies a belief that action can alleviate the consequences, Finally, acceptance of responsibility to self leads to a feeling of moral obligation toward the environment, or the activation of a personal norm for action. This last variable of the model is what directly determines behaviour and that all the other variables in the theory may have indirect effects through norms, as well as in some cases direct effects net of norms (Stem et al., 1999; Nordlund and Garvill, 2002). The main applications of the VBN model in the environmental context have been to explore cognitive components and social acceptance measurements (Ford et al., 2009); measure commitment towards the protection of biodiversity (Menzel and Bögeholz, 2010); assess management alternatives (Steg et al., 2005) and, particularly, to check the validity and reliability of the variables considered in the environmental behaviour prediction model (Sternet al., 1999; Corraliza and Berenguer, 2000; Nordlund and Garvill, 2003; Hansla et al., 2008). As in the case of the TPB model, there are not many studies relating the VBN model with intention to pay. In this context, worthy of special attention are those studies that have used only some of the VBN constructs such as environmental norms and value orientations (Blamey, 1998; Ojea and Loureiro, 2007).

Circular Economy and Water Management

On the other hand, the outrageous exploitation of natural resources by humans in their life has further augmented the strength of necessity behind the circular economy practice. A circular economy is known to be managed as an economic model based on the reuse and efficiency of resources, a sharing economy, and a closed circle (Jørgensen et al., 2018). Principles of a circular economy are thus a transition towards resource management transformation that must minimize waste and maximize use of resources through continuous circles of reuse, recycling, and regeneration. This economic model would be considered a potential solution for the resource crisis since it is dependent on the efficiency principle, more so with the behaviour in being more conscious of the reuse of resources, better waste management design, and respect for the social, economic, and natural environment (Sariatli, 2017). Hence, if the circular economy is properly performed, it will create space for economic opportunities combined with positive aspects towards society and the environment as well (Cheshire & Cheshire, 2019). In the context of water management, these concepts take the form of actions in which strategies relating to water are utilized sustainably while leaving the least detrimental impacts on the environment. The circular economy of water management connotes the concept of closing the loop through reused and recycled water many times to restore it back in the environment, resulting in reducing freshwater resources and pollution. For this case, a circular economy will advance the water resources in loops that will offer an opportunity for saving water (Sauvé et al., 2021). Another important characteristic of a circular economy of water management is that it must be a restorative and regenerative economy, which means that all water resources used must be returned to their original state (Leyva-Díaz et al., 2021). Hence, the water management emphasizing the principle of a circular economy will not waste this water but reuse it in different forms.

Statistical data underlines this necessity as the United Nations shares statistics stating that there is an increase by 55% of demand from water by 2050, while over 40% of the population faces water scarcity issues worldwide. On top of the lists of the impacts globally are water crises, according to the World Economic Forum. In this regard, the adoption of circular economy principles becomes necessary and basic for the sustainable provision of water resources among generations. The present report will show numerous case studies that are successful in applying circular economy principles to conserving, reusing, and recycling water resources. One such example is the city of Singapore, which has adopted a fully integrated water management approach, known as

"closing the water loop." Singapore treats wastewater to a high standard, making it suitable for various non-potable applications-which include industrial processes, urban landscaping, and even indirect potable use-through its NEWater project. Closing the cycle on water usage reduced the need for freshwater and allowed for less harmful discharges from water waste.

An incisive case study of decentralized systems in wastewater treatment is also required. Areas where central sewage infrastructure is less prevalent are viewed as small-scale, decentralized systems for the treatment of wastewater locally for reuse in agricultural irrigation or groundwater recharge as a cost-effective solution. Such decentralized systems may address scarcity concerns and improve soil fertility as well as reduce the pollution of water bodies. Collecting rainwater is the method in which this circular economy can be practiced in water management (Richards et al., 2021). This will diminish the possible cost that would be incurred due to the use of those linear water resources so that water is right away wasted. For example, the incorporation of rainwater catchment systems will reduce the costs of flooding in urban areas, reduce water demand, reduce production costs, fill up the aquifers, and ensure effective wastewater treatment (Espíndola et al., 2018). Moreover, industries adopt the precepts of the circular economy to abate water usage and consequently prevent waste production. For instance, the textile industry develops the latest technologies that recycle wastewater from dyeing processes in the textile industry, saving water and preventing pollution. The food and beverage industry uses water reuse systems to treat all its process water and wastewater for purposes ranging from cleaning to cooling and irrigation.

Motivational Factors in Pro-Environmental Behaviour

Motivation factors are believed to be essential in bringing people and the organisations themselves to assume pro-environmental behaviour in water management practices. For this purpose, these studies involve strategies that encourage ecological-conscious consumption such as understanding the drivers of green purchase intention (Zaremohzzabieh et al., 2021), and how it shapes the pro-environmental consumer behaviour (ElHaffar et al., 2020; Rausch & Kopplin, 2021). Perhaps, the most notable corpuses speak about human motivations and how they trigger multiple pro-environmental behaviours, including green consumption. Nguyen et al. (2022); Yang & Thøgersen (2022); Ali et al. (2020).

An important intrinsic motivator is the need to be a responsible steward of the environment, a feeling of moral obligation to protect resources such as clean water for current and future generations. Such an intrinsic driver is fueled by certain environmental values: a deep sense of reverence for nature or a commitment to mitigate the impacts of climate change. Intrinsic motivation encourages people to act because they find the action interesting, pleasurable, and satisfying, on the one hand, especially when they find these actions personally meaningful (Yang & Thøgersen, 2022). On the other hand, personal satisfaction and fulfillment from contributing to a sustainable future are very powerful intrinsic motivators.

Extrinsic motivators, however, refer to external influences on behaviour. Financial rewards like receiving subsidies for use of water-efficient technology and rebate to those conserving the resource are powerful drivers that prompt individuals and organizations into pro-environmental practice regarding water resource management. An extrinsically motivated individual behaves by expectation of certain outcome in this case, which is monetary reward (Ali et al., 2020). For example, individuals might have a motivational desire to purchase environmentally friendly goods if they enjoy themselves and have fun in the process, derive natural satisfaction or pleasure from the act of making "green" purchases themselves (Koo et al., 2015). Government regulations and legislation also set regulatory forces, which tend to be very strong factors in influencing behaviour. Laws and regulations on water harvesting or restrictions on its use have to be followed to avoid legal consequences.

Social norms and peer influence are the biggest drivers of pro-environmental behaviour in water management. The perception that what is being done is appropriate, as perceived by peers, makes people imitate it, thereby driving individuals towards compliance with pro-environmental norms. By preaching sustainable water management within communities and setting up a culture of environmental responsibility, social norms effectively push individuals and organizations toward embracing eco-friendly behaviours.

Behavioural Interventions and Nudging Techniques

Behavioural interventions and nudge techniques drive many changes toward positive water management practices. Human behaviour and decision-making processes inform the design of policy interventions on the part of policymakers and environmental advocates to promote water conservation behaviour. Cheap, non-price and non-regulatory behavioural interventions attract more attention to their use in promoting pro-environmental behaviour (Ayres et al., 2013; Andor and Fels, 2018; Carlsson et al., 2021). Many studies rely on moral suasion and social norms to induce declines in usage with respect to energy and water savings (Allcott, 2011; Andor and Fels, 2018; Carlsson et al., 2021; Ferraro et al., 2011; Ito et al., 2018; Schultz, 1999), though often mixing different behavioural elements in one treatment, something also criticized by Andor et al. (2020). Another good strategy includes the use of feedback mechanisms, which give real-time information of their consumption of water. For example, a smart water meter can track consumption patterns and provide this feedback to the users, thereby helping adjust the behaviour. It can, however, also use social comparisons on how an individual's usage differs from that of peers to enhance water conservation. This technique may make people reduce their usage of water, based on the behaviour of their surroundings, by using social norms and peer pressures.

One of the successful interventions is changing default options to make water conservation default. This way nudges people into environmentally friendly choices minus asking them to opt in. For instance, when the settings on washing machines and dishwashers are favoring a mode that favors saving water, then people will be forced into conserving much water without doing too much about it. The behavioural prompts and reminders can serve as nudges to use water-saving behaviours. Simple cues such as putting stickers or signs near the water fixtures reminding people to turn off the taps when not in use will make them internalize these habits.

Gamification elements can be added to the water conservation process, which often promotes people's engagement and motivation. The act of being involved in water-saving efforts as a

game or competition encourages every individual to embrace sustainable practices in a fun and rewarding manner. For example, applications or web-based systems that track water usage and award points or badges upon completion of certain milestones shall make users more active in saving water. Additionally, tangible rewards such as reduced utility bills and prizes for meeting particular targets, can serve as complements to incentives toward water conservation.

An effective communication strategy raises awareness of water-related environmental issues and inspires pro-environmental behaviour. Education stands at the very base of all of them, the provision of a proper learning environment that lets every individual understand just how vital the conservation of water is for life. Instilling awareness about saving water in school curricula at every stage-from elementary to higher education-is an effective approach in developing a well-grounded sense of importance for water among students. Public campaigns are also important to reach the public in general. The campaigns can also be done through television, radio stations, road billboards, posters about water conservation practices and their implications in terms of wastage of water. Social media has become another channel that influences attitudes and behaviours towards water conservation. Facebook, Twitter, and Instagram have provided a platform for discussing matters about the environment and thus can share information quickly. Influencers on social media can be tapped to get to the population in a better manner than ever before, and interactive campaigns encourage people to make conscious choices for the protection of water. In sum, water awareness and behavioural change can be achieved through education, public campaigns, and social media activities that encompass an effective strategy of communication.

Overcoming Barriers to Pro-Environmental Behaviour

The importance of pro-environmental behaviour in water management is very important to the sustainable development process. However, its facilitation is marred by many barriers that prevent the same and its adoption. Unawareness and ignorance of the public mind about the need to save water and have it used in a sustainable manner constitutes one general barrier. Many people are not aware of how their activities impact water resources or feel that water is plentiful and cannot be depleted. To minimize this barrier, there is the use of educational campaigns and outreach programmes educating the people on preserving water by promoting pro-environmental behaviour. The campaigns will adopt media, community workshops, and school curriculums to educate people on methods of conserving water, the effects of wasting water, and the importance of maintaining water resources for posterity.

Another barrier to pro-environmental behaviour in water management is the lack of accessible and efficient technologies for conserving and managing water. Most people, especially the communities, in developing regions do not have access to modern, advanced devices used in saving water or even advanced infrastructure. This obstacle can be overcome by the development and application of new technological innovations appropriate to different socio-economic situations. This includes water-saving devices whose cost is relatively low, such as drip irrigation systems, rainwater harvesting, and water-saving appliances. Governments and other entities could also provide subsidies or other forms of financial incentives to encourage the use of these technologies to spread their benefits to more people.

Policy reforms are thus very important in transcending the barriers to pro-environmental behaviour in water management. In most instances, such policies prove archaic or simply inadequate to the situations, and they end up failing to stimulate sustainable use of water since they cannot offer conducive conditions to incite positive orientation towards utilizing this essential resource. The government, therefore, has a paramount role to play in formulating and implementing policies regarding the management of this resource to conserving it and utilizing it efficiently. This shall include installing price schedules for water based on the actual cost of using it, strict policies for water polluting activities, and incentives and rewards toward water reuse and recycle projects.

Stakeholder engagement is essential in the transcending of challenges to pro-environmental behaviour, especially in water management. Stakeholders in water management include governmental organizations, the private sector, the community, and NGOs. Very often, insufficient collaboration and coordination between these stakeholders can become a barrier in their effort to save water. For that barrier to be transcended, key stakeholders need to be actively engaged in decision-making processes and encouraged to collaborate toward common goals. Achieving this can be through multi-stakeholder platforms, partnerships, and participatory approaches to facilitate dialogue, knowledge-sharing, and collective action. All stakeholders-from local communities and bodies to international organizations-should, therefore, be engaged to ensure more effective and sustainable solutions to the challenges facing water management. Going beyond barriers in pro-environmental behaviour toward water management requires an integrated approach that penetrates aspects of awareness, technology, policy, and stakeholder engagement. These may include conducting educational campaigns, innovative technological inventions in reforms of policy, and effective stakeholder engagement activities, which will finally usher into a culture of sustainability for the proper responsible utilization of water by present and future generations.

Conclusion

Conclusion This journey, which explored what motivates pro-environmental behaviour in water management within circular economies, has brought invaluable insights critical to the development towards sustainability. In this journey, we have found that 'multi-stakeholder collaboration' is perhaps a cornerstone towards effective strategies in water management. There lies herein the important synergy of policymakers, industry players, and communities on the very ground of which change toward water sustainability would be enacted through a mighty force. Another very important aspect is the role of support through policy, which support to the requirements means better regulations and incentives that contribute as catalysts to promote eco-friendly practices. Behavioural insights provide a better understanding of how humans make their decisions, thus enabling initiatives to help alter attitudes and actions toward water conservation. Future research will have to delve into the dynamics of pro-environmental behaviour at diverse cultural contexts that will accordingly enrich

our tool kits of strategies elaborated on socio-economic landscapes. Practical implications can be resonated across sectors in urging policymakers into developing supportive legislation, practitioners into implementing innovative technologies, and researchers to continue bridging the gaps between theory and application. Through collaboration, coherence in policy, and behavioural science, we have a new way into a water future where every drop counts.

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