SLAMIC JURISPRUDENCE AND CONDITIONS FOR ACCEPTABILITY OF RECLAMATION OF WASTEWATER FOR POTABLE USE BY MUSLIM USERS

Report to the
Water Research Commission

by

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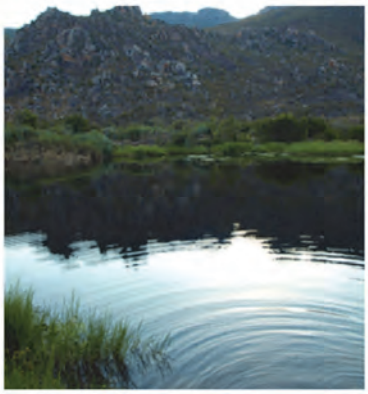
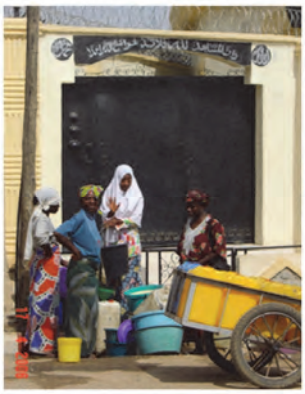
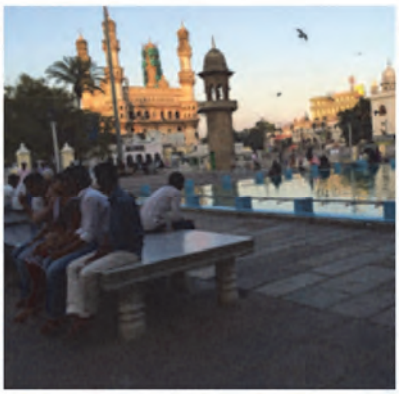


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EXECUTIVE SUMMARY

Problem Statement

In October 2012, the eThekwini municipality announced that it would be considering the use of reclaimed water to supplement existing potable water supply. Residents of Durban took to the streets to protest against this plan. Media reports indicated that the most distinctive objection came from Muslims who believed that this practice was not permissible. These and other Muslim users claimed that wastewater reclamation and reuse was unclean and unIslamic. On the other hand, there have been no reports that Muslims in Beaufort West objected to water reclamation measures in the town. Moreover, Muslims in other countries have also not objected in this way to water reclamation practices.

What does Islam really say about water and water purification? What led Muslims in eThekwini to object to water reclamation on religious grounds? And why did Muslims in Beaufort West accept water reclamation? This report is a step in the direction of finding answers to these questions.

This particular reaction to wastewater reclamation and reuse is not peculiar to the Muslim community. Water was a precious resource for economic and social life, but it was also deeply embedded in the cultural worlds of human societies. Any future plan on water use, distribution, reuse and reclamation will not be complete if the science and engineering of water management ignore the symbolic and cultural worlds in which water is mediated and lived.

Objectives of the study

The main objective of this study was to address a set of questions emerging from the protests in Durban and the acceptance of water reclamation in other areas. It asks if there was a deeper religious justification to these responses, and what it was. What does Islam say about water purification? More particularly, what do the authoritative teachers in Islam say about water?

In summary, the report addresses the following questions:

- What is the need for water reclamation and purification? What are the challenges and opportunities in South Africa today?
- How have Muslims outside South Africa addressed the question of water reclamation in recent times?
- What is the significance of water and water purification in Islam? Rather than looking for a yes or no answer, can we look deeper into the ethical, cosmological and moral universes of Islam on the significance of water and water purification?
- Can one draw lessons from the values and practices developed by Muslim jurists and juridical thinking on water and water purification for contemporary challenges?

- Is there a consensus view among representative religious leaders on the permissibility or repugnance of water reclamation from wastewater?
- Is reclaimed wastewater permissible for potable use in accordance with Islamic urisprudence and ethics?

The Approach

The research team decided that it would address the questions directly to religious scholars in the country. They are the recognized leaders of Muslims, guiding them in mosques and other community settings. They shape public opinion and lead it in direct and indirect ways. Religious leaders carry the legacy of the Prophet Muhammad in their study, knowledge and leadership.

Given this position of religious scholarship in society, the research group decided to prepare preliminary reports for their deliberation and comment. The first focused on a general understanding of water management, its challenges and opportunities for the supply, distribution and (re)use of water. The second presented an overview of water reclamation practices in Muslim majority countries. The third presented a broad overview of the ethical and juridical significance of water in Islam. These covered general ethical principles, and a discussion of purification practices related directly to water.

The reports were sent to religious leaders for comments and suggestions. Written responses were received. More substantially, a meeting was organized for representatives of religious bodies to deliberate on the report and the questions posed in this report. The participation and comments by religious leaders were constructive and substantial.

Key Outcomes and Findings

The significance of water as a scarce resource will only increase on a local and global level. South Africa is a country with a unique water supply. There are no massive rivers feeding every nook and cranny with adequate and equitable water supply. But most areas of the country have water, while some areas often face critical reserves. More significantly, water supply is extremely uneven. A swimming pool at every home in some suburbs stands in stark contrast to a tap for every ten homes in some townships.

It is clear that water management is extremely important for the country and the world. Water management includes a fundamental understanding of supply, distribution and increased reclamation. A good water management plan includes the participation and engagement of the end-users. This report addresses the significance of water use in an Islamic context.

Water reclamation practices are common in a number of Muslim-majority countries. There is a high degree of awareness about the need for water management in the face of

urbanization, population growth and industrialization in one form or another. Many of these countries are also located in low-rainfall zones, including vast deserts. There is clearly a sense of urgency expressed in the literature, indicating that much more needs to be done to preserve water resources of the regions and countries concerned.

Religion does not seem to be a major impediment in water reclamation practices. There is a general sense and appreciation of water as a valuable resource, and that it should be preserved as a general ethical good. Farmers in the study areas were most willing to reuse wastewater if it was safe and inexpensive. The report offers a sample of water reclamation projects. There are notable concerns that edible food in the raw should only be treated with extra precaution. One juridical opinion (*fatwā*) issued by Saudi religious scholars in 1978 paved the way for water reuse in agriculture, recreation and even ritual use. This opinion was cited but did not form the basis of justification for projects outside the Gulf region. It is evident that a categorical statement on water reclamation would prepare the way for greater public participation in water reuse and reclamation.

The main contribution of this project lies in underlining the religious significance of water for Muslims in the country. Water plays a vital role in the ritual and ethical practices of Muslims across the globe. It is mentioned repeatedly as an important part of God's creation in the Qur'an. Water is not only a resource that sustains life; it is regarded as the very origin and foundation of material existence: "And we created all living things from water" Qur'an (21:30).

Furthermore, water plays a fundamental role in Islamic jurisprudence. It has been discussed extensively in books relating to medical treatment (*ṭibb*); in public ethics; and in purification practices. Currently, the last-mentioned dominates the discourse of water and water purification in Muslim communities. Water occupies pride of place at the beginning of books of law. The main ethical concerns of water use are related to personal purity, particularly in relation to ritual and spiritual purification. The use of water is tempered by a strong ethic of conservation, captured in this Prophetic narration:

> The Messenger of Allah passed by Saʿd when he was performing ablution, and he said: "What is this extravagance?" He said: "Can there be any extravagance in ablution?" He said: "Yes, even if you are on the bank of a flowing river." Ibn Majah, Book 1, *Ḥadīth* 425.

Muslim jurists in the past and present classified water and impurities extensively. They deliberated on conditions that made water impure and unfit for purification, and also outlined in detail the processes required for such water to be restored to its state of purity. Jurists were acutely conscious of impurities that changed the nature and quality of the water. They outlined ways in which water could be purified, either by directly removing the impurities or through natural means (dilution of flow).

The main framework of the juridical tradition was shaped before industrialization and modern scientific threats. The tradition did not treat water as a scarce resource threatened by

pollution, population growth, pathogens or acute scarcity. These are modern challenges that demand attention. Nevertheless, the juridical foundations seemed to be applicable to modern contaminants that threaten natural water resources. The basic methods of purification in Islamic jurisprudence conform to the goals of modern water reclamation, and provide a basis of supporting water reclamation for general human use.
The representative group of religious scholars supported a comprehensive water reclamation plan for South Africa. They shared their insights on the value of water in Islam, and asked that the scope of the report be expanded by including medical and public life issues. They reminded the meeting of a minority view among scholars that rejects water purification. While supporting water management and reclamation, they expressed their reservations on three points. Firstly, they supported indirect potable reuse, and not direct potable reuse. Secondly, they asked the Water Research Commission to provide more information on treatment plants, particularly with respect to health threats to drinkable water that appeared to challenge contemporary water supplies. And thirdly, they supported greater efforts to curb wastage and leaks in water supply systems at the local, municipal levels.

On their side, the religious scholars committed themselves to promote water conservation and recycling at local levels. In particular, they proposed that recycling of water in mosques should be actively implemented. Secondly, they committed themselves to establish and support active campaigns to raise greater awareness among citizens on responsible water use.

Conclusion

Water resonates deeply in the day-to-day lives of Muslims in South Africa and beyond. The report was a very successful first step in documenting the extent of water reclamation projects and developments in Muslim countries. It was even more successful at presenting a detailed framework for understanding the ethical and juridical significance of water in the Islamic tradition. This framework made it possible to address the key questions of the project. Water reclamation was supported by Muslims in a constructive manner.

More substantially, the majority of Muslim scholars supported indirect potable Reuse. They were concerned about the continuous threats to water, and called for caution in the implementation of water reclamation practices. Muslims, in particular, were still concerned about the threat of medical hazards in the water supply. They asked Muslims and other local communities to be more directly involved in water management practices. At the same time, the religious leaders called upon mosques to lead by example and introduce water saving and recycling measures. They called upon themselves and other religious leaders to raise awareness or water conservation and water management challenges in the country.

Recommendations

This research on the significance of water in Islam and among Muslims has pointed to a vibrant religious and cultural world of water. The research is only a first step into the world of water and Islam. It should not be the last.

The scope of such projects should be expanded to the many communities and cultures that share water in the country. A detailed map on the cultural value and significance of water would be invaluable for water management in South Africa.
Such projects would support water management practices in South Africa. More significantly, they will lead to greater insights on how to enhance water management and water use on a local level.

The participants in this project called for greater information and engagement on specific water treatment practices. The research reports of the Water Research Commission should become more accessible to local communities.

The project limited itself to solicit the views of religious leaders. Future projects should find ways of engaging with end-users of water.

ACKNOWLEDGEMENTS

The report is a collaborative project that would not have been possible without the support and dedication of the UCT Research office, and Nabowayah Kafaar and Tasneem Wise from the Department of Religious Studies. Furthermore, the contribution of the religious scholars (*ʿulamāʾ*) was absolutely crucial for the value of this report. We appreciate their willingness to read the report, and share their insights on this important topic.

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1. INTRODUCTION

In October 2012, the eThekwini municipality announced that it would be considering the use of reclaimed water to supplement existing potable water allocation to address increasing demand. Residents of Durban took to the streets to protest against this plan. Media reports indicated that the most distinctive objection came from Muslims who believed that this practice was not permissible. These and other Muslim users claimed that wastewater reclamation and reuse was unclean and unIslamic. This report examines this question in depth, and explores a broader Muslim response to water management in South Africa.

This reaction from the people of Durban in general, and the Muslims in particular, can be placed in a wider context of water research and the cultural and religious significance of water. Researchers have become acutely conscious that water is not a neutral resource, but shaped by cultural and religious values and practices. The success or failure of water management will not only depend on the implementation of new technologies to a vital and strategic resource. As part of the broader objective of improving water service delivery and management in South Africa, it will also depend on how communities engaged this precious resource. This research report is a small step towards elaborating the Islamic religious significance of water, and Muslim responses to water reuse.

This report addressed the following questions:

- What is the significance of water and water purification in Islamic values and practice?
- Can one draw lessons and analogies from the values and practices developed by Muslim jurists and juridical thinking on water and water purification for contemporary challenges?
- How have Muslims in South Africa and abroad addressed the problem of water shortage and water contamination in recent times?
- Is there a consensus view on the permissibility or repugnance of water reclamation from wastewater?
- Is reclaimed wastewater permissible for potable use (including for drinking) in accordance with Islamic jurisprudence and ethics?

The report begins with a brief but crucial overview of challenges and opportunities facing water supply, reclamation and management. This overview was researched and presented to religious scholars (*ʿulamāʾ*) in a preliminary report. At a consultative meeting held with representative religious leaders in Johannesburg, Dr Nonhlanhla Kalebaila presented a comprehensive and thorough overview of the water challenges and opportunities facing South Africa. The full reports and presentation are reproduced as Appendices (Sections 8, 9, and 10).

The report then turns to water reclamation practices in some Muslim countries. This provides a perspective on the needs and demands of water reclamation in recent times, and how Muslims have dealt with such demands. The next section presents an overview of the

values and ethics of water and water purification in Islamic texts and exegesis. This is divided between a general ethical and cosmological perspective, and a legal-moral framework that guides Muslim practices on a day-to-day level. This report was prepared on the basis of a few texts from classical and modern writers. At the consultative meeting mentioned already, Muslim religious scholars from Cape Town, Johannesburg and Durban presented their responses to the preliminary reports. That deliberation included constructive comments and recommendations on the challenges and opportunities facing South Africa with regard to water. These are summarized in the next section. A conclusion completes the substantial part of the report.

2. WATER RECLAMATION AND PURIFICATION

The main question posed in this report on Muslim religious views and attitudes to water reclamation and purification could not be isolated from the broader challenges and opportunities of water management in South Africa. Water reclamation brings up questions about supply, distribution, use of old and new technology, conservation, economics, and public perception. The following summary is drawn from Appendices (Sections 8, 9, and 10) that provide detailed information.

There are various sources of water currently available in South Africa, and new sources are continually considered and tested. Water supply is directly affected by population growth and movements, industrial development, urbanization and pollution. Water supply is extremely uneven in South Africa; reflecting the high degree of inequality in the country.
Various bodies are dealing with the management of water supply, drawing on local and international expertise to increase efficiencies. There was no one unified framework on water supply in South Africa: different departments and ministries were dealing with water supply with different sets of goals and priorities. At the municipal level, the biggest challenge facing water supply was the very high rate of leakage. The Department of Water Affairs estimated that, in 2014, 25.4% of municipal water supply was lost through leakages.[1]

Conservation was another key issue related to water reclamation. Excessive use put pressure on water supply, and also put pressure on costly treatment facilities. While parts of the country faced critical shortages from time to time, other areas with greater access to water did little to conserve water. Conservation of water as a general ethical principle was unevenly appreciated in the country.

Water reclamation and reuse are long-established practices. It was used for pasturage and non-food crop irrigation, both of which did not require a high quality of water. In fact, one may call this type of water reuse as wastewater disposal. More recently, however, reclaimed water has become a valued water source with the trend shifting towards higher level uses such as urban irrigation, toilet and urinal flushing, industrial uses, and indirect potable reuse. The re-use of municipal wastewater plays an increasing role in meeting water demands (Henze et al., 2008).

Water reclamation has developed elaborate, sophisticated and sometimes expensive processes of water treatment. Many of these treatments are shared globally, but there are some unique practices in local contexts. Wastewater treatment involves a number of unit operations (physical, chemical or biological, or a combination of these). Treatment can be thought of in three different stages, namely primary, secondary and tertiary treatments.

[1] https://www.dwa.gov.za/Communications/PressReleases/2013/MEDIA%20RELEASE%20NO%20DROP%20REPORT%2010%20OCTOBER%202013.pdf. Accessed 25 March 2015.

Primary treatment involves only physical processes while secondary treatment includes biological and sometimes chemical treatments. Tertiary treatment includes physical, biological and chemical treatment and in this stage, the quality of the water is improved prior to discharge (Tchobanoglous et al., 2013). For a full explanation, please refer to the Appendix (Section 8).

The main purpose of wastewater treatment and water reclamation is to remove microbial pathogens, suspended and dissolved inorganic and organic substances, and concentrations of chemical constituents. These bodies in water threaten the safe use of water. The Report of Crook et al. (2005) outlines the effectiveness of treatment, but also the areas on which more research is required. The Report lists and discusses the various pathogens in wastewater, but also those that exist in natural sources of water. Microbiologists and public health officials have warned against new, emerging, and re-emerging pathogens, and strongly advocate that these warrant equal attention in the treatment standards of wastewater. Pathogens affecting natural- and wastewater have become more complex and demanding (Appendix, Section 10 for more detail).

It is important to recognize the different terms used in water reclamation and water reuse. Water reuse refers to wastewater which is used for a process different to the one which generated the wastewater, while water recycling generally refers to wastewater which is used in the same process as the process which generated it (such as effluents from a paper and pulp mill). Water reuse can either be direct or indirect. With indirect reuse, the treated wastewater is discharged into natural surface or groundwater sources (Environmental Protection Agency, 2012). The water is then abstracted downstream for further treatment prior to it being used for the next process. With direct reuse, the treated water is transferred directly to the facility where it is needed for the next use (Escobar & Schafer, 2010). There is no discharge into natural water prior to use. Indirect reuse of wastewater is commonly used around the world (Angelakis & Gikas, 2014) where treated effluent from a wastewater treatment plant is typically discharged into a river. Downstream, a water treatment plant abstracts this water and treats it to potable standards (Adewumi, Ilemobade, & Van Zyl, 2010). This is called **Indirect Potable Reuse**.

Direct potable reuse has been implemented in Windhoek (Namibia) since the 1970's (Department of Water Affairs, 2011). Singapore treats wastewater to potable quality directly as well, but a very small fraction of this water is added into the water distribution system. Adewumi et al. (2010) commented that there is a lack of guidelines available for direct potable reuse for South Africa and thus this has not been implemented to date. It is important to note that South Africa reclaims 4-5% of the water that it uses.

Public perception has become a matter of primary concern, and affected the implementation of reclamation and reuse (Martin, 2013; Wilson & Pfaff, 2008). This is associated with a lack of knowledge about treatment facilities, and also the natural cycle of water that includes purification and reuse. This report addresses this concern with regard to Islam and Muslims. It provides information for Water researchers on the social and religious

significance of water. At the same time, it provides detailed information on water and water reclamation that can be used by Muslims.

3. WATER RECLAMATION IN MUSLIM COUNTRIES

As this report is concerned about Islam and water reclamation, it is appropriate to consider water reclamation practices in Muslim majority countries. In these countries, we expected to find water reclamation practices that reflect the norms and values of the people. The literature on wastewater reclamation in Muslim countries is extensive, pointing to practices dating back as far as 1965. In fact, the percentage of treated wastewater in the Arab region (54%) was "higher than Asia (35%), Latin American/Caribbean 14%), and Africa (1%)." Within the Arab world Tunisia, Jordan, and the GCC counties are the leaders in the area of wastewater reclamation and reuse (Crook et al., 2005). Arab nations have played a leading role in the development of innovative water solutions. They took global leadership in desalination, dam infrastructure and drip irrigation. Despite these innovations, the challenge of enhancing water management remains significant. Planned wastewater management in the Arab region has of late focused on the general objectives of protecting public health and the environment.

Choukr-Allah identified key catalysts for wastewater reuse in Arab countries. These included limited water resources that posed severe constraints on economic and social development, and threatened the livelihoods of people. Surface water was on the decline, as the over-pumping of groundwater beyond natural recharge rates resulted in lowering the water table, and caused an increase in groundwater salinity, ground water depletion and general ecological degradation (Choukr-Allah, 2012, p. 2). Choukr-Allah further points out that the challenges of water scarcity and deterioration of water quality has been an on-going problem faced by the Arab World for the last three decades. He attributes this "looming crisis" as the necessary catalyst that prompted Arab governments to seek more efficient uses of their existing water resources, and develop interventions aimed at narrowing the gap between supply and demand.

There have been some reports that Muslim countries opposed the use of wastewater for irrigation on religious grounds (i.e., that the water originated from wastewater and is therefore contaminated). Crook et al. point out that this objection was mitigated by the presence of *fatwas* (juridical opinions) that permitted the use of reclaimed water (Crook et al., 2005, p. 29).

In the following pages, a brief overview is presented on water reclamation practices in a number of Arab and Muslim countries. The last sub-section looks at cases where religious considerations have been highlighted in the literature.

3.1. Case studies

3.1.1. Syria

Before the current conflict, the population in Syria was close to 22 million. The increased pace of population growth in Syria particularly in urban areas accelerated the demand for

potable water. High quality water was redirected towards potable use to meet the challenge, untreated wastewater was directed to agricultural irrigation.

According to the World Health Organisation (2005), the Damascus and the Homs wastewater treatment plants in Syria accounted for more than 98% of all treated wastewater and reached 177 million m^3/year and 49 million m^3/year respectively. There were subsequent developments since 2005 in the development of new wastewater treatment plants in Aleppo and Latakia (Choukr-Allah, 2010).

3.1.2. Iran

Iran had about a population of close to 70 million by 2005, and was classified as a developing economy. Only about 5% of the municipal wastewater was reused, approximately 70 Mm^3/year (18 billion gallons/year). Untreated primary effluent was directed at irrigation. A recognition of the value of reclaimed water by the Iranian government initiated investigations into exploring the use of treated wastewater. The government introduced financial incentives to encourage water reuse (Crook et al., 2005, p. 35.). Crook et al.,however, report that there was little governmental control over water reuse in Iran. The responsibility and authority for water reuse was fragmented.

3.1.3. Jordan

Jordan had a population size of over 70 million by 2005. Wastewater has been used for irrigation in Jordan for several decades and the need to incorporate water reuse into its water resources management plan was both recognised and implemented extensively.

In 2002, with the support of international organisations the government implemented several direct water reuse activities in Aqaba and Wadi Musa to demonstrate that reclaimed water reuse was reliable, commercially viable, socially acceptable, environmentally sustainable, and safe. The Wadi Musa project used the treated effluent of the Petra Regional Wastewater Treatment plant to grow a variety of agricultural crops like alfalfa, maize, sunflowers and Sudan grass, tree crops including pistachio, almond, olives, date palms, lemons, poplars, spruce, and junipers, and many varieties of ornamental flowers (iris, geraniums, petunias, and daisies). By 2005, there were approximately twenty wastewater treatment plants in Jordan whose main purpose was to provide treatment of wastewater via stabilization ponds or activated sludge biological treatment. By 2006, four million m^3 of wastewater were treated and two millions m^3 were used for informal irrigation. By 2008, it was reported that wastewater use constituted 10% of Jordan's total water supply with close to 85% of its treated wastewater reused. It was also pointed out that treated wastewater was mixed with freshwater and then used for unrestricted irrigation in the Jordan Valley. By 2009, the new National Water Strategy published higher wastewater reuse in irrigation, with a detailed plan for the period 2008 to 2022 (Choukr-Allah, 2010).

According to a more recent report by the World Bank, there has been rapid urbanisation and population growth in Amman, Zarqa and Russeifa. In response, the Ministry of Water and

Irrigation rehabilitated the existing As-Samra Stabilization Pond-Wastewater Treatment Plant and expanded treatment capacity from 68 000 m^3/day to 268 000 m^3/day. Such an expansion was able to accommodate flows estimated at 186 000 m^3 while leaving room for expected population growth. As-Samra's expansion included the construction of a new mechanical treatment plant equipped with state-of-the-art technology able to treat effluent for agricultural reuse, produce fertilizer from sludge as well as generate clean energy.

3.1.4. Gulf Cooperation Countries (GCC)- Saudi Arabia, the United Arab Emirates, Kuwait, Qatar, Bahrain and Oman

The combined population for the GCC is in the region of 50 million. The GCC countries comprise of Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain and Oman. This region of the Arab world is wealthy in comparison to the MENA countries. About 40% of treated wastewater was used in the Gulf Cooperation Countries to irrigate non-edible crops and fodder, and for landscaping (Choukr-Allah, 2010, p. 111).

Kuwait's vision for treated wastewater was to reach 26% of overall water demand, thus reducing the annual demand from non-potable sources from 142 million m^3 to 26 million m^3. Potable water supplied in Kuwait was generally sourced either from groundwater or seawater (desalinated through reverse osmosis). Irrigation accounted for approximately 60% of the water use that consisted of 60% groundwater of which 40% was reclaimed. By 2005 Kuwait had several wastewater treatments plants, with the major ones providing tertiary treatment and high level of disinfection. Kuwait reclaimed 10% of wastewater produced. Furthermore, "a small amount of reclaimed water was also being used for groundwater recharge via surface percolation basins." Kuwaiti authorities, however, demanded higher criteria for water purification for food crops that were eaten raw (Crook et al., 2005, p. 35). The treatment of wastewater in Kuwait included "biological secondary treatment, filtration using disk filters, ultrafiltration, and reverse osmosis" (Crook et al., 2005, p. 35).

The Sulaibiya Wastewater Treatment and Reclamation Plant in Kuwait is the largest plant of its kind in the world to use reverse osmosis (RO) and ultrafiltration (UF) membrane-based water purification systems. Its daily capacity which was initially pegged at 375 000 m^3/day, but with plans to increase it to 600 000 m^3/day. The goal of the plant was to allow for unrestricted non-potable uses of reclaimed wastewater (Choukr-Allah, 2010).

Oman had several small tertiary treatment plants producing reclaimed water which was used for landscape and agricultural irrigation. A groundwater recharge project involving a seawater intrusion barrier, and replenishment of groundwater used for agricultural irrigation was also under construction in 2005 in Salalah. A significant point to note is that Oman regulations on water were more restrictive than WHO guidelines with regards to faecal coliform requirements.

The World Bank cited Oman as a case study for the application of Hi-tech solutions for reclaimed wastewater. This approach complied with the standards required for treated

effluent, and that would ensure reused water for irrigation and aquifer recharge. In addition to the water quality compliance, Haya was also required to comply with sludge quality and odour emission norms. Technologies for sewage treatment processes were selected to ensure capability of constituent concentrations less than the allowable concentrations (Water reuse in the Arab World, 2011, pp. 13)

Saudi Arabia enacted "restrictive wastewater reuse criteria for landscape and agricultural irrigation." The Riyadh North wastewater treatment plant features activated sludge treatment with nitrification-denitrification, filtration, and disinfection. Reclaimed water was used mainly for agricultural irrigation, although a small amount is used for industrial cooling at a refinery. Master plans are in place for the construction of satellite plants to provide reclaimed water for landscape irrigation and industrial and commercial uses in the city. Plans for additional facilities in other cities to provide advanced treatment, including reverse osmosis, to produce water for municipal, industrial, and agricultural applications were ready for implementation. The Arabian American Oil Company (ARAMCO) owned and operated several of the water reclamation plants. Five facilities in the Eastern Province provide "either secondary or tertiary treated reclaimed water for sod farm irrigation, discharge to a canal from which diluted water is subsequently withdrawn for agricultural irrigation, and landscape irrigation – including parks, athletic fields, and residential areas" (Crook et al., 2005, 36).

Saudi Arabia is unique among Muslims countries to have had a juridical opinion (*fatwā*) from the state's Council of Leading Scholars in 1978 that water purification was permissible for water reuse in agriculture. As a result, by 1995, the Kingdom reused about 15% of its treated wastewater for the irrigation of date palms and fodder, such as *alfalfa*. Moreover, ablution water at the two holy mosques in Mecca and Madina was recycled for toilet flushing, thereby conserving expensive desalinated seawater. By 2000, approximately 9000 hectares near the capital Riyadh were cultivated with date palm and forage crops and were using approximately 146 MCM of treated wastewater effluent for irrigation. Wastewater was also being reused for the irrigation of landscape plants, trees, and grass in municipal parks, in several cities such as Riyadh, Taif, Jeddah, Dhahran, Dammam and Jubail. The Saudi Arabian municipality responsible for water provision, MAW, was considering the introduction of meters to measure and control water pumped at a farm level to assist in regulating supply and minimising losses. A shift in fodder and cereal from areas of high crop-water consumption zones to lower water requirement areas was also being considered, to further add to the savings made on water required for irrigation. It is significant to point out that public awareness around the value of water conservation was undertaken and featured in various media, and also within educational institutions (Abderrahman, 2001a).

Choukr-Allah describes the **United Arab Emirates** as having had the most extensive and notable reclaimed practices since 1976. In Abu Dhabi, where non-potable reuse was in practice since 1976, 190 000 m^3/d (50 mgd) of water was produced for the irrigation of 15 000 ha (38 000 ac) of forestland, public gardens, ornamental plants, and roadway

medians. More recent data obtained on the UAE indicated that approximately 20% of the 500 Mm^3 (132 billion gallons/year) of wastewater produced in urban areas in the Emirates was reused.

3.1.5. Yemen

In Yemen stabilization ponds are used for wastewater treatment throughout the country with the exception of the capital city of Sana, which has an activated sludge treatment plant. Wastewater used for the irrigation of all types of food crops is common but unregulated. Activated sludge treatment in Sana was used for the control of desertification. Sana's activated sludge effluent was discharged to rivers and then extracted by farmers for agricultural applications. This has reduced the overexploitation of the aquifer in the area. And by 2005, the activation of five new plants was underway mainly for agricultural irrigation and – in one case – for industrial cooling water (Crook et al., 2005, p. 37).

3.1.6. Egypt

Egypt produces about 3.5 billion m^3/year of municipal wastewater, while current treatment capacity is in the range of 1.6 billion m^3/year. An additional treatment capacity of 1.7 billion m^3 is targeted by 2017. Although the capacity increase is significant, it will not be sufficient to cope with the future increase in wastewater production from municipal sources. The Delta Region alone generates more than 2 billion m^3/year, mostly originating from Egypt's two greatest urban centres, Cairo and Alexandria. Fifty-five percent of the population is served by these plants (Choukr-Allah, 2010, p. 111.

Wastewater treatment plants in Egypt treat about one-third of all wastewater generated annually. Most of the effluent is either used directly for agricultural irrigation or discharged to rivers and subsequently reused. The extent of wastewater use in irrigation is large-scale with up to 42 000 hectares, (104 000 ac) of agricultural land being serviced. It is, however, forbidden to irrigate vegetables with reclaimed water unless strict regulations are met. Despite the regulation, food crop irrigation is common, resulting in high occurrences of Helminth infections. Noting this non-compliance, the Ministry of Environmental Affairs implemented a project in 1998 to irrigate desert land with treated wastewater from 72 plants for forestry. In the Suez, meanwhile, stabilization ponds are used for groundwater recharge by rapid infiltration basins (Crook et al., 2005, p. 39).

3.1.7. Morocco

Many of the largest cities in Morocco have sewer systems, but discharge untreated or poorly treated wastewater to the ocean. Wastewater produced in inland cities was reused with little or no treatment for all types of agricultural crops, with the exception of vegetables that are eaten raw which was forbidden. Morocco also had mechanical wastewater treatment plants, but they were not well maintained with close to 70% not functioning properly. As a consequence, high incidences of waterborne diseases were reported. One of the few landscape irrigation projects in Morocco that was functioning was the Ben Slimane, which is close to Rabat, where 5600 m^3/d (1.5 mgd) of stabilization pond effluent is used for golf

course irrigation. While public participation in reuse projects is not common in the Middle East, public involvement in a project in Drarga resulted in public support and led to the relocation of the wastewater treatment plant site.

3.1.8. Tunisia

According to Choukr-Allah, the main drivers for water reuse in Tunisia were water scarcity due to rapid population growth, increase in living standards, and increasing seawater intrusion in coastal areas from accelerated urbanization. While approximately 30% of urban and rural households were connected to sewerage systems, close to two-thirds of all wastewater produced in the country was treated. The large urban centres had sewerage systems which provided secondary treatment using oxidation ditches, activated sludge processes, or stabilization (Crook et al., 2005; Choukr-Allah, 2010).

According to Choukr-Allah wastewater in Tunisia was treated since 1965 (Choukr-Allah, 2010, p. 109). By 1998 there were at least 44 water reclamation plants. From figures obtained more recently, 60 plants produced more than 175 Mm^3 (46 billion gallons) of reclaimed water. About 35 Mm^3/year (9.3 billion gallons/year) of reclaimed water was also allocated for reuse and about 28 Mm^3/year (7.4 billion gallons) was actually reused. The greatest amount of reuse occurred in the Tunis area, for the main purpose of agricultural use, i.e. irrigation of fruit trees, fodder crops, sugar beets, and cereals. Treated wastewater was used to irrigate citrus orchards and olive trees of the Soukra irrigation scheme (8 km North East of Tunis) covering an area of 600 hectares. Several golf courses and parks were also irrigated with reclaimed water. A small amount was also used for groundwater recharge. The irrigation of vegetables with raw wastewater is forbidden and treated wastewater with secondary effluent is used for this purpose (Crook et al., 2005, pp. 36-37; Choukr-Allah, 2010, p. 109-110).

The quality standards for reclaimed water in Tunisia were high. Considerable research was also conducted by the National Institute for Research on Agricultural Engineering, Water, and Forestry. There were a number of factors that impeded Tunisia's ability to increase the use of reclaimed water, such as the high salinity of the water, the lack of storage facilities to meet peak demands during the irrigation season, inadequate planning, poor reliability of distribution systems, and inadequate training (Crook et al., 2005, pp. 36-7).

A more recent report from the World Bank provided updated information on Tunisia (Water Reuse in the Arab World, 2011, pp. 11-12). It indicated that all large and medium sized cities (up to 30 000 inhabitants) had sewage treatment facilities, and cites 109 plants as being currently in operation. Tunis and its four wastewater treatment plants had a total capacity of 97 million m^3 per year and produced most of the country's treated wastewater. The North, Centre and South districts produced 20%, 22% and 16% respectively. The total area equipped for irrigation with treated wastewater is 8065 hectares. Furthermore, treatment plants were also initialised for small urban and rural localities (less than 5 000 inhabitants) and by the end of 2010, the volume of treated wastewater reached 240 million m^3, which represented 5% of available water resources. This volume was expected to grow

to 500 million m^3 by 2021. The report also points out that Municipal wastewater was mainly domestic water constituting 80% of the total, while the proportions from industry and from tourism were 15% and 5% respectively. A portion (20-30%) of the treated volume was reused directly, while the remaining 70-80% released into natural water bodies (i.e. rivers, the Mediterranean Sea). Most of the treatment plants were located along the urban coast to prevent marine pollution and to protect coastal resorts.

3.1.9. Pakistan

The use of untreated wastewater for irrigation of all types of agricultural crops was common in Pakistan. Pakistan's urban population of 43,4 million produces about 2.301 (10^6 m^3/y), and only 7,7% of this is treated. The major producers of wastewater are both urban and rural residential sources. Only the cities of Islamabad and Karachi have treatment facilities. Pakistan, in general, has moved from a country with surplus water to a country facing a dire deficit. And it seems that wastewater treatment has become an urgent necessity .

It is clear the treatment of wastewater has become a necessity in all the Muslim countries surveyed in this brief review. The arid climate in these countries has required some kind of wastewater reuse and water treatment for a long time. More recently, social conditions like urbanization, population and industrial development have accelerated the demand for some form of wastewater treatment and reclamation. It is also clear that some countries have responded to these needs and demands with greater urgency than others. The availability of resources, and forward planning has put some countries in a lead. But it is also clear the demands will be increasing in the next few years, and the treatment of wastewater cannot be postponed any further. The threat of water shortage, and particularly water that is suitable for agriculture, and direct human potable use, is as acute as elsewhere in the world.

Table 5: Water Reuse in the Middle East (Crook et al., 2005, p. 32)

Annual Reclaimed Water Usage				
Country	Year	Mm^3	Billion Gallons	% of Total Water Withdrawn
Bahrain	1991	15	3.96	6
Egypt	2000	700	185	1
Iran	1999	154	40.7	0.2
Israel	1995	200	52.8	10
Jordan	1997	58	15.3	6
Kuwait	1997	80	21.1	15
Lebanon	1997	2	0.53	0.2
Libya	1999	40	10.6	1
Morocco	1994	38	6.87	0.3
Oman	1995	26	6.60	2
Qatar	1994	25	57.3	9
Saudi Arabia	2000	217	97.7	1
Syria	2000	370	7.40	3
Tunisia	1998	28	7.40	1
Turkey	2000	50	13.2	0
UAE	1999	185	48.9	9
Yemen	2000	6	1.59	0

3.2. Religious Considerations

In a bid to address the country's water challenges, the Council of Leading Scholars (*Hayʾat kibār al-ʿulamāʾ*) in Saudi Arabia issued a *fatwā* (legal opinion) on the re-use of wastewater in 1978. The *fatwā* is difficult to locate, but it has been quoted in some of the literature in support of water purification. As recent as 2013, the annual policy brief of the Environmental Agency of Abu Dhabi quotes its conclusion:

> impure wastewater can be considered as pure water and similar to the original pure water if its treatment using advances technical procedures are capable of removing its impurities with regards to taste, colour, and smell, as witnessed by honest, specialised and knowledgeable experts. Then it can be used to remove body impurities and for purifying, even for drinking. If there are negative impacts from the direct use on the human health, then it is better to avoid its use, not because it is impure but to avoid harming the human beings (Environmental Agency – Abu Dhabi 2013, p. 8).

In 2001, the IDRC report *Islam and Water Management* highlighted the freshwater challenges faced by Middle Eastern, and North, and Central African Countries. The diverse authors of this report supported the acceptable use of wastewater as a viable option, and cited the 1978 *fatwā* as one of their arguments.

In his particular study on Saudi Arabia, Abderrahman concluded that wastewater reuse in Saudi Arabia was not forbidden (*ḥarām*) provided that it did not cause harm. He draws his conclusion mainly from the 1978 *Fatwā*. He points out, however, that Saudi scholars did not encourage the practice of reclaiming wastewater for potable use (including drinking). They supported the use of reclaimed water for irrigation use only. Wastewater reuse expanded greatly in Saudi Arabia in the aftermath of the 1978 *Fatwā*. Abderrahman concluded that the *fatwā* illustrated the dynamic nature and wisdom of Islamic laws in solving the challenges facing the Muslim community. He added that this practise was an important step towards water conservation through the reclamation and reuse of wastewater and treated effluent reuse, but qualified, that its use was determined by the degree of treatment. This implied that the standard and treatment of waste- water for potable use would be different from that of irrigation (Abderrahman, 2001a).

Al-Khateeb studied the perceptions amongst Muslim farmers in Palestine on the reuse of wastewater. The research identified two pilot secondary treatment plants that treated wastewater to irrigate eggplants, peppers, apples, grapes, and peaches (Al Khateeb, 2001). He found the farmers willing and open towards wastewater reuse in agriculture. According to Khateeb, all the farmers believed that wastewater reuse was allowed in accordance with Islamic tradition, provided that the practice was not harmful. Many also noted the advantages of using treated wastewater for irrigation for its valuable nutrients. Farmers were even willing to pay up to $0.24 per cubic metre for treated wastewater (Faruqui, 2001a). Al-Khateeb found 67% level of acceptance amongst consumers to buy and eat agricultural products irrigated with treated wastewater (Faruqui, 2001a). In contrast, a survey conducted on user perceptions amongst farmers in Abu Dhabi found that as a result of the poor quality of the wastewater, farmers were less inclined to use the water.

A point worth noting is that while the authors of the various case studies highlight wastewater reuse in these Muslims countries, the 1978 *Fatwā* was not identified as the main contributing catalyst for water reuse. In 1978, Saudi Arabia was the only Islamic country that felt the need to declare a *fatwā* on the permissibility of wastewater reuse. In seems that Islamic countries practised wastewater reuse prior to 1978. They show no correlation, and if at all, very little relevance to, or influence of from the 1978 *Fatwā*.

4. WATER AND ISLAM: COSMOLOGY, ETHICS AND JURISPRUDENCE

Having presented an overview of water reclamation practices in a number of Arab and Muslim countries, we are ready to explore the religious and cultural significance of water in the Islamic tradition. Apart from the citation of the Saudi *fatwā* of 1978, the literature has been generally silent on the religious justification of water reclamation. Most of the Muslim countries have decided on water reclamation practices on the basis of need, demand and economic viability. In the new millennium, however, water researchers in the region and beyond have realized the importance of the cultural and religious significance of water use and reuse. This report presents some of the salient features that may be raised about water, purification, reclamation and reuse in Islamic terms. We begin with a general overview of the cosmological and ethical significance of water in the Qur'an and Sunna. We then go into some detail on the juridical significance of water-related practices in everyday Muslim life. We then turn to a brief discussion how this discourse has begun to be heard in water reclamation practices and plans.

This section of the report, then, is divided into the following heads:

- Reflections on Water in Islam in general. This will turn attention to the cosmological and ethical significance of water.
- Explanation of the significance of the Qurʾan and the Sunna, their interpretation, and the distinction between *Sharīʿa* and jurisprudence (*fiqh*).
- Discussion on the utilization of water in terms of Islamic jurisprudence, covering both classical and modern texts.

4.1. Cosmology and Ethics

In 2001, the International Development Research Centre (IDRC) collaborated with the World Bank and other partners to explore, discuss and establish a common framework for understanding water in Islam. It included some articles on current research on water purification and reclamation in Islamic ethical and cosmological terms. The rationale for paying specific attention to water in Islamic terms and contexts recognised and acknowledged the significance of water in Islam: "Since Islam is the religion of about one-fifth of the world's population and the official faith of a number of countries, in many of which water is the key scarce factor for development, understanding its actual or potential role is important" (IDRC, 2001, p. vii).

Faruqui, one of the principal editors and contributors to the IDRC report, presented a view on water as a resource, and a thematic area in Islam. As part of his analysis he cited excerpts from the Qurʾan and *ḥadīth* pertaining to water. The section below is a summary of his reflections presented in three sub-themes: 1) water as a source and resource, 2) water and humankind and 3) water conservation.

4.1.1. Water as a source of life and a valuable resource

According to Faruqui, the Arabic word for water, *māʾ*, occurs sixty-three times in the Qurʾan. He adds that God's throne is described as resting on water, and Paradise is described as "Gardens beneath which rivers flow" (Faruqui, 2001a, p. 1). In the same volume, Caponera expounds on the value of water in the Qurʾan. The life-giving quality of water according to Caponera is reflected in many verses in the Qurʾan such as the following: "And Allah has sent down the water from the sky and therewith gives life to the earth after its death; Surely there is a sign in this for people who listen." Further, a key verse (Qur'an 21:30) states that all living creatures were created from water.

According to Faruqui, the Qurʾan does not limit the right to water as an essential life source for humans only. The gift of water is for flora as well: "vegetation of all kinds" and "various colours," all "nourished by rainwater that God sends down." He further demonstrates this point by saying "that water is made available by God so that all life should receive support according to its needs, including humans, animals, and plants" (Faruqui, 2001, p. 3). Faruqui mentions the need for sufficient water that is of "good" quality because the water has to be suitable for "nourishing vegetation" and for drinking by animals (Faruqui, 2001, p. 32).

4.1.2. Water and humankind

The relationship between water and human beings is characterized as a right to a vital resource. Moreover, this right refers to a fair share of the resource. He corroborates his point with the following *ḥadīth* and verses from the Qurʾan. According to Abu Dawud, the Prophet (PBUH), described water as a community resource to which all (rich or poor) have a right: "Muslims have common share in three things: grass (pasture), water and fire (fuel)" (Faruqui, 2001, p. 31). In a *ḥadīth* narrated by Al Bukhari, Prophet [Muhammad] (PBUH) forbade Muslims from hoarding excess water and said that the one who has water is obligated to allow others to use it. The prophet also warned that "among the three people that will be ignored on the Day of Resurrection is the person who possesses superfluous water on the way and withheld it from travellers" (Faruqui, 2001, p. 3).

Besides the point of water being a right for humans, Faruqui makes reference to the value of water for human beings in general and Muslims in particular: "human beings rely on water for life and good health but, for Muslims, it enjoys special importance for its use in *wuḍūʾ* (ablution, that is, washing before prayer) and *ghusl* (bathing)" (Faruqui, 2001, p.1*).*

4.1.3. Water conservation

According to Faruqui, the Qurʾan makes two clear statements regarding water that support water demand management: 1) the supply of water is fixed, and 2) that it should not be wasted. He infers that a defined water supply implies that at some point, demand must be managed because supplies cannot be infinitely increased. He attributes this interpretation to the following verse from the Qurʾan (40:18): "And we send down water from the sky in fixed measure" (Faruqui, 2001,p.5). He continues this line of argument with another Qurʾanic verse in which God tells humans that they may use water provided that they

commit no excess therein "O Children of Adam! Eat and drink: But waste not by excess, for God loveth not the wasters" (Faruqui, 2001, p. 5).

To further substantiate his point, Faruqui cites a *ḥadīth* where the Prophet Muḥammad (pbuh) "used one *mudd* of water (equal to 1 litre) to perform ablution and approximately 5 *mudds* to bath with, one *ṣāʿ* up to five *muds* (2-3 litres)." He quotes another *ḥadīth*: "Do not waste water even if performing ablution on the bank of a fast-flowing (large) river." The second quote dispels any notion that water conservation was only necessitated by the climate of the Arabian Peninsula (Faruqui, 2001, p. 5). Faruqui makes reference to penalties for water misuse, pollution, or deterioration of clean water by Islamic scholars and rulers which in his view conform to Water Demand Management principles.

It is significant to note that Faruqui presents a general ethical approach to the value and place of water in Islamic cosmology and daily practices. He draws upon verses in the Qurʾan and the *ḥadīth*, and develops a comprehensive view on the significance of water. His report provides support for recognizing the value of water and its conservation.

Muslim society has devoted even more attention to law and jurisprudence. Jurisprudence that determines and specifies how Muslims ought to act in the world in relation to God, to human societies and to the world. We have to turn to jurisprudence, therefore, in order to get a full picture of water and Islam. To Faruqui's valuable ethical universe, we need to understand how Muslims relate to water in their everyday religious practices.

4.2. *Sharīʿa* and *Fiqh*

The purpose of this section is to provide the reader with an understanding of jurisprudence (*Sharīʿa* and *fiqh*) to fully appreciate and comprehend the process required in determining whether something is permissible for Muslims.

According to Qaradawi (1991), the Arabic word *Sharīʿa* means "whatever God has established for His worshippers to perform as an act of faith, or, whatever he has laid down as part of the religion, such as prayer, fasting, pilgrimage, regular charity and other good deeds." He adds that the root of the word *Sharīʿa* originally meant to "explain" or to "clarify," but it can also mean "path" or "way." In summarising the meaning, Qaradawi concluded that *Sharīʿa* is the totality of judgements revealed by God in the Qurʾan and Sunna, and whatever is derived from these judgements through jurisprudence (Qaradawi, 1991, p. 1). According to Fakir, "S*hari'ah is* the scientific ordering of life through divine law, which embraces the whole of Muslim life both in the individual and social sphere" (Fakir, 1978, Foreword, p. xi). *Sharīʿa* , he adds, is obliged to see that:

> the will of Allah is enforced even in a melange of multi-cultural societies …
> the *Sharīʿa* formulated in the science of *fiqh* (jurisprudence) governs the internal and external life of adherents (Fakir, 1978, Foreword, p. xii).

According to Qaradawi, *fiqh* (jurisprudence) means to deduce the unknown from what is known. Jurisprudence is the method of discovering detailed legal provisions from specific

evidence drawn from the Qurʾan and the Sunna. To do so, the jurist must exercise reflection and careful thought to problems whose solutions are not evident. He describes jurisprudence as a book of legal rulings, and states that it has two distinct categories: the first contains all rulings explicit in the Qurʾan and the Sunna, which provides the foundation of the *Sharīʿa* (he qualifies this as the smaller portion of jurisprudence). The second category consists of rulings that rely on the discretion of jurists, and includes legal precedents arrived at through analogy, consideration of public interest, juristic preference, consideration of custom, etc. (Qaradawi, 1991).

Qaradawi points out that this distinction between Shariʿa and *fiqh* is contentious amongst scholars. According to one view, *Sharīʿa* is divine while jurisprudence is man-made. He disagrees, stating that *fiqh* has both a direct and indirect relation to the Shariʿa and in truth, describes it. He describes jurisprudence as a tool of the *Sharīʿa* to deal with new issues using methods that are compatible with its principles and objectives (Qaradawi, 1991, p. 20). He admits, however, that several jurists can deliberate over the same issue or question, and offer varying opinions or judgements. The option of choosing one legal opinion over the other would be based on the strength of the evidence and juristic discretion – *ijtihād* (Qaradawi, 1991).

According to Fakir, the Arabic word *ijtihād* literally means to work very hard (Fakir, 1978, p. xvi). He adds that it is the "principle of movement and dynamism in the basic fabric in Islam" and also means "to exert one's opinion, to exercise reason, vision and human faculties in finding out the truth" (Fakir, 1978,p. xvi). He further postulates that *ijtihād* can be applied in any field of human knowledge or area of specialisation for growth and advancement, but points out that it has been limited to *fiqh* or jurisprudence. Fakir illustrates the significance of *ijtihād* in establishing the four recognised schools of Sunni jurisprudence i.e. the Shāfiʿī, Ḥanafī, Ḥanbalī and Mālikī. Scholars in each school exercised judgements on legal matters, guiding communities under changing circumstances. The Qurʾan, the Sunna the *ijmāʿ* (consensus of opinion among the jurists) and *qiyās* (analogy), are the guiding sources for the four Sunni schools of jurisprudence.

Fakir cautioned that "judgement cannot be made at whim" and qualified the perimeters within which judgements based on *ijtihād* were made, i.e. "it is not a licence nor liberalism" and has to be applied with the knowledge of Islam, with strong *īmān* (faith) and *taqwā* (piety) and a sound moral character" (Fakir, 1978, p. xvii). Qaradawi raises the same point, and specifies the need for qualifiers which must be applied to the "concept of law" itself and not just *ijtihād* (Qaradawi, 1991, p. 5). He adds that while "law is largely a product of the society it serves, and changes and develops with that society … Islamic Sharīʿ is not the product of any [person,] or the entire Muslim community [for that matter,] but was revealed [instead] by Almighty God, and came to human kind in a complete form. *Sharīʿa* can thus not be changed or fashioned with time, nor [by] the whims or wills of a people" (Qaradawi, 1991,p. 4). Qaradawi adds, however, that unchangeability does not imply rigidity. Citing Abdul Qadir Awda, Qaradawi qualifies that the "immutability of Shariʿa is dependent on

two characteristics: 1) that its general principles are universally valid, and 2), that it is flexible enough to accommodate changing social needs" (Qaradawi, 1991, p. 4).

Fakir refers to *fiqh* as the science of Shariʿa. *Fiqh* literally means intelligence or understanding, and implicitly infers exercising intelligence in deciding a ruling in the absence of a specific command from the Qurʾan or the Sunna. According to jurists, *fiqh* is the science of the rules obtained from their particular sources. According to Fakir, Abū Ḥanīfah defined *fiqh* as "the soul's cognisance of its rights and obligations whereby human beings are able to observe the right conduct in the world and prepare themselves for their future life" (Fakir, 1978, p. 7). According to Fakir, Muslim authorities generally define *fiqh* as the knowledge of one's rights and duties derived from the Qurʾan and or the Sunna of the prophet, or the consensus of opinion among the learned (*ijmāʿ*) or reasoning through analogy (*qiyās*). This forms the basis upon which the rules of *fiqh* are derived. In summary: Shariʿa is the wider of the two and embraces all human acts, while *fiqh* is the narrower of the two and deals mainly with legal acts (Fakir, 1978).

Four schools of jurisprudence have developed in the history of Sunni Islam. They differ with each other on how they interpreted the sources, and elaborated rulings on ritual practices, and social and economic relations. The earliest school is associated with the name of Abū Ḥanīfa (d. 148/767). The second school emerged from the teachings of Mālik b. Anas (d. 179/795) and then spread to North, and West Africa. Muhammad in Idris al-Shāfiʿī (d. 204/820) also has a large following, and is famous for producing the first systematic approach to *fiqh*. The fourth school is name after Aḥmad ibn Ḥanbal (d. 241/855) who lived in Baghdad. Muslims in South Africa follow mainly the Ḥanafi and Shāfiʿī schools, but there are smaller groups of the other schools. Shiʿite Muslims follow similar legal methods, but they do not follow schools. In their case, *fiqh* is determined by prominent living scholars.

4.3. Classification of human action

In jurisprudence, human acts are not always divided between the permissible and forbidden. Jurists developed a graded approach and developed terms that Muslims used in a day to day basis:

wājib – According to the Ḥanafī school, it is similar to *farḍ* in terms of its juridical/legal standing. It is that action, the commission of which is incumbent and necessary (*lāzim*), and failure to comply is considered to be sinful and reprobate (Abū Zahra, pp. 28-29).

mandūb – is that action which the legislator (Allah/God, or the Prophet, whichever applies), has required, but not as a matter of necessity (*ghayr lāzim*). The commission of such an act is considered virtuous and praiseworthy, but the omission of it is not considered sinful and reprobate. Other names for *mandūb* are: *sunna* (as in tradition), *nafl* (meaning optional), *mustaḥabb* (meaning preferred), and *taṭawwuʿ* (meaning voluntary). There are also various gradations within *mandūb* (Abū Zahra, p. 39).

ḥarām – is that action which the legislator has commanded abstention from as a matter of incumbency and necessity, regardless of whether the proof for the prohibition has

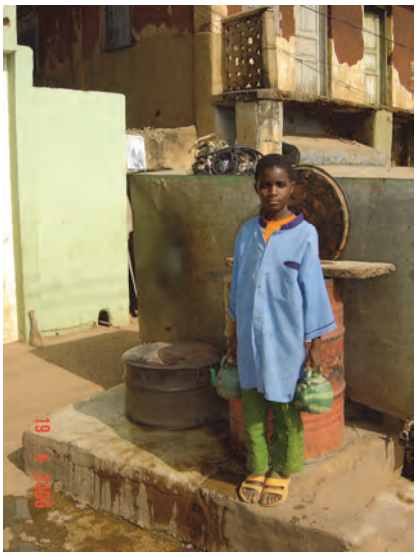
categorical, apodictic origins (*qaṭʿī*), or implied origins (*ẓannī*). As for the Ḥanafīs, they are of the view that it must have apodictic origins (*qaṭʿī)*. Likewise, there are gradations of *ḥarām* in terms of severity and reprehensibility of various actions. (Abū Zahra, p. 42-43) Undoubtedly, the commission of *ḥarām* acts is considered to be sinful.

makrūh – is that action which the legislator has commanded abstention from, but not as a matter of incumbency and necessity, as in the case of a *ḥarām* act. As far as the Ḥanafīs are concerned, the distinction between *ḥarām* and *makrūh* is that, while in the former case, categorical, and apodictic sources (*qaṭʿī*) are required for such a declaration, in the case of *makrūh*, implied sources (*ẓannī*) would suffice. *Makrūh* acts in turn are also graded in terms of severity (Abū Zahra, pp. 45-46).

mubāḥ – is that act with regard to which the legislator has given a choice of commission or omission. In other words, the commission of such acts is not considered praiseworthy, nor is their omission considered reprobate. They are basically, harmless acts. Other words for *mubāḥ* are: *ḥalāl* (meaning allowed/permissible), and *jāʾiz* (meaning permissible). The basis of *mubāḥ* acts is found either due to the absence of any text/s prohibiting such acts, or on the presence of a text/s allowing it, or on the absence of either, that is, the legislator is silent on the matter (Abū Zahra, pp. 46-48).

rukhṣa – means allowance, permission, or license, and *ʿazīma* – literally means determination, or resolve. It refers to concessions, either in terms of being excused by the *Sharīʿa* from omitting acts which have hitherto been commanded, or in terms of committing such acts that which has been hitherto prohibited by the *Sharīʿa* , for example, the concession (*rukhṣa*) of not having to fast when one is ill, or on travel, (the command to fast being the (*ʿazīma*), the initial resolution or command). Similarly, the permissibility to drink alcohol when one is in danger of dying from thirst, when there is no other *ḥalāl* fluid available to drink (Abū Zahra, pp. 50-51).

4.4. Water in Islamic Jurisprudence (*fiqh*)



This section of the report focuses on water as a substance and value as it was developed in *fiqh* (jurisprudence). It may be contrasted with the cosmological and ethical approach in the IDRC report. In the interests of brevity and relevance to South Africa, only texts that are reflective of the predominant Ḥanafī and Shāfiʿī juristic schools, as well as of those scholars who are more oriented towards either of the two, have been consulted and referred to in this review.

4.4.1. *Al Maqāsid*: the Manual of Islam of Imām Nawawī

Yaḥyā b. Sharaf al-Nawawī (d. 676/1277) is a highly regarded scholar of Islam, particularly for his work on Shāfiʿī jurisprudence and commentaries on *ḥadīth*. The *Manual of Islam* is a

translation of his book called *Maqāṣid* by Keller. He is usually referred to as Imam Nawawī in honour of his status.

Imam Nawawī begins with the observation that water in Islam is not an unrelated stand-alone matter. It is discussed in relation to ritual purification or *ṭahāra*. According to Nawawī, *ṭahāra* means the lifting of a state of "ritual impurity." He classified impurities in relation to the purification of the human body. Minor impurities like excretion, loss of consciousness, touching of the genitals, etcetera, are called *ḥadath* and require a ritual ablution. Major impurities are called *janāba* and include sexual intercourse, all forms of ejaculation, death, menstrual flow of blood, and post-natal bleeding. This requires a ritual bath (*ghusl*). Imam Nawawī provides a list of impurities, and these include blood, pus, vomit, liquid intoxicants, urine, stool, semen, sexual fluid or discharge, animal life that dies before being slaughtered other than aquatic life, humans, swine, dogs and their offspring, locusts and amphibians that are not slaughtered (Nawawī, 1994,pp. 9-10).

Water is the primary means used for purification. Moreover, such water should be "plain" water, and not be characterised by the following:

- Water that has been previously used for purification, unless at least 216 litres or more has been added to it (Nawawī, 1994, p. 10).
- has changed in taste, colour and odour, to such an extent that that it is no longer considered "water," because it has been mixed with something else, even if this substance was pure (*ṭāhir*) such as flour or saffron, and where the mixing could have been avoided.
- is impure and less than 216 litres into which an impurity (*najāsa*) has fallen.

Water less than 216 litres becomes impure by virtue of its mere contact with an unclean substance, whether the water changes or not. However, when the unclean element is so slight that it is not noticeable with the naked eye, then it is considered pure. When there is 216 litres of water or more, it does not become impure by mere contact with impure, unclean substances, but only becomes so when there is a change in the taste, the smell, or the colour of the water. If such water then changes again by virtue of standing for a lengthy period of time, or if more water is added to it (and it becomes diluted), then even that water becomes pure (Nawawī, 1994, pp. 9-10).

Water in a pure state has the ability to restore persons or things from a state of impurity to a state of purity. Cloths, or sheets, or body parts, for example, that come into contact with an impurity (*najāsa*) can be restored to a pure state by washing the object or affected part seven times, at least once with earth or sand (Nawawī, 1994, p. 11). If the article or part thereof is affected by any other form of impurity, then washing it once with water is sufficient. However, it is recommended to wash it three times (Nawawī, 1994, p. 11). Interestingly, if the urine of an infant boy (and not a girl) who is solely breast-fed, spills onto a cloth or onto clothing, the article need only have water sprinkled over the affected area to return it to its state of purity (Nawawī, 1994, p. 11).

If an article or person comes into contact with the flesh of dead animals that has no blood or bodily fluid, no ritual purification is necessary. The same rule applies to a person in a state of prayer, who has a little pus or blood spilled onto clothing or onto the person. Nawawī makes a point of specifying the container carrying or collecting water. The vessel must not in any way have been contaminated by impurity (*najāsa*). He states that it is permissible to use any vessel or container except those made from silver or gold. In concluding the discussion on water and methods of purification, the *Manual* expounds on the processes of purification with and without water (Nawawī, 1994, p. 12).

4.4.2. *Nūr al-Īḍāḥ*: Book of Ṭahāra

We now turn to a Ḥanafī text to examine its discussion of water and purification. Abu'l-Ikhlāṣ Ḥasan al-Shurunbulali (994-1069/1586-1659) lived in Egypt, studied and taught at al-Azhar, the great centre of learning in Cairo, and is considered as one of the leading scholars of Ḥanafī jurisprudence. We are referring to the Arabic-English texts made available by Wesam Charkawi with copious notes and explanations (Shurunbulali, 2007).

The discussion of water in this Ḥanafī text begins with identifying the forms, types and sources of water that can purify. These are identified as rainwater, seawater, river water, wells, and water from melted ice, melted hail, and spring water. This text identifies five states of water, and they are the following:

- *Muṭlaq* (pure) water: "is water that is intrinsically pure and purifying for others but not *makrūh* (reprehensible not prohibited)" (Shurunbulali, 2007, p. 31).
- Water that is intrinsically pure and purifying for others but *makrūh*. This is a small quantity of pure water from which a cat or similar animal has drank from (Shurunbulali, 2007, p. 31).
- *Mustaʿmal* (used) water that is intrinsically pure but does not have the ability to act as a purifying agent for other substances, since it was used to remove a state of ritual impurity or used for the sake of attaining rewards. It would have been used for ablution or a bath. According to this text, *muṭlaq* water becomes *makrūh* (reprehensible for use) as soon as is has fallen off the body (Shurunbulali, 2007, p. 31).
- The fourth type is impure (*nājisa*) water. Water becomes impure if an impurity (*najāsa*) falls into a small quantity of *muṭlaq* water. The author specifies that such volume of water in a pond or reservoir should measure 10 by 10 arm-lengths, or 60 arm-lengths in circumference (Shurunbulali, 2007, p. 34). If the pond or reservoir is larger, then it would only be impure if the characteristics (smell, colour and taste) of such water changes. Flowing water is pure unless impurities fall in it, and they are clearly noticeable in spite of the flow (Shurunbulali, 2007, p. 35).
- The fifth type of water is called doubtful (*mashkūk*) water, from which a mule or donkey has drunk. It may be pure, but there is doubt if it can be used for purification.

Under used water, the author discusses water squeezed from a tree or fruit. This form of water does not have purifying properties. Similarly, water that is used in cooking and loses its nature cannot be used for purification. Water mixed with solid substances (such as

saffron, and fruit and leaves from trees) remains pure even if some, or all of its essential characteristics have changed. This is because such water continues to flow. However, if it is mixed with other liquids, then one has to consider the dominance of the two constituents (water and the foreign liquid). If water is overwhelmed by the properties of the foreign liquid, then it cannot be used for purification (Shurunbulali, 2007, p. 33).

In instances where the liquid has no distinct characteristic, then the weight and volume of the two (water and liquid) should be considered. He gives the example of rose water that no longer has a smell, or used water which does not have any clear characteristic. If the pure water is double the volume and weight of this new characterless liquid, then it may be used for purification purposes (Shurunbulali, 2007, p. 34).

Shaykh Shurunbulali then makes a distinction of water from which animals have drunk. It ranges pure from the permissible (when humans, horses and animals whose meat is permissible have drunk from it), to doubtful (when amules and donkeys have drunk from it). If forbidden animals like dogs, pigs, or predators like the cheetah, fox of wolf, have had a sip, then the water becomes impermissible. Cats, stray chickens, predatory birds make water reprehensible (*makrūh*) (Shurunbulali, 2007, p. 35-6).

He devotes a section to the purification of wells. If impurities such as blood and alcohol fall in, then all the water has to be removed. If animals such as pigs, dogs, sheep and also humans fall in and die, then all the water has to be removed. If small animals fall and become bloated, then 200 buckets of water should be removed. If chickens, cats and similar, fall into a well, then 40 buckets should be removed from it. The dung of camels, sheep, horses, mules, donkeys and cows are acceptable, unless they are noticeable (smell, sight, and taste). When humans and other clean animals fall in and do not die, then water is pure unless there were impurities on their bodies. He concludes this section with important reminders on the number of prayers that need to be repeated if any of these conditions prevail (Shurunbulali, 2007, p. 37).

Shaykh Shurunbulali concludes the chapter of purification with categories of filth (*najāsa*). He divides them into heavy (*ghalīẓa*) and light (*khafīfa*). Heavy impurities include blood, alcohol, flowing blood, meat of dead animals and their skins, urine of animals not permitted for humans, the dung and saliva of dogs and predatory animals, droppings of chickens, ducks, human discharges and a mouthful of vomit. Light impurities are the urine of horses, urine of animals permitted for human consumption, droppings of birds not permitted for human consumption (Shurunbulali, 2007, pp. 107-109). He then mentions quantities of such impurities that would be excused, meaning that humans may perform prayers in this state. Examples include the size of a heavy impurity on a body or cloth that does not exceed the size of the head of a *dirham* coin, or thin sprays of unavoidable urine (Shurunbulali 2007, p. 109).

The purifying agents were water and other liquids (vinegar and rose water). Shaykh Shurunbulali also mentions rubbing with soil, and wiping. And concludes the section with

tanning of skins as purifying process (excluding in all instances pig and human skins) (Shurunbulali, 2007, p. 112).

4.4.3. *Fiqh us Sunnah* – As-Sayyid Sabiq (1985)

Sayyid Sabiq (d. 2000) is a twentieth century scholar whose book has become very popular. It was written to provide a clear and simple overview of jurisprudence, combining an approach that privileges the *hadīth* of the Prophet, while drawing on the wealth of all the Sunni schools of jurisprudence.

Sabiq also begins with a classification of water into four types:

- *Muṭlaq* (pure) water
- used water
- mixed water with pure elements and
- mixed water with impure elements (Sabiq, 1985, pp. 1-3).

Like Fakir and Shurunbalali, he mentions several types of *pure* water with which cleanliness can be achieved: rainwater, sea water, river water, well (borehole) water, water from melted ice, hail snow and spring water (Sabiq, 1985, p. 1). According to Sabiq, pure water is water that remains in its original or natural state as created by God. It has an inherent state of purity and can be used by individuals to purify themselves. It is water that is intrinsically pure, and as well as being able to act as a purifying agent for other things, and it is not (considered to be) *makrūh* (reprehensible) (Sabiq, 1985, p. 1). In accordance with his methodology, Sabiq cites the Qurʾan and *ḥadīth* quite extensively in his book.

Used water refers to *w*ater that drips from a person after performing ablution (*wudūʾ*) or a bath (*ghusl*). Sabiq argues that this water should be considered pure. He cites a *ḥadīth* where the Prophet (PBUH) states: the believer is not impure in person when he is in a state of ritual impurity. He also cites the following *ḥadīth* in support of his contention, that the Prophet "wiped his head with (the water) remaining on his hands from his ablution." He also narrated another *ḥadīth* in which the Prophet declared that "the believer does not become impure"(Sabiq 1985, pp. 2-3).Sabiq argues on the basis of these texts that used water does not become impure. All the other texts referred to in this report make a distinction between *muṭlaq/ṭahūr* water and *ṭāhir* water. While the latter has purifying properties, it cannot be reused for ritual purification.

Water Mixed with pure elements is a third water. Such water has been mixed with substances (like soap, saffron, flowers, etc.) and objects that are considered to be pure by the *Sharīʿa* h (Sabiq 1985, p. 3).

Water mixed with impure elements is divided into two*:*

- Where the impure substance alters the taste, the colour, or odour of the water, in which case, the water cannot be used for purification. Like other scholars, Sabiq makes provision for the dilution of this water.

- Where the liquid is still considered to be water. The impure substance has not altered the essential properties of water: taste, colour or odour. Sabiq considers the water to still be pure and permits its use for purification. At this point in the texts, Sabiq does not discuss the size of containers as other jurists had done. He does relate a number *ḥadīth* to support his argument. The general tenor of these is that some degree of dilution (two buckets of water, or one bucket thrown over an impure place) was sufficient for purification rituals. He does not require specific quantities for replacement and dilution.

Sabiq also lists the major distinctions of impurities, and the requirements of purification rituals. Most of his lists are similar to the one we have seen, but there are some distinctions that he introduces into the discussion, often based on *ḥadīth* reports. Thus, he says that alcohol is impure according to the majority of scholars, but may not be impure as such. A pig, on the other hand, would be pure in essence (Sabiq, 1985, p. 6). He also brings up the case of animals that feed on carrion (even if they are normally permissible). They would have to be separated in an enclosure to render them pure again.

4.4.4. Manual of prayer and fasting by Abu Baker Fakir

Abu Bakr Fakir was a prominent intellectual in Cape Town, and produced and compiled a book on fasting and prayer. He was for a short time an Imam at a mosque, and then taught English literature in Jeddah, Saudi Arabia.

Fakir discusses water. Fakir recognises water as a means to attain purification, and states that pure water is a pre-requisite to perform ablution and *ghusl* for the purposes of removing *najāsa* (impurity) and returning to a state of purity. Pure water is a necessity in accordance with Sharīʿa h and attention must be paid to the kind of water that is used (Fakir, 1978, p. 64).

Fakir provides a classification of water in Islam, identifying three types (Fakir, 1978, pp. 64-65): *tahūr*, *ṭāhir*, and *mutanajjis* water. *Ṭahūr* water is that water which is pure and naturally clean in itself, and in turn has purifying properties. These include, snow, rain, springs, wells, aquifers, seawater, and, according to Fakir, even normal tap water. Pure water, he continues, has the following characteristics:

It has retained its natural physical properties – colourless, odourless and tasteless,
- It has not been defiled or affected by any impurity,
- It has not changed any of its natural physical properties in an unnatural way,
- It has not already been used for ablutions or baths.

Interestingly, Fakir highlights a significant characteristic of water which is not evident in classical discussions of water. According to Fakir, water of a large volume remains pure even if the following are present:
- vegetation that grows within it,
- fish breed in it,

- natural substances such as salt or sulphur are present, or
- leaves or fruit fall into it (Fakir, 1978, p. 65).

Writing in the twentieth-century, Fakir's discussion puts water in an ecological context. Since there is only a "natural" change to the water, its use for purification is acceptable. Imam Nawawi and other classical scholar do perhaps hint at this matter when they make concession for unavoidable elements (like leaves and branches) that may fall in pure water, and not render it unfit for ritual purification (Nawawī, 1994, p. 10).

Ṭāhir water is different from *ṭahūr* water. It is pure (is not considered to be defiled by impurities), but it is not purifying. *Ṭāhir* water cannot be used by a person, or on an article, for ritual purification. It is pure water, but has changed as a result of its coming into contact with *pure* substances such as sugar, ink, flour, dye and the like. It can be used for other purification purposes but not for ritual purification (Fakir, 1978, p. 65).

Mutanajjis water is water that has been contaminated by impurities or filth (*ḥadath* and *najāsa*). Water is considered contaminated:

- "If the *tahoor* water amounts to more than 47.5 gallons (190 litres) and *najāsa* [impurity] falls into it, and on contact changes any of the natural or essential properties (i.e. odourlessness, tastelessness and colourlessness) of the *ṭahoor* water, then the *tahoor* water becomes *mutanajjis*. If, however, the volume of water is 190 litres or more, and the water's essential properties and characteristics of *tahoor* water are retained, then it remains *tahoor"* (Fakir, 1978, p. 66).
- If the volume of *ṭahūr* water is less than 190 litres and *najāsa* falls into it. The change from *ṭahūr* to *mutanajjis* water occurs even if the essential properties of the *ṭahūr* water are not altered (Fakir, 1978, p. 66).

Mutanajjis water, like *mustaʿmal* (used water) can return to its state of *ṭahūr* (purity) when sufficient *ṭahūr* water is added to it. Should the added volume of *ṭahūr* restore the essential properties of *ṭahūr* water, its purity would have been restored.

Fakir divides impurities into three categories: heavy (*mughallaẓah*), light (*mukhaffafah*), and medium (*mutawassiṭah*). Examples of the first include the saliva of dogs and swine. Light impurities can be easily removed and they include the urine of the male infant. Most of the impurities fall under the medium mode, and Fakir seems to include herein "intoxicating fluids, dung of animals, human excreta, pus, vomit, all dead creatures other than man, locust, (and) fish." They also include, he continues, "part of a living animal," and the different types of sexual emissions. Fakir continues this mathematical framework by specifying how the three types of impurities may be removed. Heavy impurities should be washed seven times, at least once with "clay or a cleansing agent." Light (*mukhaffafah*) impurities should be sprinkled with water once the impurity is no longer visible. And medium impurities (*mutawassiṭah*) should be cleaned with running water at least once. If the impurities are still noticeable, then they should be removed with "soap if necessary in the washing and rinsing." There is no problem, he adds, with colour or odour which resists

removal (Fakir 1978, pp. 67-69). Like Imam Nawawī, Fakir also refers to what he calls "ceremonial impurity" which he calls *ḥadath asghar* (minor *ḥadath*) and *ḥadāth akbar* (major *ḥadath*).

Like earlier scholars before him, Fakir also mentions the transformation of *ṭahūr* and *mutanajjis* water to its natural *ṭāhir* state: "such … water can again become *ṭahoor* by the addition of sufficient *ṭahoor* water with the result that the alteration in 'taste,' 'colour' or 'smell' disappears" (Fakir 1978, p. 66). The "sufficient" quantity is at least "two *qullahs*" that Fakir calculates to be more than 190 litres. We saw earlier that Nawawī's translator comes to a figure of 216 litres. There has been a general disagreement on the meaning of *qullah* in Islamic jurisprudence, but it denotes a large quantity of water (Fakir, 1978, p. 65).[2]

4.5. Summing Up

We have presented a small summary of views and interpretations held by different scholars on water, with regard to its forms, its nature, and its state of purity and impurity. The section shows how jurists classified water and impurities. They deliberated on conditions that made water impure and unfit for purification, and also outlined in detail the processes required for such water to be restored to its state of purity. They also classified impurities in great detail. The impurities and purification process are closely related, organized in great rationalized detail.

It is significant to point out that there are a number of commonalities and differences among jurists. They approached the topic at the beginning of their manual of jurisprudence. Purification is the beginning of ritual practice, and ethical obligation. The scholars agree on the necessity for pure water, and for some process of purification needed for ritual purposes. It is noticeable that the discussion in *fiqh* is not unsurprisingly related to purification rituals. These texts go into great detail on classifications, not only as a scientific practice, but one that is related to the purification of the individual for ritual practice. There is consideration given for the purposes of obtaining purity, for the reasonable accommodation of human needs, as well as for the prevention of undue harm or prejudice (*ḍarar*) in maintaining standards of purity.

But there are also differences, in the classification categories, in the organization of the material, and in some specific positions adopted. Some of the differences relate to terminology, for example, where pure water was referred to by some as *muṭlaq* and by others as *ṭahūr*. There were also some long-standing differences with respect to the amount of water which retained purity in spite of the presence of impurities in it.

We could summarize the main proposition that impurities that change the quality of the water should be removed. But we also note that large quantities of water annul the impact of impurities (unless these are clearly noticeable). We may conclude from this that a high

[2]See the discussion on *qullah* at http://en.islamtoday.net/artshow-377-3270.htm (accessed 11 February 2015).

degree of dilution is considered to be a form of purification (as long as the characteristics of the water do not change). These conclusions have a direct impact on our assessment of water purification systems in contemporary societies.

It is noteworthy that the jurists, both in the past and the present, did not address the question of drinking water or water used for irrigation. The only reference made to pure water for drinking purposes was in relations to animals, and the types of animals sharing the same source of water with humans. There was no reference to water that is suitable or fit for human consumption. Nowhere in this tradition is there a suggestion that water as a resource was threatened by pollution, or calamitous scarcity.

5. CONSULTATION WITH RELIGIOUS SCHOLARS

A preliminary draft report was sent to representative bodies of religious scholars in Cape Town, Johannesburg and Durban. They were invited to read the report, and attend a consultative meeting in Johannesburg on 24 March 2015. The invitation was warmly received, and the religious scholars shared their views in both written and oral form. The meeting was attended by 10 scholars. Written submissions are reproduced as an Appendix (Section 12 of this Report).

After some deliberation on the report, the substantive information presented in this report was accepted as an adequate starting point on thinking about Islam in relation to the challenges and opportunities of water management. The value of water and its place in the ethical and practical lives of Muslims was endorsed. There were two specific points raised to complement and qualify this agreement. Firstly, it was emphasized that this was a very short summary of what has been said in Islamic jurisprudence on water. More extensive source books discussed impurities and purification in greater detail and depth. Future research should focus on these source books (particularly those used in South African institutes of learning (*madrasas*)) in order to draw from their intellectual labour. Secondly, it was also mentioned that water was not only discussed in relation to purification practices. A more extensive search of the Islamic scholarly tradition would reveal discussion of water in books that focus on medicine and public law. Until modern times, these questions drew the attention of scholars and practitioners. Focussed research on them would provide greater support for the value and significance of water, and public and private practices that supported good water management. In general, the meeting agreed that the ethical principles presented in the report were not only elaborated in purification practices in relation to personal ritual purity, but clearly evident in public and private ethical norms.

The assembled scholars were generally supportive of the goals of water management and conservation strategies presented by the Water Research Commission, and by the scholarly reports presented to them. They were also generally in agreement that water reclamation met the minimum requirements for the requirements of *ritual* purification. Reclaimed water from which impurities were completely removed such that the natural qualities of water (taste, smell and sight) were restored, could be used for ablution facilities in mosques. One representative shared his impression that this was already happening in mosques. Recycled water was used for ablution, even though it may not be fit for drinking.

This included an interesting observation that the requirements of *ṭahūr* water fit for ritual purification was provided by water reclamation. However, delegates were concerned about the health risks associated with both wastewater and reclaimed water. Such risks were equally important from the religious ethical principle of *removing harm.* The purity of water for potable use could not be limited to considerations of purification practices, but had to look at the broader challenge of offering good water for human consumption.

The meeting was notified of dissenting voices that argued that wastewater could not be purified at all. The meeting noted the lack of justification in these views (one of which is reproduced in the Appendix (Section 12)). Moreover, no one present at the meeting took this view. In the absence of any justification for this view, there was no debate on this position. The minority view, however, could not be ignored in this record.

On the basis of the water reclamation practices presented, delegates deliberated on their support for water reclamation. One view was that the necessity of water reclamation should recall the Islamic juristic principle that "necessity makes lawful the prohibited." But this view was not accepted, as it was felt that water reclamation and purification were not prohibited practices as such. Moreover, water demand had not reached such critical levels that called for this principle. It was felt that water reclamation was in principle desirable and allowed.

The delegates then discussed the relative merits of direct and indirect potable reuse. On this point, the different positions on the matter between the Ḥanafī and Shāfiʿī positions were discussed. According to the former, indirect potable reuse was clearly the preferred method as the reclaimed treated water was discharged into natural systems or large reservoirs, and where it constituted a small proportion of the total volume of water to be extracted downstream for reuse. In the Shāfiʿī view, the extraction of impurities from reclaimed water to such an extent that the natural state of water was restored met the minimum requirements of *ṭahūr* water. On the basis of the expert evidence presented at the meeting, it was proposed that Muslims should support indirect potable reuse (IPR). The evidence referred to the persistence of pathogens and impurities that threatened water sources, and that were not currently removable by conventional means. There was also evidence presented that the impact of the sun contributed to further purification. This particular position was in conformity with purification principles that conformed to Islamic juristic knowledge.

The meeting referred to popular and scientific evidence that modern impurities had a persistent and negative impact on clean water supply. In particular, not all pathogens and medical waste products could be removed by any of the known methods of water treatment. One delegate recounted anecdotal evidence that researchers had reported the inability of some water reclamation practices to purify water completely. Responses to this important concern may be summarised in two points. The religious scholars present supported the idea of further information on treatment plants, and the kind of specific challenges facing water supply. It was the responsibility of the Water Research Commission to make information available on such practices so that users were aware of the dangers of water supply needs. Such specific information on specific plants was important for religious scholars to offer their expert advice to the Water Research Commission, and to the wider public.

A more general discussion ensured on the validity of scientific practices for lay people, and for members of the religious bodies in the country in particular. One suggestion presented was to support Muslims to develop expertise in water management. Such expertise could

bridge the gap between the scientific and local communities. But another point was raised on the nature of scientific research, and its often conflicting results and claims. There was a general recognition that a better understanding of scientific research on water must be made available, not only to support one or other position, but to understand the state of research knowledge on particular practices. The delegates present supported both approaches. They also took note of water researchers who could be consulted for further deliberation (for example, Prof Faizal Bux is the Director of the Institute for Water and Wastewater Technology, Durban University of Technology).

The delegates proposed some practical steps that could be taken to support water recycling in the Muslim community. The Imam of the Mountview Mosque in Cape Town reported that his mosque was looking into the feasibility of recycling ablution water used in the mosque. It was suggested that this practice should be adopted by other mosques in the country. Other delegates proposed that sermons and large posters in mosques should highlight the value of water. One of the delegates shared a Friday sermon that he prepared for Water Week in March 2015 (See Section 12 for a sample of this sermon).

Delegates raised concerns about water management in the country. They took note of campaigns to reduce water wastage. But they were surprised to learn that while South Africa was currently reclaiming only 4-5% of water used, an estimated 24% was wasted through leaks and poor infrastructure. The delegates felt that greater attempts should be introduced to reduce or eliminate this wastage. More directly, they felt that communities should be directly engaged in better local and municipal practices of water management.

There was also a concern that recycling might become a way of increased privatization that would not a desirable outcome. There was an enduring Islamic principle that water, grazing fields and fire (power) were public goods that should be shared by people. At the very least, this meant that water management should remain a public responsibility. Privatization, it was argued, would enrich a few at the expense of the many.

6. CONCLUSIONS

The main focus of the research was rested on the question whether water reclamation was an acceptable Islamic practice. We have achieved this goal, and more. The research consisted of several components. Firstly, it reviewed water management challenges and opportunities in South Africa. It presented an overview of the standards of water treatment in South Africa, including the particular steps involved and the kind of pathogens affecting water. Secondly, it presented findings of recent research on water reclamation practices in Muslim-majority countries. Thirdly, it presented the Islamic significance of water between general ethical and cosmological significance, and key practical terms. And fourthly, it solicited the views of representative religious scholars on these questions.

The reports and presentations on water management in South Africa gave a comprehensive overview of the challenges and opportunities facing the countries. They gave a general picture of the water cycle from natural sources, to diverse users, to treatment plants, and back again. The reports demonstrated the thoroughness with which water purification processes have identified the various pathogens that affect human health. But they also recognized the on-going research involved in new and re-emerging pathogens in wastewater. The reports then put water management in the social and economic contexts of the country.

The report then presented the findings of recent research on the urgency and necessity of water reclamation projects in Muslim countries. It pointed to the existing gaps, and the great opportunities that still exist in expanding the scope of water reclamation for agricultural and potable use. It is clear that those countries that face lower rainfall, urbanization and high population growth face greater challenges in reusing water and reclaiming water.
This report focussed on the value and significance of water in the ethical universe of the Qur'an. It provided references to a number of studies on the value of water, and the value of its availability and benefit to life. The report then went on to explore the place of water in Muslim jurisprudence (*fiqh*). It provided a short background on the terms used in this jurisprudence.

It is clear that *fiqh* (jurisprudence) has gone to great lengths to describe the meaning of purity, impurity and their relevance to purification practices and rituals. This rich legacy has produced a number of terms and concepts regarding purity, impurities and purification. In terms of this jurisprudence, the process of water reclamation as an artificial process may be regarded as a form of Islamic purification. The latter outlined various processes, natural and artificial, of removing impurities from contaminated (*mutanajjis*) water. Modern methods of water reclamation are inventing new processes of separating pure water from the impurities that have fallen in it.

The consultative meeting with religious scholars produced a fruitful and constructive plan for the future. In spite of a minority dissenting view, the religious scholars supported

indirect potable reuse of wastewater. They did not supported direct potable reuse. Moreover, they suggested that greater attention needs to be paid to medical and public health ethics, which were extensively discussed in the tradition of Islam. They were also supportive of measures and campaigns to advance water management and reclamation among Muslims in particular, and among South African citizens in general.

Abderrahman says that “Islam is a dynamic religion and as such, responds to changing conditions.” He was echoing the sentiments expressed by Qaradawi and scholars whom we consulted on the responsive nature of Islamic jurisprudence to new challenges. Most of the authors of the books of jurisprudence could not have envisaged the problems of scarcity and the ravages of modern pollution as we face them today. Water purity and scarcity were not endemic problems that they had to address with great urgency. In contrast, water scarcity is now a serious challenge in many parts of the world. It was scarcity in the 1970s that led countries in the MENA region to address the problem of water and reclaimed water for agricultural use. Greater scarcity has to be addressed in the 21st century. The second challenge comes in the form of excessive pollution of what the earlier jurists termed pure water forms (rain, river, streams and bore-holes). These sources of natural, pure water have become contaminated through acid rain, chemical seepage, effluent, and indiscriminate dumping in seas, rivers and streams. Poorly treated wastewater and highly toxic waste from mines, industry and agriculture, are being disposed into our rivers and oceans. The future of pure water is in the balance. Water reclamation processes are some ways in which polluted water may be restored to its original state. In earlier times, the problem was how to restore water that has been defiled. The future problem may be how to produce pure water in the first place from highly polluted and toxic water.

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APPENDIX A

ISLAMIC TERMINOLOGY

- *faqīh* – a jurist (plural *fuqahāʾ)*. One who has a deep understanding of Islamic jurisprudence (*fiqh).*
- *fasād* – corruption, chaos, mischief, or spoiling of anything including water resources.
- *fatwā* – juristic opinion; a jurist's response to a question from an individual or group. in order to reach a decision, the jurist goes through a careful process of reasoning.
- *fiqh* – literally "comprehension" or "knowing." The branch of learning concerned with the injunctions of the *Sharīʿa* relating to human actions derived from the detailed evidence pertaining to them. See *faqīh*.
- *fuqahāʾ* – see *faqīh*
- *ghusl* – purifying bath that Muslims must take in certain conditions.
- *ḥadīth* – a narration describing what the Prophet (pbuh) said, did, or tacitly approved of.
- Ḥanafī – one of Sunni schools of jurisprudence in Islam, named after the jurist Abū Ḥanīfah (d. 767 A.C.).
- Ḥanbalī – one of the Sunni schools of thought, named after Aḥmad Ibn Ḥanbal (d. 855 A.C.).
- *ḥarām* – forbidden.
- *ḥaram* – sacred or inviolable. The area around the Kaʿba in Mecca [or Makka], and the area around the Prophet's mosque in Madina, are *ḥaram.*
- *ḥarim* – Protected (from *ḥaram*) – land surrounding canals, wells, and other water sources on which digging a new well is forbidden so as to protect the quality and quantity of the water source.
- *hawāʾ* – Personal temptations.
- *ḥisba* – office of accounting or public inspection.
- *ḥukm* – a decree, judgement, or an Islamic legal decision applied to a specific case.
- *ijmāʿ* – unanimous agreement of Muslim jurists.
- *ijtihād* – literally "striving and self-exertion: independent reasoning; analytical thought;"*ijtihād* is the interpretation of the source materials, to arrive at an opinion (*fatwā*) or judgment (*ḥukm*)
- *istiḥsān* – juristic preference, a type of juristic reasoning in *fiqh*
- *istiṣḥāb* – presumption that *fiqh* laws applicable to certain conditions remain valid until proven otherwise.
- *istiṣlāḥ* – juristic reasoning, based on the principle of seeking general or particular welfare.
- Mālikī – one of the Sunni schools of jurisprudence, named after Mālik ibn Anas al-Aṣbaḥī (d. 795 A.C.).

- *maṣlaḥa* – public interest. It is generally held that the principal objective of the *Sharīʿa* is to realize greater social benefit.
- *mujtahid* –- a jurist consult.
- *najāsa* – impurity such as saliva or blood from a dog or swine.
- *qiyās* – reasoning applying a known law to a new situation not covered in the original law.
- *rizq* – provisions that God destines for a person, in such forms as additional income, food, clothing, or a natural resource such as water.
- *ṣaḥāba* – companions of the Prophet (pbuh).
- *ṣalāh*, *ṣalāt* – worship that must be offered at least five times a day by every adult Muslim.
- *salām* – peace and harmony of people between themselves or with nature; key word in an Islamic greeting.
- *Shāfiʿī* – one of the Sunni schools of thought in Islam, named after Muḥammad ibn Īdrīs al-Shāfiʿī (d. 820 A.C.).
- *Sharīʿa* – jurisprudence, Islamic law, moral code.
- *shūrā* – consultation among decision-makers and between decision-makers
- *sunna* – the way of the Prophet (pbuh): *sunna* comprises what the Prophet (pbuh) said, did, and encouraged, both explicitly and implicitly.
- *taqwā* – piety.
- Unanimous consensus – see *ʾijmāʿ*
- *ʿulamāʾ* (sing. *ʿālim*) – a general term used for religious guides and scholars who are recognized for their knowledge and leadership by Muslims.
- *uṣūl al-fiqh*: legal philosophy, how laws are derived/extrapolated
- *wuḍūʾ* – *abl*ution: the ritual cleaning of the body be*fore beg*inning an act of worship.
- zakā or zakāt – literally “the purification (of wealth);” one of the five pillars of Islam.

APPENDIX B

WASTEWATER TREATMENT AND REUSE

Wastewater treatment involves a number of different unit operations that are physical, chemical or biological, or a combination of these. Treatment can be thought of in 3 different stages namely primary treatment, secondary treatment and tertiary treatment. Primary treatment involves only physical processes while secondary treatment includes biological (and sometimes chemical) treatment as well. Lastly, tertiary treatment includes physical, biological and chemical treatment and in this stage, the quality of the water is improved prior to discharge (Tchobanoglous et al., 2013).

Primary Treatment

Primary treatment includes unit operations that allow unwanted particles such as rags, plastic, sand and grit to be removed physically. It also includes flow measurement and sometimes primary sedimentation which allows some organic material to be removed.

Raw Sewage Pumping

This is the first physical process which wastewater undergoes. If required, the influent sewage is pumped to a higher level which will allow the wastewater to gravitate through the remainder of the plant. This pumping is normally accomplished by Archimedean screw pumps, although other pumps can also be used.

Screening

Screening is used to remove any large rags, plastic or other objects which may cause pipe blockages or damage pumps. Screening is accomplished by means of either large or fine bar screens, or a combination of both. There are many different types of screens available ranging from fully mechanically raked screens, to screens which need to be raked manually. The screened material is normally disposed of either by burial at smaller works, or incineration at larger works.

Flow Measurement

Based on principles of hydraulics, flow measurement is conducted at the plants. This is for information purposes and allows efficient operation of the plant. Parshall flumes are typically used for flow measurement as well as a flow measuring device.

Grit Removal

Grit and sand which accumulate in wastewater treatment plants can reduce the life of mechanical equipment due to abrasion. For this reason, grit and sand needs to be removed during primary treatment. This is accomplished using degritters. The principle behind them is simply based on the settling velocity of different sized particles. Larger particles settle with greater ease than smaller particles. So since grit and sand are larger in size than organic

material, the velocity in the grit chamber is maintained such that the grit is able to settle, but the organic material remains suspended.

The grit is washed prior to disposal in the event that some organic material was removed with the grit. The cleaned grit is disposed of either at a hazardous landfill site, or buried with the screenings.

Primary Sedimentation

Primary sedimentation takes place in a primary settling tank (PST) and allows certain material (which is able to settle in a given period of time) to settle out of the wastewater, thereby reducing the organic load on the plant. This results in smaller reactors for downstream processes and lower aeration requirements. The settleable material (termed primary sludge) which is removed by primary sedimentation is typically treated using anaerobic digestion, which can either be heated digestion (at 35°C) or cold digestion (which takes place at ambient temperatures). PSTs can either be circular or rectangular and there are also different configurations available to remove the settleable solids.

Secondary Treatment

In secondary treatment, the settled sewage (following primary sedimentation) or raw sewage (if primary sedimentation was omitted) undergoes biological treatment followed by physical separation of the solids from the liquid phase.

Biological Treatment

Biological treatment can either take place in trickling filters, activated sludge reactors or oxidation/anaerobic ponds. The effluent quality from ponds is usually unpredictable with large variations and so discharge to a river or other surface water body is not permitted. Trickling filters are typically 2 m deep stone beds and settled sewage is distributed evenly over the stones. Trickling filters are fixed film biological reactors and the bacteria grow on the stones (or alternatively plastic media). Oxygen is provided by an air draft that flows through the spaces in the stones which allows the bacteria to grow (provides the correct conditions). Any solids which slough off the stones are settled out in a humus tank and these solids are called humus sludge. The humus sludge undergoes treatment with the rest of sludge from the plant.

Activated sludge is a very common means of biological treatment and can remove organic material, nitrogen components as well as phosphorous components, given the correct conditions. Activated sludge reactors consist of a series of tanks and the tanks are either aerated (meaning that oxygen is supplied and hence dissolved into the water) or non-aerated, and instead only mixed with mechanical mixing devices. The mixing devices and aeration equipment allow the solids (or sludge to remain suspended and prevent it from settling). Removal of organic material, some nitrogen component and phosphorus components is accomplished by biological transformations in the reactor which allows it to form organism mass. The remaining nitrogen components are removed through a conversion of these components to nitrogen gas which then escapes to the atmosphere.

In order to control the mass of sludge in the reactor which ensures a specific length of time which the solids remain in the reactor, sludge must be harvested from the reactor (common practice in South Africa, although other countries harvest sludge from the SST underflow). This sludge requires further sludge treatment in the sludge treatment facilities along with the humus sludge and primary sludge.

Secondary Settling

The sludge as well as the biologically treated wastewater from the activated sludge reactor are then passed to a secondary settling tank (SST) where the solids are allowed to settle out of suspension. The solids settle to the bottom of the tank and is recycled to the head of the system where it is used to continue treating the incoming sewage. The clear water (free of solids) overflows around the top of the settling tank and this undergoes tertiary treatment.

Tertiary Treatment

Maturation Ponds

Maturation ponds are used as a means of stabilization and a final buffer prior to discharge into a river or other body of water. The water is normally held in earth dams for a period of 30 days. If water is required for reuse by industry, or other uses which does not require potable standards, water is normally abstracted from the ponds.

Disinfection

Disinfection of the effluent (from the clear overflow at the SST) is accomplished using either chlorination or UV light. In South Africa, chlorination is more commonly used. This allows some of the remaining pathogens to be killed prior to discharge of the water into a river or lake. Many countries across the world are tending towards disinfection with UV instead since chlorine gas is toxic and can also result in explosions. However, using UV light requires that the final effluent be clear in colour so that the light may be efficiently absorbed into the water. Effluents in South Africa are not typically clear due to the poor operation of the plant and hence chlorine is seen to be more advantageous than UV treatment.

Water Treatment Unit Operations[3]

From the wastewater treatment plant, the effluent is discharged to a river or lake (for indirect reuse) and downstream of this, the water is abstracted and water treatment allows the water to be treated to potable standards (drinking and household use).

There are a number of objectives within water treatment namely, to remove the colour, removal of suspended material, disinfection, corrosion protection and lastly, water softening.

[3] This section was written using information from (Ekama, n.d.-a; Sincero & Sincero, 2002).

Removal of Colour and Suspended Material

In some areas, such as the Western Cape in South Africa, the water has a natural brown colour to it, although it's clear. In this region, the colour is primarily due to the vegetation in the area and is caused by humic and fulvic acids (Flower, 2004). Although this colour is not directly harmful, if not removed prior to disinfection, the hypochlorous acid (HOCl – from disinfection) combines with the humic and fulvic acid to form chloroform ($CHCl_3$) which is a carcinogen.

Suspended material shields the bacteria and viruses from disinfection and hence this needs to be removed. It may also cause abrasion to pipes and reduce their lifespan. Some particles cannot settle by filtration alone due to their size (too small) and in addition, filtration alone will not remove the colour in the water. A number of steps needs to be followed to facilitate the removal of colour and suspended solids.

Coagulation

The addition of iron chloride allows smaller particles to form long chain molecules which increases their size. The chemical is known as a coagulant and must be accompanied by high energy mixing in order for these long molecules to form. In addition, the humic and fulvic acid also form larger colloids due to the addition of the coagulant coupled with mixing.

Flocculation

By applying slower mixing, particles are brought closer together and this facilitates the formation of flocs. Flocs settle easier due to the physical size. The mixing intensity is important because if the intensity is too high, the floc breaks up, whereas if the intensity is too low, settlement may occur which prevents the formation of larger flocs.

Settling

Settlement of the water takes place once sufficient flocs have formed. Settlement by means of gravity in settlement tanks is the most common means of settling although there are other technologies available. The collected solids (sludge) requires separate disposal.

Filtration

Filtration allows the removal of any residual flocs such as sand or other particles which were too small to settle in the given time. Filtration can either be slow rate filtration which uses fine sand as the filtration medium, or rapid sand filters which uses coarse media instead. Slow sand filters require a larger area and more difficult and labour intensive to clean while rapid sand filters by means of backwashing.

Disinfection

Disinfection allows all remaining pathogens in the water to be killed. The pathogens could have been residual pathogens not killed during treatment at the wastewater treatment plant, or these pathogens could have originated from the time the water spent in the river. Removal of pathogens prevents diseases which is a threat to human life. This disinfection is normally

obtained by the addition of chlorine (by the addition of hypochlorous acid). An alternative is UV disinfection, but this requires no turbidity in the water (clear water).

Corrosion Protection

The addition of lime (calcium hydroxide) in slight excess to the treated water, such that the water is saturated or slightly supersaturated with calcium ions, allows a corrosive protective layer to form on the inside walls of the distribution pipes. This layer is made up of calcium carbonate formed from the calcium ions in the lime, together with dissolved carbonate ions present in the water.

Water Softening

Hardness refers to the mineral content in the water specifically calcium and magnesium ions. The correct water hardness must be maintained. If the water is too hard, it forms scum with soaps, and also forms scales and lime deposits in boilers and kettles.

Water softening involves the removal of some of the calcium and magnesium ions by precipitation by the addition of hydroxide (either sodium or calcium hydroxide). If the water is too soft, it can be corrosive and aggressive to concrete. This is usually resolved by the addition of calcium ions, usually as lime.

PATHOGENS AND FOREIGN BODIES IN WASTEWATER

The main purpose of wastewater treatment and water reclamation is to deal with dangerous pathogenic microbial pathogens, high levels of suspended and dissolved inorganic and organic substances, and concentrations of chemical constituents. These bodies in water threaten the safe use of water. In the following overview, data is taken from the Report of Crook et al. (2005) that outlines the effectiveness of treatment, but also the areas on which more research is required. The Report lists and discusses the various pathogens that appear in wastewater, but also those that exist in water ordinarily used by humans. Microbiologists and public health officials have warned against new, emerging, and re-emerging pathogens, and strongly advocate that these warrant equal attention in the treatment standards of wastewater.

Some of the selected emerging and re-emerging waterborne pathogens are listed in *Table 2* below, which have been found in municipal wastewater. Reviewing the Table shows that fungi (i.e., yeasts and moulds) exist in abundance, but only a few are known to be pathogenic to humans. More research is needed on these, as they can contribute to water-borne disease infections. Another concern identified is two types of aquatic microorganisms (aeromonads and cyanobacteria) that scientists argue are cause for concern for potable reuse systems as they have a tendency to bloom if sufficient nutrients are present in the water (increasing the production of toxins in the water).

Table 6: Emerging and Re-emerging Waterborne Pathogens of Public Health Concern

Bacteria	Viruses	Protozoa
Agrobacteria	Adenoviruses	*Acanthamoeba*
Aeromonas hydrophila	Astrovirus	*Cryptosporidium parvum*
Campylobacter (including *C. jejuni*, *C. coli*, and related species	Coxsackie viruses	*Cyclospora cayetanensis*
	Echoviruses	*Giardia lamblia*
Helicobacter pylori	Enteroviruses	Microsporidia
Legionella spp.	Hepatitis viruses	*Toxoplasma gondii*
Mycobacterium avium complex	Norwalk/Caliciviruses	
Pathogenic *Escherichia coli*	Rotavirus	
Pseudomonas aeruginosa		
Yersinia enterocolitica		

The Crook et al. Report describes the molecular techniques employed universally for the purposes of assessing water for the existence of pathogens. This process is organism-specific and often only indicates the presence or absence of genetic material in the sample, and not the concentration or viability. The utility of this treatment process is limited in evaluating the safety of reclaimed water for any particular use (Crook et al., 2005, p. 5). However, the Report also mentions the impracticality of monitoring reclaimed water for all microbial pathogens.

Chemical elements in the use of reclaimed water for irrigation or other non-potable applications seem to have minimal health concerns. Even wastewater that contains significant amounts of toxic industrial wastes such as pesticides, heavy metals, and organic chemicals, can be treated with conventional wastewater treatments. They are not expected to present any risks to health from contact or inadvertent infrequent ingestion of reclaimed water. But the Report still carries the following warning: “The health effects related to the chemical constituents are of primary concern with regard to potable reuse” (Crook et al., 2005, p. 6). The Report further warns that organic and inorganic chemical constituents need to be considered for water used for irrigation, or where such use reaches potable groundwater supplies, or where organics may bioaccumulate in the food chain (e.g. in aquaculture applications).

The effects of physical parameters (e.g., pH, colour, temperature, and particulate matter) and chemical constituents (e.g., chlorides, sodium, and heavy metals) are well known, and recommended limits guidelines have been developed (Crook et al., 2005, p. 9).

The presence of organic compounds with health significance is currently not established. However, traditional measures of organic matter in wastewater are used as measures of treatment efficiency and general water quality. It is important to point out, though, that such measures are not sufficient indicators to ascertain the safety of reclaimed water, since many chemicals are carcinogenic or otherwise hazardous at levels far below that commonly measured.

Greater concern for human health associated with pharmaceuticals, hormones, and other organic wastewater contaminants have entered the debate on the quality of reclaimed wastewater (Crook et al., 2005, p. 8). For example, chemicals that interfere with endocrine systems of humans and wildlife are termed endocrine disrupting compounds (EDCs) and those chemicals in humans that elicit a pharmaceutical response are called pharmaceutically active compounds (PhACs). There are more than 4 000 compounds reported that demonstrate endocrine disrupting properties, primarily in relation to estrogenic effects. More than 60 identified PhACs impact the endocrine system of animals or humans in nanogram/litres (ng/l) or lower concentrations in the ecosystem. Pharmaceuticals and personal care products (PCP/ PPCPs) including prescription and over-the-counter drugs, fragrances, cosmetics, sun screen agents, and diagnostic agents contain a broad and diverse collection of thousands of chemicals, and many other compounds (Crook et al., 2005, p. 8).
Of equal significance is the realization that EDCs are found in all types of waters (i.e. groundwater, surface water, drinking water, and treated wastewater) with concentrations of different classes of EDCs ranging from ng/l to μg/l levels. More importantly, the report notes that it is not viable to monitor the entire spectrum of potential EDCs. A priority list has therefore been developed and is listed in Table 3. This list provides a basis for credible analytical determination of EDCs in water and is subject to change as more becomes known on the subject. The Report pointed out that findings from data collated had focussed predominantly on the impact on the aquatic environment, and adverse effects on aquatic animals such as frogs and fish**.** While the impact on human health was not part of the research, the Report refers to several researchers who have conducted risk evaluations on human health and concluded that there is no appreciable risk at these low levels found in drinking water. But the report adds that the information on the impact of toxicological data on the impact on humans and the environmental significance of PhACs with regard to subtle long-term effects are lacking. A strong recommendation by experts is to limit human exposure to these substances (Crook et al., 2005, p. 8).

The Report highlighted that commonly used pharmaceuticals were removed or reduced in concentration by microbial degradation, and adsorption to particulates that are removed during wastewater treatment, or by biotransformation. However, research on wastewater samples collected at several wastewater treatment plants in California indicated, for example, that

> … secondary effluent contains estrogenic hormone concentrations comparable to those that cause vitellogenesis (i.e., feminization) in fish and that filtration of secondary effluent removes approximately 70% of the hormones from secondary effluent (Crook et al., 2005, p. 9).

In delineating the various treatment processes for reclamation the Report points out that activated sludge secondary treatment removes EDCs more effectively than secondary treatment using the trickling filter process. Further, long retention times and nitrification/de-nitrification during activated sludge treatment enhanced removal of EDCs. While conventional secondary and tertiary treatment efficiently removes some pharmaceuticals, removal or reduction of others is highly variable. Advanced wastewater treatment processes

such as reverse osmosis are capable of removing most EDCs and PhACs to undetectable levels in the product water. Ozone also is an effective treatment process to reduce the concentrations of many of these chemicals to low levels.

Table 7: Global Water Research Council (GWRC) Priority List of Endocrine Disrupting Compounds Pesticides and Herbicides

<table>
<tr><td colspan="2">Aldrin α-Endosulphan Metoxychlor
Cyhexitin β-Endosulphan Parathion
DDT Endrin Simazine
DDE Heptachlor Terbutylazine
DDD Heptachlor epoxide Tributylin
Dieldrin Isodrin Vinclozolin
Endosulphan-sulphate Lindane (-BHC)</td></tr>
<tr><td>Hormones
17α-ethinylestradiol
17β-estradiol
Estriol
Estrone</td><td rowspan="3">Industrial Chemicals
Bisphenol A
Glycol ethers
p-Nonylphenol
p-Octylhenol
PCB (total)
Phthalates: DBP, DEPH</td></tr>
<tr><td>Heavy Metals
Cadmium</td></tr>
</table>

A review of the scientific literature did not provide any information on whether or not pharmaceuticals and endocrine disrupting compounds become concentrated in vegetation or in soil irrigated with reclaimed water. Drugs detected in the environment are generally in the µg/L-ng/L range and many have short half-lives (i.e., they do not persist for long periods in the environment) and may not pose much acute risk. Nevertheless, the report continues to warn that

> … there is increasing concern regarding antibiotic resistance in microbial pathogens. There is a correlation between antibiotic use and the appearance of antibiotic-resistant bacteria in the environment health risk implications (Crook et al., 2005, p. 10).

Table 8: Concentration Ranges of Some Endocrine Chemicals in Secondary-Treated Municipal Wastewater Compound

Endocrine Disrupting Chemicals	**Concentration In Secondary Effluent**
Estrogen (ng/L)	1.4-76
Testosterone (ng/L)	50
Estrone (ng/L)	1.4-7.6
17β-estradiol (ng/L)	2.7-48
Estriol (ng/L)	<0.2-37
17α-ethinylestradiol (ng/L)	<0.3-9
Bisphenol A (ng/L)	20-50
Alkylphenols (total) (µg/L)	27-98

The spread of resistant genes between different bacterial species is enhanced in the presence of biomass and nutrients, and thus is an important factor in the spread of resistance in matrices containing wastewater. An increasing level of antibiotic resistance of micro-flora in the gastrointestinal tract of humans may be transferred to infectious pathogens and severely affect the effectiveness of medically-prescribed antibiotics.

> More studies are needed to determine the extent and gravity of antibiotic-resistance in microorganisms and microflora as a result of the presence of PhACs in municipal wastewater (Crook et al., 2005, p. 11).

The Global Water Research Coalition categorized some knowledge gaps and research needs related to EDCs and PhACs in water.

APPENDIX C

SUBMISSIONS RECEIVED FROM RELIGIOUS SCHOLARS ON WATER RECLAMATION AND ISLAM

- Jumu'ah (Friday) Khutbah on the conservation of Water
- Response from Mawlana Muhammad Allie Moosagie
- Response from Mufti Siraj Desai
- Response from Jamiatul Ulama, KwaZulu-Natal

Sh. Dr. Muhammad Ridwaan Gallant

The Environmental Desk of the Muslim Judicial Council./SAFCEI

Jumu'ah Khutbah on the conservation of water

Khutbah -Islam and Water Conservation

NB Khutbah may be performed on any Friday in March

Insha-Allah

Background to Khutbah

SECTION 1

N.B The first section is a general discussion on the issues concerning water conservation This is for the Khatib's info only. The aim is to sketch a brief background on water conservation.

Introduction

South African citizens will be having water awareness week during from 16thth to 22nd of March 2015.

The khutbah will deal how we can approach water conservation from an Islamic point of view.

Over the last year water scarcity and water crisis have become a concern in many part of South Africa. Areas in the Karoo water had import water from other areas. Drought threatened the Southern Cape. The Western Cape received a below average rainfall for the first time in five years.

Water is being wasted at an alarming rate everyday. We use large quantities of water to wash our cars, spend more than half an hour washing ourselves and waste when taking wu'du when only a small quantity would have sufficed. All sectors of society do not realize the importance of conserving a resource that is decreasing in availability every year.

In general, South Africa is a dry country. Water restrictions are becoming the norm in an effort to ensure that the country has sufficient water supply throughout the year. However, people are still wasting water. Water resources need to be managed in an integrated manner to ensure that everyone can benefit from it, now and in the future. This means that water needs to be used efficiently and fairly and at the same time, we need to protect out water resources.

Three-quarter's of the Earth's surface is covered with water, little wonder it has been called the Blue Planet. Of this, 94% is in the form of salt water and 6% can be found in rivers, springs, wetlands, underground aquifers and glaciers

As Muslims we need to reflect on the wonders of Allah (TA) and on the great Mercy Allah (TA) shown us by providing us with sustenance in the form of water for without water, we cannot grow crops nor perform our daily ablutions nor provide our animals with water.

SECTION 2

This section is for the *Pre-Khutbah* talk.

The name of الله has a double shaddah. This is due to the fonts- please ignore one. I tried to rectify it but it is not easy.

The Islamic View on Water Conservation

The Khutbah : English-Arabic

Allah speaks about the importance of water in the Quran. Allah (TA) says:

وَأَنزَلْنَا مِنَ ٱلسَّمَآءِ مَآءً بِقَدَرٍ فَأَسْكَنَّاهُ فِي ٱلأَرْضِ وَإِنَّا عَلَىٰ ذَهَابٍ بِهِ لَقَادِرُونَ

And we send down water from the sky (rain) in (due) measure,
and We gave it lodging in the earth, and verily, We are able to take it away.
(Surah al-Mu'minun 23:18)

Allah mentions His innumerable blessings to His servants, whereby He sends down rain in due measure, meaning, according to what is needed, not so much that it damages the lands

and buildings, and not so little to be insufficient for crops and fruits, but whatever is needed for irrigation, drinking and other purposes

All living species are dependant on water. Water is a life-sustaining and purifying resource. According to the Quran the origin of every living thing is in water.

وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ

And We have made from water every living thing. (Surah al-Anbiya 21:30)

Allah sends the water as sustenance to his creation. Subsequently man and beast will benefit from the vegetation as stated in the Holy Quran: **"It is He Who sends down water from the sky; and with it We produce vegetation of all kinds… "** (Qur'an, 6:99).

وَهُوَ ٱلَّذِيٓ أَنزَلَ مِنَ ٱلسَّمَآءِ مَآءً فَأَخْرَجْنَا بِهِۦ نَبَاتَ كُلِّ شَيْءٍ

The precipitation is a blessing and provision for the servants of Allah, it is a relief and means of survival for His creatures and it is a mercy for His creation.

Water fulfils many functions in our society. Water is the mainstay of human society - early civilisations were concentrated in river basins, such as the Nile, Ganges, Tigris and Euphrates river basins. Water is used by households, industry, agriculture and also forms the habitat for marine and freshwater plants and animals, an important food source for many societies. Water is thus the basis of life and plays an indispensable role in the sustenance of all life on this earth.

It is a matter of fact that life on earth will not be possible without the presence of water. Man only realizes the value of water when there is a shortage. The Quran describes how water resuscitates the earth. **"And Allah sends down water from the skies, and gives therewith life to the earth after its death…"** (Qur'an, 16:65)

وَٱللَّهُ أَنزَلَ مِنَ ٱلسَّمَآءِ مَآءً فَأَحْيَا بِهِ ٱلأَرْضَ بَعْدَ مَوْتِهَآ

Without the rain the earth is lifeless. When the rain comes the earth becomes alive. Plants start to grow, flowers begin to bloom, man and animals can quench their thirst and benefit from the plants. A whole life cycle starts to bloom.

Man does not appreciate the preciousness and the benefits of water. If the water would have been salty, sour, bitter it would have been unfit for drinking purposes as well as for the growing of plants. The Dead Sea in the Middle East is a good example where no plant or animal life is possible due its high salt content. Allah says in the Quran:

أَفَرَءَيْتُمُ ٱلْمَآءَ ٱلَّذِى تَشْرَبُونَ * أَءَنتُمْ أَنزَلْتُمُوهُ مِنَ ٱلْمُزْنِ أَمْ نَحْنُ ٱلْمُنزِلُونَ * لَوْ نَشَآءُ جَعَلْنَـٰهُ أُجَاجاً فَلَوْلاَ تَشْكُرُونَ

"See you the water which you drink? Do you bring it down (in rain) from the cloud or do We? Were it Our Will, We could make it saltish. Then why do you not give thanks?" (Qur'an, 56:68,69,70).

In the life of a Muslim, water also has a socio-religious function in that it is used for ritual purification. Cleanliness of one's person and one's surroundings is stressed in Islam. Allah says in the Quran:

وَهُوَ ٱلَّذِيۤ أَرْسَلَ ٱلرِيَاحَ بُشْرَى بَيْنَ يَدَيْ رَحْمَتِهِ وَأَنزَلْنَا مِنَ ٱلسَّمَآءِ مَآءً طَهُوراً

> And it is He Who sends the winds as heralds of glad tidings,
> Going before His Mercy (rain);
> And We send down pure water from the sky.
>
> (Surah al-Furqaan 25: 48)

Every living species on the earth must have a right to water. The supply and preservation of fresh water was always regarded as of fundamental importance since the time of the Prophet (SAW). This can be deduced from the following hadith: "**All Muslims are partners in three things: water, herbage and fire and to sell it is prohibited."** (Ibn Maja :1990).The rulers must make provisions for people to have access to water.

حدّثنا عَبْدُ اللَّهِ بْنُ سَعِيدٍ. حَدَّثَنَا عَبْدُ اللَّهِ بْنُ خِرَاشِ بْنِ حَوْشَبٍ الشَّيْبَانِيُّ، عَنِ الْعَوَّامِ بْنِ حَوْشَبٍ، عَنْ مُجَاهِدٍ، عَنِ ابْنِ عَبَّاسٍ

، قَالَ: قَالَ رَسُولُ اللَّهِ: «الْمُسْلِمُونَ شُرَكَاءُ فِي ثَلاَثٍ: فِي الْمَاءِ وَالْكَلأِ وَالنَّارِ. وَثَمَنُهُ حَرَامٌ

سنن ابن ماجه

In Islam it is not permissible to withhold excess water where there are others who have need of it. The Prophet (SAW) declared: "**Excess water should not be withheld so that the growth of herbage may be hindered"** (Muslim:1993 :Vol3A: 38 no. 1566).

عَنْ أَبِي هُرَيْرَةَ ،؛ أَنَّ رَسُولَ اللَّهِ قَالَ «لاَ يُمْنَعُ فَضْلُ الْمَاءِ لِيُمْنَعَ بِهِ الْكَلأُ».

صحيح مسلم

If water is withheld then it will hinder the growth of herbage which is important for the fodder of animals. Excess water should also not be withheld from usage by animals (An-Nawawi:1995:193-194).

Unfortunately, despite the value of this great blessing, we seldom express our gratitude but rather take it for granted and overuse, pollute and waste this precious resource.

Extravagance in using water is forbidden; this applies to private use as well as public, and whether the water is scarce or abundant. The Prophet (SAW) emphasized the proper use of water without wasting it.
When the Prophet (SAW) saw Sa'd performing wudu he said : **"What is this? You are wasting water."** Sa'd replied: Can there be wastefulness while performing ablution? The Prophet (SAW) replied: "**Yes even if you perform it in a flowing river."** (Ibn Maja : 1990 : Vol. 1: 147:no.425).

عَنْ أَبِي عَبْدِ الرَّحْمٰنِ الْحُبُلِيِّ، عَنْ عَبْدِ اللَّهِ بْنِ عَمْرٍو

،أَنَّ رَسُولَ اللَّهِ مَرَّ بِسَعْدٍ، وَهُوَ يَتَوَضَّأُ. فَقَالَ: «مَا هٰذَا السَّرَفُ؟» فَقَالَ: أَفِي الْوُضُوءِ إِسْرَافٌ؟ قَالَ: «نَعَمْ. وَإِنْ كُنْتَ عَلَى نَهْرٍ جَارٍ».
سنن ابن ماجه

In addition to encouraging water conservation, the Prophet SAW) himself set the example; for instance it is narrated by Anas: **The Prophet (SAW) used to take a bath with one Sa'a (one Sa'a equals 2.6 litre) of water and used to take ablution with one Mudd (2/3 litre) of water.(** Bukhari:1986: Vol.1:135 no.201).

حدَّثني ابنُ جَبْر قال: سَمعتُ أَنَساً يقول: كان النبيُّ صلى الله عليه وسلم يَغسِلُ ـ أو كان يَغتَسِلُ ـ بالصاعِ إلى خمسة أمدادٍ، ويَتوضَّأ بالمُدِّ.

صحيح البخاري

Imam Al-Ghazzali said that if one were to have a bath one should not keep pouring water continuously, but should restrict oneself to the amount needed Al-Ghazzali, The Revival of Islamic Sciences, vol. 1, p. 139

The Muslim scholars understood from this the importance of water conservation and they have discussed it in their writings. (Abu Bakr al-Jaza'iri, Minhaj Al-Muslim Dar Al-Shuruq: 1991, p. 267

Wise use of our natural resources, keeping in mind the preservation of the common good, is thus a key principle of natural resource management in Islam. The basic principles that relate to natural resource management in Islam have been outlined in a book entitled, *Environmental Protection in Islam*. This book was produced for the World Conservation Union and set out the principles as follows:

- The Creator is the real owner of everything in the universe – humans are only trustees who are answerable for our actions. Thus we are accountable for our use of all resources, including water;

- There should be no damage or infliction of damage to any other being. We should not abuse the rights of any other being while securing our access to water, or any other resource;
- Humans have a right to benefit from environmental resources, however if they inflict damage to that resource, then they are held liable to repair the damage as the rights of the whole society has been violated ;
- The benefit of a thing is in return for the liability attached to it. A good example to provide here is the construction of dams which holds benefit in the supply of water, yet it also has liabilities attached to it. Thus, careful consideration of alternatives is required to reach a decision on a particular action;
- The ruling authority must secure the common good and eliminate injuries to society. There is an onus on the authority to manage water resources and to protect the interests of the society as whole;
- All acts are evaluated in terms of their consequences as social goods or benefits and social detriments and evils. Thus, planners, administrators and designers must strive for achieving the common good of all created beings.

Another principle applied to the use of water resources is: "whatever fulfills and helps to achieve the basic necessities of our live is itself a necessity." By misusing water, a vital resource, through pollution or misuse, we are in fact tampering with its function as the source of life, leading to disease, sickness or even death of life itself.

These principles formed the basis of water law in most Muslim societies, which were largely located in dry areas. The use of these principles, based on guidance from the Qur'an and the Sunnah, defined water rights in Islam.

Water was generally regarded as common property, to be shared, allocated and managed for the collective benefit of all. This was put into practice by such great leaders as Sayyedinaa Uthmaan (RA) the third Khaliph, who established a precedent by purchasing a well and making it freely available for public use.

Water is most often regarded as public (rivers, springs and wells). However, where a private landowner invests labour into digging a well on his/her property, the rights to that water rests with the landowner. However, a number of conditions still govern this private use, for example in times of stress, water should be shared. There is thus strong disapproval of practices where water is controlled for individual benefit, thereby causing hardship and shortages for others. Water is thus regarded as a public concern and practices that result in pollution, wastage and misuse of water is not permitted.

The principles of the shari'ah no longer forms the basis for water laws in Muslim countries. Up to 1926, many countries under Ottoman rule applied the Turkish law (known as the *Mejelle* or Ottoman Civil Code) which incorporated shari'ah principles. In Turkey, these laws were replaced by new water laws based on the Swiss Civil Code, thus repealing all shari'ah-based laws. Many other countries followed suit.

In a semi-arid region such as the Middle East, where the majority of watercourses are shared with other countries, co-operation in water resources management is critical. It has been said that the next war in the Middle East will be fought over water, not politics. Water therefore plays a crucial role in Middle Eastern politics, particularly in the Tigris-Euphrates river basin which supplies water to Turkey, Syria and Iraq and the Jordan River, supplying water to Israel and a number of Arab countries.

The value and importance of shari'ah principles, which formed the basis of water rights in many Muslim societies, has much to contribute to creating a co-operative water management

system. Similarly, it lays the foundation for the wise use of natural resources by the individual. In our lives, water fulfils a vital function. We need to transform our understanding of the lessons and teachings of the Qur'an and Sunnah into action.

Practical tips to incorporate wise use of water in our everyday lives:

- Use water sparingly;
- Check for leaks and dripping taps;
- Water gardens in the cool of the evening or early morning to reduce evaporation;
- Recycle washing water onto your garden;
- Turn off the tap while brushing your teeth;
- Have shallow baths or a quick shower;
- Install water-saving devices or simply place a brick in your cistern to reduce the amount of water (toilets flush away about 11 litres of water);
- If possible, plant indigenous plants which are adapted to the local environment as these require less water;
- Use water sparingly when performing wudhu (ablution) or ghusl (purification bath);
- Encourage mosques in your area to install water-saving taps or to investigate ways of recycling wudhu water e.g. for use in gardens;
- Report any signs of leakages or pollution to your local authority;
- And never dump waste in rivers, seas or wells.

We need to teach our children to use water sparingly. To think of the water that was wasted that could have been used by others. The rivers, streams and dams in our country cannot continue to supply us with water if we continue to have blasé attitudes about water and to think only of ourselves and not of the people dying of thirst across the world.

Sh. Dr. Muhammad Ridwaan Gallant

The Environmental Desk of the Muslim Judicial Council./SAFCEI

الخطبة في اللغة العربية

الحمد لله نحمده ونستعينه ونستغفره ونؤمن به ونتوكل عليه ونعوذ بالله من شرور أنفسنا ومن سيئات أعمالنا من يهده الله فلا مضل له و من يضلله فلا هادي له

و أشهد أن لا إله إلا الله وحده لا شريك له و أشهد أن محمدا عبده ورسوله

اللهم صل على عبدك ورسولك محمد , وعلى اله وصحبه , وسلم تسليما كثيرا

أما بعد فيا عباد الله أو صيكم ونفسي أولا بتقوى الله تعالى وطاعته

قال الله تعا لى

وَأَنزَلْنَا مِنَ ٱلسَّمَآءِ مَآءً بِقَدَرٍ فَأَسْكَنَّاهُ فِي ٱلأَرْضِ وَإِنَّا عَلَىٰ ذَهَابٍ بِهِ لَقَادِرُونَ

قال الله تعا لى

وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ

قال الله تعا لى

وَهُوَ ٱلَّذِيۤ أَنزَلَ مِنَ ٱلسَّمَآءِ مَآءً فَأَخْرَجْنَا بِهِ نَبَاتَ كُلِّ شَيْءٍ

قال الله تعا لى

وَٱللَّهُ أَنْزَلَ مِنَ ٱلْسَّمَآءِ مَآءً فَأَحْيَا بِهِ ٱلأَرْضَ بَعْدَ مَوْتِهَآ

قال الله تعا لى

أَفَرَءَيْتُمُ ٱلْمَآءَ ٱلَّذِى تَشْرَبُونَ * أَءَنتُمْ أَنزَلْتُمُوهُ مِنَ ٱلْمُزْنِ أَمْ نَحْنُ ٱلْمُنزِلُونَ * لَوْ نَشَآءُ جَعَلْنَـٰهُ أُجَاجاً فَلَوْلاَ تَشْكُرُونَ

قال الله تعا لى

وَهُوَ ٱلَّذِيۤ أَرْسَلَ ٱلرياَحَ بُشْرَى بَيْنَ يَدَيْ رَحْمَتِهِ وَأَنزَلْنَا مِنَ ٱلْسَّمَآءِ مَآءً طَهُوراً

حدّثنا عَبْدُ اللَّهِ بْنُ سَعِيدٍ. حَدَّثَنَا عَبْدُ اللَّهِ بْنُ خِرَاشِ بْنِ حَوْشَبٍ الشَّيْبَانِيُّ، عَنِ الْعَوَّامِ بْنِ حَوْشَبٍ، عَنْ مُجَاهِدٍ، عَنِ ابْنِ عَبَّاسٍ

، قَالَ: قَالَ رَسُولُ اللَّهِ: «الْمُسْلِمُونَ شُرَكَاءُ فِي ثَلاَثٍ: فِي الْمَاءِ وَالْكَلأِ وَالنَّارِ. وَثَمَنُهُ حَرَامٌ

سنن ابن ماجه

عَنْ أَبِي هُرَيْرَةَ ،؛ أَنَّ رَسُولَ اللَّهِ قَالَ «لاَ يُمْنَعُ فَضْلُ الْمَاءِ لِيُمْنَعَ بِهِ الْكَلأُ».
صحيح مسلم

عَنْ أَبِي عَبْدِ الرَّحْمٰنِ الْحُبُلِيِّ، عَنْ عَبْدِ اللَّهِ بْنِ عَمْرٍو ،أَنَّ رَسُولَ اللَّهِ مَرَّ بِسَعْدٍ، وَهُوَ يَتَوَضَّأُ. فَقَالَ: «مَا هٰذَا السَّرَفُ؟» فَقَالَ: أَفِي الْوُضُوءِ إِسْرَافٌ؟ قَالَ: «نَعَمْ. وَإِنْ كُنْتَ عَلَى نَهْرٍ جَارٍ».
سنن ابن ماجه

حدَّثني ابنُ جَبْر قال: سَمعتُ أَنَساً يقول: كان النبيُّ صلى الله عليه وسلم يَغسِلُ ـ أو كان يَغتَسِلُ ـ بالصاعِ إلى خمسة أمدادٍ، ويَتوضَّأ بالمُدِّ.
صحيح البخاري

تأليف : د. محمد رضوان جلنت

May the mercy and grace of Almighty Allah prevail with eternally? May Allah reward you amply for your response.

If one looks at the issue of *najasah* in the Shariah, one is compelled to concede the following:

1. It is physical, visible and tangible in nature.
2. It has intrinsic properties which are easily and clearly discernable through the human senses of smell, touch and sight. In other words, *najasah* is neither invisible nor undetectable through the human senses.
3. There is a distinction between *najasah per se* and its impact on water. Although *najash* in its original form, will always manifest its intrinsic properties, it may be absorbed by the water resulting in its intrinsic properties being neutralized to the extent that they are no longer discernable via the human senses. If this occurs in a small quantity of water then its impact has major ramifications in terms of the Shariah. The example of urine mixed with a small quantity of water. Although the urine (*najasah*) in its original form manifested its intrinsic qualities, it became neutralized by the water. In this case, although the intrinsic qualities of the urine were neutralized by the water, and it (urine) is no longer discernable via the human senses, the water will be regarded as impure (*najis*). On the other hand, if urine mixes with a large mass (above two and a half cubic meters or 2500 liters) of water then it has no impact on the status of the water.

There are differing definitions on what constitutes a "small" quantity of water and what constitutes a "large" quantity of water. The classical *Fiqh* texts are replete with the definitions of the above.

For our purposes we need to consider the fundamental question which is; can polluted or impure (*najis*) water be restored to its original form, if all traces of the impurity (*najasah*) is effectively removed and neutralized?

Unfortunately, the classical works on *Fiqh* do not deal with water reclamation, thus an automatic inference is drawn that *najis* water cannot be purified. If it were possible to purify *najis* water, it is argued, the *Fuqaha* (jurists) would certainly have discussed it in their voluminous works. Thus, there are many who are of the view that *najis* water cannot be restored to its original form therefore they would restrict the use of reclaimed water to irrigation and as a limited cleaning agent. According to this view, *najis* water cannot be restored to its original form of *Tahur* (able to "ritually" cleanse) nor can it be consumed (potable).

I, however, differ with this view for the following reasons:

1. In terms of *usul al-fiqh*, when the *illah* (*ratio legis*) is removed, the *hukm* (ruling) changes. For, the *hukm* is based and contingent on the *illah*.
2. In the case of *najasah*, the *illal* are tangible.

3. If any substance sufficiently undergoes changes, its *hukm* changes.
4. Since there are no clear textual evidence governing water reclamation, any ruling will invariably be based on juristic discretion and *qiyas* (analogical reasoning), resulting in differing opinions.

In the light of the above, I will argue that during the reclamation process, the *najasah* was effectively removed and reutilized to the extent that the *illah* no longer exists. We are left with a body of reclaimed water that harbours no trace of the *najasah* which constituted the original *illah*. Since the *illah* which was the *najasah* is non-existent the *hukm* changes. Some might argue that once the *hukm* of *najis* was applied to water, it is "permanent" and cannot be reversed, even though the original *illah* was effectively and comprehensively neutralized. The ruling of the "permanent, irreversible" status of impure (*najis*) water appears to be based more on the fact that the *Fuqaha* did not discuss it, than on *usul al-fiqh* and juristic reasoning.

It is my view that, if any substance that is pure in its original form, becomes impure, it can potentially be restored to its original state of purity after the removal of the impurity and undergoing some form of "cleansing" procedure.

If one examines the case of *khamr* (wine), we note that although the Quran refers to *khamr* as "*rijsun*" or filth, its status changes when the *illah*, which in this case is the intoxicating agent, is effectively neutralized through some process. In the case of *khamar* which is unanimously regarded by the *fuqaha* as *najis* (impure), its *hukm* of impurity changes to pure once the *illah* is effectively neutralized. On the basis of the above precedent, can it not be argued that there is no "permanency" in a *hukm* of *najasah*? For, if the principle of "permanency and irreversibility" were to be applied to *khamr* then its status could never change from one of "*rijsun*" filth to one of *tahir* (clean). By way of *qiyas* (analogy) can it not be argued that if the "*rijsun*" status of *khamr* can be reversed so can the status of impure water? In both cases, the main consideration must be the *illah* and its impact on the *hukm*. Although there are major differences between *khamr* and *najis* water, the overarching *usuli* principle must be applicable to both cases, which is that there is no bases for permanency and irreversibility in the *hukum* of *najasah* on substances that are pure in their original form. In fact, the above seems to favour the direct opposite notion which is, that impurity is only impure as long as it contains the impure and defiling agent. Thus, it is my view that water is provisionally impure, i.e. as long as it contains the impure agent (*illah*) it will remain impure (*najis*) and whenever it overcomes and neutralizes the *illah* it will revert to its original pure state. Water is provisionally and not permanently and irreversibly impure when it is polluted by *najasah* and remain so as long as it contains that *najash*. But it reverts to its original state of purity once the *najasah* (*illah*) is effectively removed *(izalah al-ayn)*. This is further strengthen by the ruling that "a large body of water cannot be made impure" *(la unajisuhu shaya)*. In other words, once the *najasah* (*illah*) is removed from the contaminated (impure) water and added to a large body of water ("flowing water"), it is "cleansed" by the "flowing" of water. Thus, if a few hundred liters of impure (*najis*) water mixes with two thousand liters of pure water after the *najasah* was removed, the whole body of water will be

regarded as pure. Bearing in mind that two thousand liters of water is not much water in the first place. Some Fuqaha have even quantified “flowing or running water” as being far less than two thousand liters (some have defined “*kullatan*” as under three hundred liters). From the general tenor of the discretionary nature of quantifying “flowing” water one can deduce that impure water is only provisionally impure and whenever it undergoes some form of substantial “cleansing” process whether through adding it to other large quantities of pure water or through distillation, it reverts to its original pure form. If one holds the view that, once water has been declared to be impure (*najis*) its impure status is permanent and irreversible, then one has to concede that adding a hundred liters of *najis* water to two thousand liters of pure water cannot alter its status because its impurity is irreversible. Otherwise, it must be conceded that a portion of the two thousand liters of water is impure, which is clearly not the case. But, if one accepts that impure water is only provisionally impure, then it is easy to justify the concept of “flowing water” as expounded by the Fuqaha.

Moreover, even to those who are opposed to the view that impure water cannot be purified must however accept the fact that once the impure water had undergone the reclamation process and pumped into large reservoirs of pure water for distribution, it will become fit for both human consumption (potable) and permissible for ritual purification.

And Allah knows best.

Wassalaam

Ali Moosagie

Bismillahi Ta'ala

WATER RECLAMATION

These are my thoughts on the water reclamation issue, after reading the report titled *Water Reclamation and Shariah*.

Water reclamation is a process of purifying and re-using waste water. It is evident that waste water to a large extent contains sewerage water; there is, therefore, no doubt as to the *najaasat* or the impurity of waste water.

When water becomes najis or impure, there is absolutely no way that it can become taahir or pure once again. Hence, the Jurists of Islam have never discussed ways of purifying water per se. Yes, they would discuss the types of water that may be used in the process of purifying other items that have become impure, or purifying other liquids that have contracted impurities. But water purification has never come under any sort of fiqhi analysis. This is because water that has become contaminated by najaasat or impurity cannot be cleansed in any way, due to the intrinsic nature of water. Once impurities become diluted with water then such water will forever remain impure.

This much is clear that waste water per se is najis and impure. In any case, our discussion centres around waste water that has been recycled and after the recycling and reclamation processes have been completed, pumped into huge reservoirs for distribution to consumers.

The questions we are faced with are:

a) After recycling is that reclaimed water regarded as paak or pure in terms of Shariah?
b) If not, then after adding that water to a large body of clean or paak water, does the whole become taahir and fit for ritual use?
c) If not, will such water be allowed for industrial or agricultural use?
d) Will such water be permissible to use for washing clothing, utensils, and other items of daily use?
e) If the answer to question (b) is in the affirmative then will such water be allowed for wudhu and other forms of ritual purification?

In answer to question (a) my view is as stated earlier. Waste water is najis and can never be purified in any way. No doubt the elaborate purification and recycling procedures will ensure that all bacteria, silt, dirt, etc are removed from the water. The water will regain its natural look and natural propensities of having no colour, smell, or taste; But najaasat that has become inextricably diluted with every molecule of water can never be removed or separated from the water through any means of purification. For example, if urine falls into paak water, the entire mass of such water is contaminated. There is no way that such water can ever be purified. I have not come across any fiqhi precedent that provides an example of purifying water that has become najis. There is consensus among the Jurists that when a substance that is najisul-ayn, (whose very essence is impure), falls into a

limited amount of clean water then the entire body of water becomes impure or najis, regardless of whether any of the natural qualities of water have changed or not. The water might appear clean and clear, but once it is known that such water contains impurity, it will remain najis

As for question (b) we can answer this with a well known and standard ruling of the Fuqaha that when impurity falls into flowing water or water that is 25 square yards [1] (approximately 22 square meters) or more in size, such water is not considered as impure as long as the najaasah is not visible in the water. Therefore, when recycled waste water is pumped into large reservoirs or dams, the latter will not become contaminated or impure, based on the above principle of Fiqh. Such water will then be fit for all usages, including drinking, cleansing of najaasah and ritual purification like wudhu and ghusl. Allah knows best.

► Water that is impure may be used for irrigation and watering of gardens. So recycled waste water, even before being pumped into large reservoirs of clean water may be used for these purposes and even for certain industrial uses where the end product is not being consumed.

► On another note, the report makes mention of the scarcity of water in today's times being a mitigating factor in the relaxation of some fiqhi rules. I would beg to differ. It is not the scarcity of water, rather the overuse of water in today's times that has forced scientists to develop reclamation technology. Water is being used in hundreds of different ways, some totally unnecessary; in the manufacturing industry and in the watering of hundreds of acres of sports grounds, parks, gardens, and farmlands. It is, therefore, hardly surprising that we are forced to embark on alternate ideas to save water. In my humble opinion this factor will not constitute a valid reason to invoke the principle of *umoom-e-balwaa* which Fuqaha have used in several areas of tahaarah.

Allah Ta'ala knows best

Siraj Desai

Port Elizabeth

24 Jumādal-Ūla 1436

16 March 2015

[1] The original size as mentioned in fiqh is 10 X 10 *zhiraa'*, and according to most books the *zhiraa'* is about 18 inches, i.e. half a yard. We, therefore, gave the dimensions as 5 X 5 yards, which is 25 square yards. And Allah knows best.

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بسمه تعالي

Professor Abdulkader Tayob

As-salāmu ʻalaykum.
We greet you with Islamic greeting of peace.

Re: Water Research Commission (WRC)

At the outset, we thank you for inviting Jamiatul Ulama KZN for contributing to the above referred. Hereunder, is our preliminary and brief response. We hope to expand or modify after further research. *Jazakallah Khair.*

Mufti Ebrahim Desai

Fatwaa Department.

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Reclaiming Water.

Praise be to Allah, the Lord of the Worlds who has blessed mankind with pure water. Salutations and blessings of Allah upon our Master, the Final Prophet Muhammad from whose blessed hands water flowed, and who's blessed saliva would cause the water levels to rise, and who's sprinkling of water would cause the unconscious to regain consciousness.

Water is a great bounty upon us. Consider the following:

1. *"Have those who disbelieved not considered that the heavens and the earth were joined together as one united piece and We separated them and made from water every living thing? Will they not then believe?" [21:30].*
2. *"And it is He who sends the winds as good tidings before His mercy, and We send down from the sky pure water."* (25:48)
3. *"And He caused water (rain) to descend on you from the sky, to clean you thereby." [8:11]*

WATER ETHICS: FAIR ACCESS & ENVIRONMENTAL STEWARDSHIP:

While we appreciate water being a great bounty of Allah upon us, it is part of that appreciation that we conserve water and utilize it in the most responsible way. This is also the advice of Rasulullah (*salallahu alyahi wa sallam*) to us. See the following:

The Prophet (*salallahu alayhi wa sallam)* passed by Sa'd when he was performing ablution, and he said, "What is this extravagance, O Sa'd?" He said: Can there be any extravagance in ablution? He *(salallahu alayhi wa sallam)* said, "Yes, even if you are on the bank of a flowing river."

The *Fuqaha* (jurists) have defined the ethics of water use ensuring a fair and equitable access to all.

It was narrated that 'Aishah (*radiyallahu 'anh)* said: "O Messenger of Allah (*salallahu alayhi wa sallam),* what are the things which are not permissible to withhold?" He *(salallahu alayhi wa sallam*) replied: "Water, salt and fire."

The seas, the rivers, and those ponds which are on public property or wells that have been given in the name of Allah *(waqf)* – the water of all these resources can be used by the general public. No one has the right to stop another from using it and neither does one have the right to use it in such a way that it causes harm to the general public.[1]

[1] رد المحتار (27/ 151)

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Environmental stewardship in Islam an important aspect of thanking Allah for this blessing. Peter Brown writes that "Water is given great importance in Islam and it is considered as a blessing from God that sustains life. In addition, ensuring social justice for Muslims is the cornerstone of their Religion."[2]

He also writes that: "Water conservation in quantity and quality is specifically encouraged within Islamic laws."[3]

By utilizing our water resources efficiently we will God-willing *(Insha-Allah)* pave the way for future generations to enjoy the blessings of Allah as well.

DEFINING IMPURITIES IN ISLAMIC LAW:

Water in its original form is considered pure unless it becomes evident that it is contaminated by impurities which have a specific definition in Islamic Law *(Shariah)*. For example, blood, urine, feces, wine, etc..

Water which is free and clean of such impurities would be pure as long as it retains its three original qualities[4](color, taste and odor).

METHODS OF REMOVING IMPURITIES FROM WATER EXIST IN ISLAMIC LAW:

The *Fuqaha* (jurists) have presented detailed rulings of purifying impure water. The different types of water (still and flowing, large body and small body) are all dealt with including detail of water conservation and reclamation that we face today.

For example, the *Fuqaha* (jurists) have advised methods of purifying wells that fall within the ambit of a small body of standing water and have also outlined methods of how to clean the well if the water continues filling into the well from other underground springs.

BASIC PRINCIPLES OF WATER BEING CONSIDERED PURE IN ISLAMIC LAW:

(قوله إن لم يضر بالعامة) فإن أضر بأن يفيض الماء ويفسد حقوق الناس أو ينقطع الماء عن النهر الأعظم أو يمنع جريان السفن تتارخانية ، فلكل واحد مسلما كان أو ذميا أو مكاتبا منعه بزازية ، وظاهر ما قدمناه عن الهداية أن هذا في الأنهار ، أما في البحر فإنه ينتفع وإن ضر وبه صرح القهستاني

[2] Water Ethics: Foundational Readings for Students and Professionals. Pg.32
[3] Ibid. Pg.33

[4] المبسوط للسرخسي (1/ 71)
لأن الأصل في الماء الطهارة فعليه التمسك به حتى يتبين له غيره

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As mentioned earlier the basic principle regarding water is that it is considered pure unless it becomes evident that it is contaminated by impurities.

However, when some impurity has fallen into it, for the water to remain pure, it has to meet two conditions.

1. The water has to be flowing water or plentiful that it is considered equivalent to flowing water:

→ Example's of flowing water are, streams, rivers, water flowing in pipes, etc..

→ Example of plentiful water *(Kathir)* is that which has a surface area of 248 square feet (23.04 square meters) and can include both natural bodies of water (lakes, seas, etc.) and man-made structures (canals, ponds, etc.).[5]

Water of this quantity or above is considered as "flowing water" due to it being plentiful even if it is still water. The minimum depth of this water should be such that if one scoops the water he cannot see the base of the water (sand, gravel, concrete, etc).[6]

On the other hand, if the surface requirement is not met then this water will not qualify as plentiful water, even if the water is extremely deep. If an impurity falls in this, it will be considered impure, no matter how deep the water is.

2. There has to be **no** change in the three principal qualities of water:

→ Taste

→ Color

→ Smell

As long as there is no change in the three qualities mentioned above, the water will continue to be seen as pure from the Islamic legal perspective.

After understanding the above principle we can see that treated wastewater while clean from a technical aspect, will not be seen as pure from the Islamic legal perspective because once impure, it cannot become pure by itself.[7]

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[5] Fatawaa Mahmoodiya. Vol 5, Pg 171, Jamiyah Farooqiya.
Nur Al-Idah, Pg 34, Charkawi, Waseem.
Ahsanul Fatawa. Vol 2, Pg 45. (Reports 225 square feet, but we have taken the higher amount as a precaution since other reliable sources have mentioned 248 square feet)

[6] الفتاوى الهندية – ط. دار الفكر (1/ 18)
والمعتبر في عمقه أن يكون بحال لا ينحسر بالاغتراف هو الصحيح

[7] رد المحتار – ط. بابي الحلبي (1/ 189)

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For it to become pure so that it is suitable for ablution, bathing, etc. one solution would be to discharge it into a large body of pure water:

SOLUTION #1: DISCHARGING EFFLUENT INTO A LARGE BODY OF WATER

If the wastewater effluent (defined as the final product of earlier treatment processes) is discharged into a river, a sea or any large body of pure water (248 sq. ft. or more) such that none of the three characteristics (taste, color, smell) of the receiving waters change, then that entire body of water will remain pure from the Islamic legal perspective.[8]

SOUTH AFRICA WATER ACT (WASTE DISCHARGE GUIDELINES):

Currently, from our understanding, the South African Water Act's 2010 standards for waste discharge are aligned perfectly with this as they deem that the discharge should not contain any "substances capable of producing the variables listed" which are defined as "color, odor or taste" of the receiving waters now and in the future.[9]

The current Water Act would then integrate perfectly with Islamic Law as long as the receiving waters are considered "abundant" from an Islamic perspective which is a surface area of 248 sq. ft. or more for standing water and no such requirement for flowing water.

These stringent rules as defined by the Water Act to deal with municipal wastewater are ideal both from the perspective of keeping the water pure from an Islamic perspective and also since "South Africa's rivers are fairly small by international standards with limited flow volumes to mitigate contamination by the discharge of untreated effluent. Thus South Africa has stringent effluent discharge standards to regulate return flows. Unlike Europe, Asia and South America which use rivers as an extension of their municipal sewer systems, South African municipalities must treat all wastewater before it is discharged."[10]

Going forward, as the population of South Africa increases so will the volume of treated discharge. Since water is a finite resource, overusing this method could have an impact on

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لأن الماء النجس لا يطهر بتغيره بنفسه إلا إذا جرى بعد ذلك بماء صاف فإنه حينئذ يطهر

[8] رد المحتار (2/ 56)

)قوله : أي وقع نجس إلخ) شمل ما لو كان النجس غالبا ؛ ولذا قال في الخلاصة : الماء النجس إذا دخل الحوض الكبير لا ينجس الحوض وإن كان النجس غالبا على ماء الحوض ؛ لأنه كلما اتصل الماء بالحوض صار ماء الحوض غالبا عليه.

ا هـ). قوله : لم ير أثره) أي من طعم أو لون أو ريح

Fatawaa Uthmania. Vol. 1 Pg 325-326

[9] Http://www.wateronline.co.za/wastewater/downloads/dwa-general-standards-2010.pdf

[10] Transforming Water Management in South Africa: Designing and Implementing a New Policy Framework. Pg 77

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the receiving waters and that could result in a discernible change in the taste, color, or odor of the water resource.

Therefore, we cannot suffice with just one solution and indeed Islamic jurisprudence provides other solutions as well that would allow for treated wastewater to become "pure" without having to be discharged into water resources.

SOLUTION #2 INTERNALIZING THE PURIFICATION PROCESS:

However we mention two additional solutions that internalize the purification process.

The 2nd solution would be to reverse the process mentioned earlier and perform it at the wastewater treatment facility.

Instead of discharging the treated water into a large body of pure water, we instead take pure water and add it to the treated water and make it flow so that it takes the ruling *(hukm)* of flowing water. This process would then make the water usable for making ablution *(wudu)* and removing impurities.[11]

The specific requirement here is that the water must overflow. The overflow of the tank or container that is holding that treated wastewater will go from "impure" to "pure" once it overflows. In this alternative solution then, the crossover point to purity is the "overflowing of the water."

The advantages of this process are as follows:

→ No surface requirement of 248 sq. ft. or more

→ The entire treated water will become pure as soon as the water overflows since it will meet the requirement of "flowing water" as mentioned above.

→ There is no specific quantity of pure water to be added.

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[11] بدائع الصنائع في ترتيب الشرائع (1/ 87)

وقال الفقيه أبو جعفر الهندواني: إذا دخل فيه الماء الطاهر، وخرج بعضه، يحكم بطهارته بعد أن لا تستبين فيه النجاسة؛ لأنه صار ماء جاريا، ولم يستيقن ببقاء النجس فيه، وبه أخذ الفقيه أبو الليث

رد المحتار (2/ 68)

وأما على القول المختار فقد حكم بالطهارة بمجرد الخروج فيكون الخارج طاهرا تأمل ، ثم رأيته في الظهيرية ونصه : والصحيح أنه يطهر وإن لم يخرج مثل ما فيه ، وإن رفع إنسان من ذلك الماء الذي خرج وتوضأ به جاز

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SOLUTION #3 INTERNALIZING THE PURIFICATION PROCESS:

The 3rd alternative solution would be to make the water flow in pipes instead of tanks. This process is very similar to the above solution except instead of performing the purification process in tanks, it is performed in pipes.

This process simply requires pure water to be added to the treated wastewater such that both waters are mixed and flowing. This can be easily accomplished by having the water flow through pipes and the end result would be that the water would become pure.

The jurists have also made it clear that water flowing from tanks by way of pipes falls under the ruling of flowing water.[12]

The advantages of this process are as follows:

→ No surface requirement of 248 sq. ft. or more.

→ The entire water will become pure as soon as the pure water is made to "flow" with the treated water subject to there being no changes in the color, taste or smell.

→ There is no specific quantity of pure water to be added.

POTENTIAL USES FOR WATER THAT IS IMPURE IN ISLAMIC LAW:

Treated wastewater or even water that has one or two of its qualities changed will continue to be impure from the legal perspective but still has uses.[13]

An example would be where the color of the water has changed but its smell and taste continue to be like that of water. This type of water (where one or two qualities have changed), while impure in Islamic Law, can still be used in the following ways:

→ Given to animals for drinking purposes.

→ Can be used for irrigation.

→ Can be used for construction (plastering mud or mixing with cement and sand for concrete, etc.). However, this mixture cannot be used for our places of worship *(masajid)*.

→ Can be used for flushing the toilet.

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[12] Fatawaa Uthmani. Vol.1 Pg 327-328

[13] الفتاوى الهندية – ط. دار الفكر (1/ 25)

إذا تنجس الماء القليل بوقوع النجاسة فيه أن تغيرت أوصافه لا ينتفع به من كل وجه كالبول والا جاز سقي الدواب وبل الطين ولا يطين به المسجد

البحر الرائق شرح كنز الدقائق ومنحة الخالق وتكملة الطوري (1/ 132)

وَفِي الذَّخِيرَةِ وَلَا بَأْسَ بِرَشِّ الْمَاءِ النَّجِسِ فِي الطَّرِيقِ وَلَا يُسْقَى لِلْبَهَائِمِ وَفِي خِزَانَةِ الْفَتَاوَى لَا بَأْسَ بِأَنْ يُسْقَى الْمَاءُ النَّجِسُ لِلْبَقَرِ وَالْإِبِلِ وَالْغَنَمِ

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Note: If all three qualities (taste, smell and color) have changed the water may not be used under any circumstances.

SAFETY & POTABILITY:

One final issue that needs to be considered for all solutions mentioned is that the final product should be safe for use so as not to pose any adverse health risk to society. This would mean that the level of variables (ammonia, nitrate, etc.) should be safe for human consumption.

This condition is derived from the Quranic verse referring to one of the objectives of the Prophet Muhammad (*salallahu alayhi wa sallam*): *"He will make lawful for them all good things and prohibit for them only the foul" (7:157).*

This condition integrates seamlessly with expected standards of potability, that the final product of any water reclamation process be safe for human use and consumption.

Thus, the water reclamation practices that meet the above legal requirements would not only make the water suitable for ablution and bathing but also for drinking.

Mufti Ebrahim Desai

The following *Fatwaa* was issued some time ago and may be useful:

In the Name of Allah, the Most Gracious, the Most Merciful.
As-salāmu ʻalaykum wa-rahmatullāhi wa-barakātuh.
The issue of the process of sewage water purification being in conformity to the Sharʻī criteria of *tahārah* (purity) is only applicable if the sewage water is rendered *najis* (impure). Central Highlands Water defines sewage as: "Wastewater from your shower, bathtub, washing machine, dishwasher, kitchen sink and toilet is all considered sewage - it isn't just

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from the toilet. Interestingly, sewage is actually 99.8%"[14]water." According to Central Highlands Water, The sewage is transported to the treatment plant by a series of pipes and pump stations.[15] In other words, there is a **flow** of water (both pure and impure). If this "flowing water" in the pipes has no traces of impurity i.e. there is no change in color, smell, or taste, the water will be *Tāhir* (pure in terms of Sharī'ah).[16]

However, if the sewage water does have traces of impurity in its color, taste, or smell, then we may proceed to discuss the recycling/wastewater treatment process.

The process of purifying sewage water differs from place to place. Similarly, the avenues in which purified sewage water is used also differs from place to place. Nevertheless, a summary of the process adopted by Point Loma Wastewater Treatment plant in San Diego as explained by The Earth Institute of Columbia University (blog) follows[17]:

- Sewage first goes through advanced primary treatment in which water is separated from large particles, then enters sedimentation tanks where chemicals are used to make primary sludge settle to the bottom and scum rise to the top. Once the water is separated out, 80% of the solids have been removed, and the wastewater is clean enough to be discharged to the ocean.
- In secondary treatment, bacteria are added to the wastewater to ingest organic solids, producing secondary sludge that settles to the bottom.
- Tertiary treatment filters the water to remove whatever solids remain, disinfects it with chlorine, and removes the salt. In California, tertiary-treated water is called "recycled water" and can be used for irrigation or industry.
- For Indirect Potable Reuse (IPR)—recycled water that eventually becomes drinking water—tertiary-treated water undergoes advanced water technology, then spends time

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[14] http://www.chw.net.au/community/what-sewage
[15] http://www.chw.net.au/community/sewage-treatment

16

و أما الماء الجاري إذا وقعت فيه النجاسة جاز الوضوء منه إذا لم ير لها أثر لأنها لا تستقر مع جريان الماء (مختصر القدوري ص–٦١، دارابن كثير(

...فالنجس لا يخلو إما أن يقع في المائعات كالماء...فإن وقع في الماء، فإن كانجاريا، فإن كان النجس غير مرئي كالبول...لأ ينجس، ما لم يتغير لونه أو طعمه أو ريحه...و إن كانت النجاسة مرئية كالجيفة و نحوها، فإن كان جميع لاماء يجري على الجيفة– لا يجوز التوضؤ من أسفل الجيفة لأنه نجس بيقين ...و إن كان أقله يجري على الجيفة و الأكثر مجري على الطاهر– يجوز التوضؤ به من أسفل الجيفة....(بدائع الصنائع ج–١ ص–٤٠٢، دار الكتب العلمية(

و يتوضأ بماء السماء...لا بماء تغير بكثرة الأوراق...و بماء دائم فيه نجس إن لم يكن عشرا في عشر، فهو كالجاري، و هو ما يذهب بتبنة، فيتوضأ منه إن لم ير أثره، وهو طعم، أو لون، أو ريح (كنز الدقائق ص–١٤٠، دار المنهاج(

[17] http://blogs.ei.columbia.edu/2011/04/04/from-wastewater-to-drinking-water/

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in groundwater or surface water, such as a reservoir, before being sent to drinking water supplies. Advanced water technology first involves microfiltration that strains out any remaining solids.

Analysis of the purification process in light of *Fiqh*:

1. The advanced primary treatment which the water goes through in stage one does not "purify" the water in terms of Sharī'ah. In order to become pure in Sharī'ah, the impure water must either

- be mixed in a "large body of pure water" (the surface area of which is approx. 225 sq. ft.[18].)
- flow with pure water, or
- pure water must be poured into the impure water tank causing a significant over flow of water after the impurities are removed.[19]

Note: In all three methods the color, taste, and smell of the water must return to normality.

1. At stage two and three, the water has still not met the Shar'ī standards of purification, though it may be biologically clean.

N.B. It should be noted that *tahārah* (purification) of water is only necessary for drinking, cooking, *wudu'*, *ghusl*, and washing clothes. Tertiary-treated water may be used for irrigation, flushing (toilet), etc.

1. Tertiary-treated water for IPR-drinking water- which spends time in groundwater or surface water, such as a reservoir, is *tāhir* because it is mixed with a "large body of water."

And Allah Ta'āla Knows Best

Mufti Ebrahim Desai

[18] Ahsanul Fatawa vol.2 pg.45, H M Saeed

[19] و لو كان في النهر ماء راكدا فتنجس ذلك الماء الراكد و نزل من أعلاه أي أعلى النهر ماء طاهر و أجراه أي أجرى الماء الطاهر الماء الراكد المتنجس و سيله فإنه أي الراكد يطهر بغلبة الماء الجاري عليه و لو توضأ إنسان منه جاز إذا لم ير لها أي للنجاسة أثر من الأوصاف الثلاثة كما هو حكم الماء الجاري (حلبي صغير ص-٥٩، دار النشر العلمية)