RESEARCH REPORT

SYNTHESIS REPORT ON STATE OF WATER: A LOOK AT THE LEGAL AND REGULATORY FRAMEWORK GOVERNING WATER SERVICES ACROSS JURISDICTIONS

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TABLE OF CONTENTS

Introduction

Water is arguably the most essential natural resource. Not only does it sustain life, it also constitutes critical infrastructure for important functioning, such as sanitation, washing, cleaning, hygiene, disease control and improved health.

It is alarming to note that almost 780 million worldwide do not have access to clean drinking water and almost 2.5 billion people lack access to improved sanitation according to data published by Centers for Disease Control and Prevention.

In this context, the future of humanity will depend on managing and conserving water resources and although it is an issue of global magnitude it requires localized, systematic resolution. Our relationship with water and the legal structures that govern this relationship vary from territory to territory, often within the geographical boundaries of one nation. The process of abstracting, using and disposing off water is now strictly controlled and regulated by most nations in response to the pressures our water resources are facing.

These paper sets out to identify, comprehend and analyze these legal frameworks and structures; examine the control exercised by national, state/provincial as well as municipal governments over water and sanitation-related questions; and the responsive measures being taken by them to preserve the water resources and their quality for future generations.

While any resolution to the water crisis cannot reside exclusively within the system of laws and legal enforcement, responsive laws in this regard have the capacity to make a significant impact in ensuring quality drinking water, improved sanitation facilities and conservation of our water resources. Other forms of intervention would require large-scale individual and community action. However, the scope of these papers is the application of laws in this regard.

With this backdrop, this paper in the first phase of the study examined water laws in three jurisdictions: South Africa, England and United States. The second phase of the study will cover the laws and approaches followed by India and Malaysia. The study looks into how 'water', and related questions such as access to water, is conceptualized by these countries, for instance, as a public or private resource, the manner in which water supply and sanitation services are provided in these countries, financial models in place, the role of independent regulators and private enterprises in this endeavor and finally the challenges faced by these legal and regulatory frameworks.

This document seeks to provide a summary of the findings of the first phase of the study and serves as an introduction to the detailed notes for each of the aforementioned countries.

1 SOUTH AFRICA

History

The history of water laws in South Africa is a product of its climatic as well as socio-economic and political history. South Africa's unique history of conquest, colonization and subsequent rise of a people's democracy has framed the legal and regulatory environment governing water services as much as the country's geographic and geo-climatic features.

In the pre-colonial period African customary law governed water just as land and since, this was a pre-industrial period, rights to water resources were hardly ever contested, however, with colonization and subsequent industrial development, water began to be regarded as a scarce economic resource and invited increased regulation by the colonial government. The Dutch colonists imported the Roman-Dutch legal system of governing water recognizing three classes of rights (private, common and public) and gradually as the pressure of the water resources grew, these distinctions were discarded, and all water became public; i.e. owned and controlled by the State. Under the British colonial rule, riparian principles were favored whereby owners adjoining the rivers were granted entitlements to use the flowing water although certain uses were prioritized (personal use and support of cattle over irrigation and industrial use). In 1912 a comprehensive water law was codified to balance competing interests of the drier and drought prone Northern provinces and Southern Provinces. This Act divided all water into public and private water and private riparian rights were mainly granted to the white minority bringing about stark inequity in division of water resources. With the beginning of the Apartheid era, the riparian principles had to be discarded because South Africa was sufficiently industrialized at this time and large-scale water projects were undertaken to spur on economic development. At the same time, the support base of the National Party in power was primarily rural and hence, sufficient water resources had to be allocated to the agricultural needs of this population. The Water Act of 1956 sought to achieve these competing objectives of the government by establishing strict government controls over abstraction, use, supply, distribution and pollution of water. Water boards, Ministry for granting industrial licenses were established for the first time and it was also the first time in South Africa that a serious attempt was made to control the discharge of effluents into water streams. During this period, however, there was large scale dispossession of the colored majority of land rights and consequently water rights.

The feature of the water regime in South Africa pre-democracy was governance of inter-se rights between competing interests and did not deal with provision of water services as such. There was no express recognition of rights of people to have access to drinking water and sanitation services and consequently, little attention was devoted to provision of these services by government agencies. Further, the different levels of government and administrative units prevailing in South Africa in the apartheid era made comprehensive regulation of water services almost impossible. This resulted in non-standardized services and in effect differentiated services to the detriment of the country's black majority.

With the end of apartheid in 1990s, there was a marked shift in government's policy on water and sanitation. It was estimated that around 14 million people across the country lacked adequate water supply services while some 21 million (50% of the country's population) were without adequate sanitation with the poorer black rural areas bearing the brunt of the lack of adequate services. Providing these services to the deprived was a priority for the post-apartheid government and at the same time, water as a resource had to be protected and preserved not only for rapid economic development of the country but also for future generations. The current water regime in South Africa developed in this backdrop. In fact, the African National Congress came to power on the back of a promise of universal access to water and sanitation services amongst other things.

Water Policy in the new Democracy

The Reconstruction and Development Programme of the African National Congress (RDP) formed the basis of water policy of the new government and it recognized the universal right to access clean water – water security for all. Subsequent policy documents like Water Supply and Sanitation Policy, 1994, National Sanitation Policy, 1996 and National Water Policy 1997 elaborated upon the fundamental policy objectives regarding water and sanitation. These policy objectives summarized below formed the bedrock on which the water and sanitation laws and regulations were formulated:

(i) Development should be demand driven and community based – This paved the way for devolution of decision-making and control to accountable local structures.

(ii) Basic services are a human right – This paved the way for right to a level of service adequate to provide a healthy environment, however, an individual person or community cannot demand services at the expenses of others in light of the limitations prescribed in the interim constitution. This paved the way for defining the basic water supply and basic sanitation in future legislations.

(iii) "Some for all", rather than "All for some" – Priority in planning and allocation of funds will be given to those who are presently inadequately served.

(iv) Equitable regional allocation of development resources – Basic services should be equitably distributed among regions, taking into account population and level of development.

(v) Water has economic value – Water and sanitation services should be provided in a manner that sustainability and economic growth are not compromised, and the economic value of water is not undermined.

(vi) The user pays – to ensure sustainable development and for efficient and effective management of services.

(vii) Integrated development – Water and sanitation development should be part of the larger development initiatives and all stakeholders should participate.

(viii) Environmental Integrity – Environment should be considered and protected in all development activities.

(ix) Sanitation is about health – The sanitation policy should develop on overall development of health and not just on construction of toilets.

(x) Sanitation programs should be community driven.

(xi) Water laws and regulations should be consistent with the Constitution.

(xii) All water, irrespective of its occurrence in the water cycle, is a common resource and its use is subject to national control.

These policies also mandated that the responsibility of delivering water services lay with the local government while the National government was to carry out a legislative and regulatory function regulating and monitoring the standard of services. The provincial government in its supervisory role over the local governments was to take up water services in case the local governments failed in their duties. Another critical aspect of these policies was that apart from a lifeline level of service, service delivery was to take on sound economic and market principles to ensure sustainable service delivery by local governments. Thus, water apart from being treated as a basic right was also an economic asset to be managed in accordance with economic principles. This was the task before the National Parliament when it set out to draft the new water legislation of the country.

Legal and Regulatory Framework

The Constitution of South Africa in the Bill of Rights which binds all levels of government, executive and the judiciary guaranteed everyone the right to an environment that is not harmful to their health or wellbeing, access to housing, right to freedom of security of the person, right to privacy and right of access to sufficient food and water amongst other things. The Bill of Rights exhorts the State to take reasonable legislative and other measures, within its available resources, to achieve the progressive realization of this right.

These rights form the cornerstone of the South African legal and regulatory framework for water and sanitation. Although the Constitution does not recognize an explicit right to sanitation, the rights to a healthy environment and access to housing could be said to encapsulate a right to sanitation. The Constitutional Court of South Africa in the landmark Grootboom judgment interpreted the right to housing to include sanitation. The Court remarked that the right to access to housing goes beyond a brick and mortar structure and contemplates a dwelling which encompasses services like water supply and sewage system.

Similarly, a right to waterborne sanitation can also be inferred to be contained in terms of Section 27(1)(b) of the Constitution which guarantees access to sufficient water. The rights relating to privacy, protection of human dignity, security of the person and a healthy environment could also be read widely to cover a right to sanitation. The Constitution in accordance with the stated policy of governing water services accorded the responsibility of delivering water services to local governments and the responsibility of regulating standard of services to the National government.

The National Government enacted two legislations in accordance with this constitutional mandate in mind: National Water Act, 1998 to regulate the use of water and

the Water Services Act, 1997 regulating the standard of water services to be delivered in South Africa.

The National Water Act, 1998 establishes a system of licenses for abstraction and use of water and also regulates the discharge of waste into water. This Act recognizes the National government as the custodian of water resources in the country and makes the National government duty-bound to protect water resources from pollution. On the other hand, the Water Services Act, 1997 gives effect to the Constitutional right to access sufficient water by recognizing that everyone has a right to access to basic water supply and basic sanitation and requires every water services authority (local governments) to provide for measures to realize these rights. The Act defines "basic sanitation" as the prescribed minimum standard of services necessary for the safe, hygienic and adequate collection, removal, disposal or purification of human excreta, domestic waste-water and sewage from households, including informal households. "Basic water supply" is defined as the prescribed minimum standard of water supply services necessary for the reliable supply of a sufficient quantity and quality of water to households, including informal households to support life and personal hygiene.

According to the Regulations relating to Compulsory National Standards and Measures to Conserve Water dated June 8, 2001 published under Section 9 of the Act, the minimum standard for basic sanitation services is (Regulation 2):

(a) The provision of appropriate education; and

(b) A toilet which is safe, reliable, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exit of flies and other disease carrying pets.

Regulation 3 defines the minimum standard for basic water supply services as:

(a) The provision of appropriate education in respect of effective water use; and

(b) A minimum quantity of potable water of 25 litres per person per day or 6 kilolitres per household per month –

(i) At a minimum flow rate of not less than 10 litres per minute

(ii) Within 200 metres of a household; and

(iii) With an effectiveness such that no consumer is without a supply for more than seven full days in a year.

The Act prioritizes provision of basic water supply and sanitation while stating that if a water services institution cannot meet the requirements of all its existing customers, it must give preference to provision of basic water supply and basic sanitation to them. The Act empowers Water services authorities to control discharge of industrial effluent by making it subject to the approval of Water services authorities in their respective jurisdictions. The Act in line with the Constitutional mandate and the policy mandate relating to water and sanitation assigns the responsibility of ensuring delivery of water services to the Water services authorities (Municipalities) and the responsibility of setting standards of service delivery and norms for tariffs to the National government.

Implementation

Although the South African legal system squarely places access to water as a basic human right in the Constitution, there are a number of limitations placed on this right being justiciable. The targets set by various government policy documents for achieving universal basic water supply and sanitation services have not been met. As per the available government data the progress has been slow and has been affected by a number of structural as well as infrastructural problems.

This table sets out the progress of South Africa in providing basic water supply based on RDP standards set out in 1994:

	1994	2001	2011	2014
Source	DWS	DWS	Stats SA	Stats SA
Households (million)	8.66	11.52	14.45	15.60
% HH below RDP	3.89	3.07	2.16	2.20

This table sets out the progress of South Africa in providing basic sanitation:

	1994	2001	2011
Households (million)	8.66	11.52	14.45
% HH below RDP	4.50	4.95	4.52

In terms of ensuring drinking water quality in accordance with SANS 241, South Africa has made good progress with over 1300 Water Treatment Works mostly owned by Municipalities operating at close to 80% of their overall capacity. However, many rural areas reliant primarily on ground water still don't have the benefit of water treatment.

South Africa hasn't made much progress in terms of wastewater quality. Of the 1363 registered Waste Water Treatment Works, 897 are municipal owned, 393 privately owned and 73 Department of Public Works or Department of Health owned. DWS issues Waste Water Treatment Works licences and regulates Waste Water Treatment Works and effluent releases, through an incentive based, risk management approach, which addresses design and operating capacity of works, compliance of the effluent to agreed standards, and infrastructure management and condition, (i.e. asset management practices). This process, known as the "Green Drop" certification process, assesses the risk of failure of each works. Works that achieve a certain rating are awarded the prestigious Green Drop status. Systems scoring below 30% are awarded a "Purple Drop" and given 30 days in which to provide the DWS with a corrective action plan. These are placed under regulatory surveillance, in accordance with Sections 62 and 63 of the Water Services Act. Green Drop assessments are done every second year and during intervening years a less comprehensive progress assessment is done. The last released Green Drop assessment, the 2011 report, (which provides 2010 data), found that 317 (38%) of the works required urgent attention and that 143 had a high risk of failure, whilst 90% were found to be non-compliant on more than 3 final effluent determinants. The lack of skilled and qualified process controllers and poor asset management were identified as areas needing urgent attention. Recent assessments indicate that the situation is deteriorating, with a large number of systems being awarded a Purple Drop.

Two major problems with the regulatory framework may be responsible for South Africa's water sector underperforming. These inherent limitations of the South African regulatory framework are discussed below:

- Reluctance of the Constitutional Court to take a proactive role in enforcement of Constitutional rights
- Over-dependence on municipalities in delivery of water services

The justiciability of the Constitutional right to sufficient water received a jolt with the Mazibuko case and it brought the distinction between lofty Constitutional ideals and the pragmatic implementation approach of South Africa's highest court into sharp relief. The City of Johannesburg had three levels of water provision. The lowest level of service, Service Level 1, provides a tap within 200 metres of each dwelling. As noted above, there are still 100 000 households in the City without even this level of water provision. The second level of service, Service Level 2, is the provision of a tap in the yard of a household which has a restricted water flow so that only 6 kilolitres of water are available monthly. The third level of service, Service Level 3, is a metered connection. The City provided the residents with two options, they had to choose between the second level of service or a pre-paid meter. The City cut off the water supply of those residents who refused either a pre-paid meter or a yard tap leading them to approach the High Court. The High Court ruled in favour of the applicants and further held that the free basic water supply of 50 litres per person per day would meet the constitutional mandate. The City appealed to the Supreme Court of Appeal which stated that the City's policy had been formulated on the misconception that it was not obliged to provide the minimum set in Regulation 3(b) of the Compulsory National Standards (25 litres per person per day) free of charge to anyone who could not afford to pay, it was influenced by a material error of law and should be set aside. The Court held that the quantity of water required for dignified human existence in compliance with Section 27 of the Constitution was 42 litres per person per day and not 50 litres as held by the High Court. On appeal, the Constitutional Court overturned the basis of the decision by the High Court as well as the Supreme Court of Appeal by stating that Section 27(1)(b) did not require the state upon demand to provide every person with sufficient water without more; rather it requires the state to take reasonable legislative and other measures progressively to realise the achievement of the right of access to sufficient water, within available resources. The Court rejected the notion that Section 27(1)(b) created a directly enforceable obligation upon the state to provide every citizen with sufficient water immediately. The Court elucidating upon the context in which Section 27(2) was introduced stated that *"At the time the Constitution was adopted, millions of South Africans did not have access to basic necessities of life, including water. The purpose of the constitutional entrenchment of social and economic rights was thus to ensure that the state continue to take reasonable legislative and other measures progressively to achieve the realisation of the rights to the basic necessities of life. It was not expected, nor could it have been, that the state would be able to furnish citizens immediately with all the basic necessities of life. Social and economic rights empower citizens to demand of the state that it acts reasonably and progressively to ensure that*

all enjoy the basic necessities of life. In so doing, the social and economic rights enable citizens to hold government to account for the manner in which it seeks to pursue the achievement of social and economic rights." The Court further argued that fixing a quantified content might prevent an analysis of context since the content of the right will vary over time and context. Secondly, the Court held that it is institutionally inappropriate for a court to determine precisely what the achievement of any particular social or economic right entails and what steps the government should take to ensure the progressive realisation of the right. The Court stated, "*This is a matter, in the first place, for the legislature and executive, the institutions of government best placed to investigate social conditions in the light of available budgets and to determine what targets are achievable in relation to social and economic rights. Indeed, it is desirable as a matter of democratic accountability that they should do so for it is their programmes and promises that are subjected to democratic popular choice.*"

The judgment of the Constitutional Court has been heavily criticized mainly on the ground that residents in the area were among the poorest in South Africa and many of them were suffering from HIV/AIDS and their inability to pay the top-up amount would leave them with little or no access to a considerable part of every month. Criticisms have also been levelled on favouring a neo-liberal policy of cost recovery and giving it constitutional recognition at the expense of the poor. But more importantly, the Court by limiting its role in Constitutional interpretation and deferring to the judgment of the legislative / regulatory branch of the government missed an opportunity to test the reasonableness of the measures taken by the government to achieve these constitutional goals. It must be noted that the government in South Africa by its own admission has missed the targets / goals it has set in terms of achieving universal supply of basic water services. Further, the Court did not even examine if the basic standards set by the government were reasonable setting a dangerous precedent for the future where the government can through regulation define the content of the constitutional rights by setting standards that suit its objectives.

The Constitutional Court followed a similar approach in the *Nokotyana* case where in a shockingly formalistic approach avoided commenting upon the reasonableness of government regulation relating to sanitation standards prescribed under the housing regulations.

Although these two decisions by the country's highest constitutional court place are disappointing, a large part of the blame also lies with the country's regulatory structure which has left the implementation of very important rights to municipalities which are often under-funded, under-staffed and mismanaged. The municipal boundaries in a country with a history of segregation ensure that certain municipalities have significantly poorer constituents than others, have had a history of poor infrastructure and cannot now give effect to the neo-liberal sustainability principles under which water services have to be supplied. Further, it is difficult for individual municipalities to invest in and maintain large scale piped water and sanitation systems and the deepening inequality depending on geographic location of the municipalities is stark.

South Africa is currently in the process of reviewing its water legislation. The National Water Act, 1998 and the Water Services Act, 1997 are under review and will be replaced by a National Water and Sanitation Act; the Bill for which is currently being developed. The aim of this Bill is to amalgamate the two Acts to avoid the need to cross-read between the two pieces of legislation, address issues pertaining to ownership of water & sanitation infrastructure, differential levels of service for sanitation, and appropriate technologies for sanitation, address issues pertaining to water use authorization, enable the setting of tariffs for the whole value chain linked to levels of service and economic conditions, create a mandate for a National Water and Sanitation Strategy. While many believe that South Africa needs better water management instead of new water laws and criticize the government for not implementing the existing legislations effectively, it remains to be seen whether a revamped legislation will cure the current legal and regulatory framework of the chinks that have prevented South Africa from achieving the targets it set way back in 1994.

2 ENGLAND

History

The regulation of water services in the United Kingdom can be traced back to the 19th Century. Unlike South Africa where the country's unique history and scarcity of water resulted in development of complex legal structures to govern the use of water, the early development of water laws in United Kingdom arose from a concern for public safety and health. Raw sewerage which was routinely disposed of in Thames led to frequent epidemics and the earliest legislations governing water were concerned with construction of underground sewer systems and water treatment. In the 20th Century the water and sanitation industry in England was highly fragmented with a number of local bodies involved in providing these services. This fragmentation was the cause for renewed interest in the legislative and regulatory framework governing water when England faced a severe drought in 1959 followed by floods next year. The focus now was on creating a coordinated approach towards water resource planning and conservation of water resources. Further, consolidation would have enabled water suppliers take advantage of improved infrastructure for water supply and sanitation services and enabling public investment into expanding infrastructure to rural areas. The Water Resources Act, 1963 was enacted which introduced a system of abstraction permits placing controls on use of common water resources. Subsequently the Water Act, 1973 went further in consolidating water services by housing them under 10 new regional authorities as against more than 2400 bodies involved in water and sanitation services till then.

However, the new regional authorities soon ran into problems because of strict fiscal controls and the mode of cost recovery mandated by Water Act 1973 became unworkable as European legislation made certain safety and environment standards mandatory thereby increasing the prices of supply of services. The government liberalized the regulation governing these authorities in 1983 increasing access to private capital markets and reducing oversight exercised by local authorities. This however wasn't sufficient to give a boost to private funding as the infrastructure of these authorities was ageing and a number of pollution incidents involving these authorities further dampened the spirit of investors.

This led to the privatization of water services in England in 1989 which was arguably one of the biggest privatization drive involving a public essential service. Post privatization, the process of restructuring and reforming water services and water resource management continued through the Water Industry Act, 1991, the Water Industry Act, 2003 and the Water Act, 2014. In the meantime, European Union issued a number of binding directives relating to water and sanitation standards which were made applicable in the UK. These directives issued as part of European Union's environment regulatory mandate primarily related to quality standards for consumption as well as conservation of water resources and were incorporated into domestic legislation.

Regulatory Framework pre-privatization

The early development of regulatory framework was primarily spurred by public health and safety concerns and therefore, various cities took up the mantle of ensuring supply of clean water and sanitation services to their residents. One of the earliest example in this regard is the Metropolitan Water Board responsible for water services in Greater London which was established in 1902. During the second world war, the need for greater centralization was felt owing to water shortages for fire-fighting services and hence, a Central Advisory Water Committee was formed to look into ensuring continuous supply of water to even smaller communities outside larger cities. Immediately after war, the regulatory framework underwent drastic change when the National government took control of water resources under the Water Act, 1945 which hitherto had been the domain of local authorities. The Minister of Housing and Local Government was put in charge of conservation and proper use of water resources, as well as supply of water services. A license regime which enabled water suppliers to supply piped water and also construct necessary works was implemented, however, this did not lead to consolidation of water services with more than 1000 water suppliers involved. The next notable legislation Water Resources Act, 1963 sought to create an integrated structure for water resource management and vested the Minister of Housing and Local Government with

increased oversight over water resources although the Act did not touch upon water services, which were still the domain of existing local authorities and statutory water undertakers. This Act paved the way for establishment of 27 river authorities corresponding to 27 major rivers of England and a Water Resources Board which would assist the Minister in his oversight functions. Each of these river authorities apart from their specific functions was required to take all necessary steps to conserve, re-distribute, augment and ensure proper utilization of water resources in their area. The functions of existing river boards under previous legislations were also transferred to respective river authorities. One of the principal duties assigned to the river authorities was to create a demand forecast taking into account the future demand of the statutory water undertakers. Further, in exercise of their functions. The membership of these river authorities in indicative of the approach that the Parliament sought to take in water management. The river authorities had to be comprised of members of constituent councils (county councils or county boroughs) of a river authority area and experts from the field of land drainage, fisheries, agriculture, public water supply and industry other than agriculture. While retaining some local representation, the river authorities were to also benefit from the expertise of appointed technocrats. In addition to the river water authorities the Act contemplated constitution of a Water resources board entirely comprised of appointed board with advisory and monitoring functions reporting to the Minister. Riparian principles were given legislative weight through the Act. The system of licensing for controlling abstraction and impounding of water was made more robust.

This legislation was soon found to be incompatible with the needs of England and it was felt that a more integrated approach was required to better manage the water resources in light of future demand which was proving difficult to estimate under the system established by the 1963 Act. Planning for future increases in demand was complicated by the significant conflicts of interest between the different requirements of water users. Rivers in England and Wales were important for both water supply and effluent disposal, yet there was no organisation in place to co-ordinate the roles of the water suppliers and sewerage and sewage disposal authorities. Most local city councils sought to dispose sewage cheaply leading to asymmetric investment in water supply and sewage treatment works leading to increased costs of water abstraction. The government decided to move away from individual river management to an integrated river basin management system and the idea of somewhere between 6 and 15 vertically integrated monopolies was mooted. Finally, ten regional water authorities were created based on the ten major river basins in England and Wales and these authorities were not only responsible for management of these water basins but also water services in their respective areas. The water authorities were required to manage their finances through prudent means with a return on assets prescribed by the Secretary of State to be achieved in a certain period by the authorities. The water authorities were empowered to fix, to demand, take and recover such charges for the services performed, facilities provided, or rights made available by them to satisfy the return required to be achieved which could be levied pursuant to a general scheme of charges or by way of a specific agreement between the authority and the recipient of the water services. The water authorities were also empowered to install meters to measure the volume of water supplied and volume of sewerage discharged in case the charges for these services are determinable on such volumes and the meter reading was to be taken prima facie evidence of the appropriate charges to be levied. However, a significant portion of revenues continued to be collected based on property values rather than volume of supply and usually the bills were averaged across an authority's supply jurisdiction rather than be determined by consumption at an individual household level leading to rural areas paying as much as urban areas within the same water authority area and wastage of water.

In the years following the 1973 Act, the water authorities racked up significant debt primarily due to lack of infrastructure and investment in boosting the water sector. The United Kingdom joined the European Community on 1 January 1973. Four Directives had immediate effect on water resources which prescribed standards for: (i) the quality of drinking water; (ii) the discharges of dangerous substances to the aquatic environment; (iii) the quality of bathing water; and (iv) the quality of fresh water for fish life. The government was ultimately responsible for ensuring that the Directives were codified into law and for ensuring that the respective standards were met. Each Directive required a significant programme of capital investment by each water authority. The attempt to unifying water services under a single structure as mandated by the 1973 Act proved difficult as well. In spite of abolishing the erstwhile river authorities, the new water authorities retained a similar structure to administer the 1973 Act with divisions for water supply largely comprising of erstwhile statutory water undertakers, river divisions comprising of erstwhile river authorities and

new divisions for sewage treatment. The fact that the same water authority was responsible for monitoring river quality and sewage treatment, quality breaches went on unabated.

In 1983 an attempt at reorganizing the water authorities into boards like those favored by private enterprises was made however, the quality of rivers was still deteriorating. In the meantime, England had seen a wave of privatization in gas and telecom sectors and the idea of privatizing water was mooted. The Conservative government signaled they were going to go ahead with the privatization prior to the elections in 1987 and their election manifesto proposed a regulatory model whereby pollution control, flood protection and land drainage would be the remit of a new national body by the name of 'National Rivers Authority' whereas private companies would manage water supply, distribution, sewerage and sewage disposal.

Privatization

The proposals for privatization of water differed in a few fundamental aspects as opposed to earlier privatization of the gas and telecom sector. Firstly, the privatization of water would not involve one but ten Water authorities; secondly, the environment protection aspect had to be taken care of with the privatization of water and sewerage industries and thirdly, a natural monopoly situation prevailed in case of water in the absence of a national distribution network with local and regional monopolies controlling water.

On the other hand the economic regulation aspect had to be given serious thought to avoid a scenario where customers are over-charged for sub-standard services. Initial price limits were set by the Secretary of State for Environment in England and by the Secretary of State for Wales in Wales for 10 years and for future price limits, the economic regulation power was vested in the Director General of Water Services (the staff supporting him was collectively known as Office of Water Services or Ofwat). The economic regulation model was largely derived from the Littlechild Report, 1986 and the economic model proposed in this report was similar to the one proposed in Littlechild Report 1983. The Littlechild Report, 1983 favoured a RPI-X formula for price control rather than the commonly used return on investment formula for tariff determination. This same formula was also used for water charges. The RPI-X formula allows for a fixed increase in charges every year based on the Retail Price Inflation, however adjusted to efficiency gains represented by 'X' in the formula. The price cap had to be reviewed periodically to ensure that there was no significant variance from the cost-base over a long period of time and the efficiency gains represented by 'X' were to be imposed across the companies because at the time of privatisation, each of these companies would have started at the same position. Critical recommendations to make the system workable and allay fears of the consumers were made:

(i) Regulation would have to take into account quality standards as well since only a price regulation could lead to reduction in quality.

(ii) The regulator should compare the costs and quality of service across the 10 water authorities and privatised water companies already in existence through a standard measurement metric to assess the performance of these privatised authorities.

(iii) The 10 privatised authorities would have to compete in the capital market and that would encourage innovation. The government would also have to prevent any hostile takeover of these privatised authorities.

(iv) The franchisee model followed in France was not to be followed (where the municipality retained the ownership of the assets and franchised out their management and functions to private players) as this was perceived to be not competitive enough. However, the privatised authorities themselves were allowed to franchise their services out to limit government intervention and this was left to the discretion of the managers of these privatised authorities.

Later on, under public pressure the aspect of environmental regulation was handed over to an independent watchdog – National Rivers Authority. The privatisation was achieved through the Water Act, 1989 ("1989 Act"). It re-characterized the existing water authorities into private companies (Water and Sewerage Companies) and appointed them as undertakers for their respective regions. Three authorities were also mandated to carry out regulatory functions: (i) the Secretary of State for the Environment was tasked with the overall responsibility of ensuring quality of drinking water (ii) the National Rivers Authority was tasked with managing pollution and exercise environmental control whereas (iii) the Director General of Water Services was designated as the economic regulator. The existing statutory companies were also allowed to come into this new regulatory framework by registering as private companies under the Companies Act, 1985 and restrictions on their borrowings and dividend pay-outs were removed.

The RPI-X economic regulation model proposed to be introduced for water charges perceived to provide strong incentives to companies for improving efficiencies and cutting costs so as to enable them to retain all profits made within the prescribed price cap was however discarded in favour of a different mechanism. Because of the unique financial constraint plaguing the water industry in the 1980s (requirement of significant investment to remedy past under-investment, funding requirement to bring water and wastewater quality up to the standards prescribed by EC directives), the water prices to the consumers would have had to be increased. Therefore, the formula for determining the price-cap had to be computed at RPI + K (K referred to as the K factor). The K factor for a water company was primarily based on K factors are based primarily on water undertakers' revenue requirement over a long period of time which took into account its capital investment (to meet the statutory standards), operating expenditure budget, cost of capital and tax requirements. Thus, the K factor represented the maximum percentage by which the total income of a water undertaker can be increased for a basket of tariffs (domestic, business, metered or unmetered). The tariff basket formula allowed for tariff rebalancing which meant that changes in tariffs for one type of service or consumers could be offset against tariffs for other services or consumers. The initial K factor was fixed for a decade by the Secretary of State till March 2000. While setting the K factor, the comparative efficiency of each company and the minimum return expected by investors was taken into account.

The government worried that given the performance of the water industry in the preceding decades, investor appetite for this sector had to whetted with attractive return plans (7% for water and 8% for sewerage companies). Further, the Government to give a push to these companies when they were floated on stock exchanges, forgave total debt of the erstwhile authorities to the tune of 4.9 billion pounds (in 1989 prices), provided a cash injection of 1.5 billion pounds (in 1989 prices) and capital tax allowances of 7.7 billion pounds were provided. The Government retained a "golden share" in each of these companies that would prevent any individual or a company to control more than 15% of the voting power in these companies to prevent any unwanted take-overs.

On being listed, 100% of the companies were offered for sale, on an individual share basis and a special share package was offered to UK institutions as well as overseas investors. 2183 million shares were issued at a price of 2.40 pounds each and this issue was oversubscribed by almost 3 times. The Government to give these water companies a chance to recover from their cash-poor days offered these shares at an attractive price with returns being expected in the range of 8.1% to 9.7% and the Government had accounted for the target premium to go up to 10%. The listing was a huge success and the total proceeds of the sale was estimated to be at 7.6 billion pounds offsetting the cash injection and the costs of privatisation including the debt write-off leading to no net effect on the taxpayers. The trading in water shares was also popular and on the day of listing itself (December 12, 1989), the share prices rose 0.40 pounds per share representing a premium of 8.7% after accounting for general movement in shares on listing and by January 1990, these shares were outperforming the index and the premium on these shares was in excess of 20%.

The 1989 Act was significant in another respect, it introduced water quality classifications and standards for the first time and also established a mechanism for monitoring water quality as well as effluents, prescribed treatment of water prior to supply for drinking and established detailed provisions relating to control of pollution and flood defence.

Post Privatization

Post privatization, the Parliament began the process of consolidating the existing water laws in the country and these were codified in 4 primary legislations:

1. The Water Industry Act, 1991 – This replaced the powers and duties of the Water and Sewerage companies set out in the 1989 Act and also listed out the powers of the Director General of Water Services.

2. The Water Resources Act, 1991 – The duties of the National Rivers Authority were defined and water quality classifications and standards to be met were elaborated keeping the core defined in the 1989 Act intact.

3. The Statutory Water Companies Act, 1991 – This set out the powers and functions of the erstwhile statutory water companies which had come into the new regulatory framework via the 1989 Act.

4. The Land Drainage Act, 1991 – This transferred the powers of local authorities relating to land drainage to the National River Authority.

Subsequently, a number of other legislations although not directly related to the water services framework amended the manner in which these services are rendered:

a. The Competition and Service (Utilities) Act, 1992 – This provided wide-ranging dispute resolution powers to the Office of Water services.

b. The Environment Act, 1995 – This restructured the entire environment regulation landscape in England and created the Environment Agency which took over the powers and functions of the National Rivers Authority, Inspectorate of Pollution, the Waste Regulation authorities and some functions of the Department of Environment. This legislation required the Water companies to promote efficient use of water by customers.

c. The Competition Act, 1998 – The Water companies were brought into the purview of competition regulation with the Director General of Water Services sharing investigative powers with the Office of Fair Trading constituted under this Act.

d. The Water Industry Act, 1999 – This was a consumer-friendly intervention and made far-reaching changes to the framework in which water services were provided by the Water companies. It prohibited disconnection of domestic water connections for non-payment of bills, tightened the compulsory metering power of the Water companies and put in place an approval mechanism for the charging schemes of Water companies with such approval to be given by the Director General of Water Services.

e. The Water Act, 2003 – This amended the framework for abstraction of water, licensing of water services and replaced the Ofwat with the Water Services Regulation Authority.

f. The Water Act, 2014 – Amended the Water Industry Act, 1991 introducing additional types of water supply and sewerage licenses to companies other than water undertakers.

The Water Industry Act, 1991 is critical in as much as it established the system of water supply services and sanitation services being provided by Water undertakers and Sewerage undertakers respectively. The Water undertakers had apart from undertaking domestic water supply by connecting them to a network had to:

i) Develop and maintain an efficient and economical system of water supply within their area of operation

ii) Provide supplies of water to premises in their area of operation on demand; and

iii) Maintain, improve and extend the water undertaker's water mains and other pipes

Similarly, the Sewerage undertakers were tasked with the responsibility for providing public sewer services for domestic consumers. Apart from that they were also required to:

i) Provide, improve and extend a system of public sewers, and to cleanse and maintain them to ensure effective drainage services in their area of operation;

ii) Make provision for emptying the sewers and treatment of sewage

All these functions of water undertakers and sewerage undertakers are enforceable against them by the Secretary of State or the Director General of Water Services and all charges to be imposed for the functions on the end consumers can be through a charges scheme or by a specific agreement. The charges scheme since 1999 are subject to annual approval by the Director General of Water Services.

The water and sewerage undertakers are appointed by the Secretary of State for the Environment in England and Secretary of State for Wales and the conditions of appointment (sometimes referred to as the license) were originally issued in 1989 for a 25-year period and are subject to termination with a 25-year notice. The license relates to setting conditions for water services and primarily is concerned with quality of services and the charges for services to ensure that the consumers are protected.

The regulatory environment in England is characterized by various regulators with supra-national legislation by the European Union through various directives relating to quality standards, environmental regulation in England by the National Rivers Authority and the Environment Agency, economic regulation by Ofwat (now Water Services Regulation Authority) and Competition Commission and finally the quality standards are monitored and regulated by Drinking Water Inspectorate and Customer Service Committees and later on by the Consumer Council for Water. Finally, the overall regulation and management of this sectors is carried out by the Secretary of State, Department for Environment, Food and Rural Affairs.

EU Regulation

The European Union has issued a number of quality control directives over the years which England had had to incorporate into its domestic legislation under the various EU treaties. The While most directives addressed a specific aspect of water quality or environment protection, the Directive 2000/60/EC (WFD) is important in as much as

it represents the first attempt to develop an integrated European Community policy on water. The Directive claims that its purpose is to prevent further deterioration and protection and enhancement of the status of aquatic ecosystems, promote sustainable water use based on long-term protection of available water resources, ensure progressive reduction of pollution of groundwater, contribute to mitigating the effects of floods and droughts etc. The WFD ushered in a new administrative machinery to deal with water resources by prescribing river basins as units of management by creation of river basin districts. Apart from that the WFD mandated that water pricing policies should reward users who use resources efficiently, comprehensive strategies against combating pollution etc. The WFD set a target of 2015 to achieve "good" quality of water in water resources of the European Union. The United Kingdom has responded to this target by passing appropriate regulations under the Water Environment (Water Framework Directive), 2003 for England & Wales, Scotland and Northern Ireland.

The privatization initiative in England remains one of the unique success stories when it comes to privatization of essential services. Water infrastructure has received the necessary financial boost and the quality of water in rivers has improved since privatization, however, the standards set by the EU-WFD are yet to be achieved. England also faces the challenge of reigning in water services bills and these have been steadily increasing without any difference in service levels. In some instances, water companies have also been found guilty of environment pollution in a bid to cut costs. Although England's privatization model may not be perfect, it still provides interesting insights into the workings of an economic model of regulation. Whether a model like this could be adopted in a developing nation with scarce water resources or not remains an interesting question.

3 UNITED STATES OF AMERICA

History

Water regulation in the United States has been an evolving and transitioning subject over the last century. The underlying theoretical foundation it stands on, however, remains largely the same. The United States does not explicitly follow any uniform principle that guides its approach in framing policies. informs the framing of policies. This becomes apparent from its' Constitution and the series of other legislations enacted in the US.

The Constitution of the United States does not envisage a guarantee or human right to water. A right to water is therefore non-justiciable in US Courts. The US rights framework is majorly focused on the protection and enforcement of civil and political rights, rather than economic, social and cultural rights. Economic, social and cultural rights are also considered difficult to enforce before courts, as they involve questions of administrative and public policy, and the allocation of resources amongst competing groups.

State Constitutions are also not uniform in this regard. The Constitutions of Massachusetts and Pennsylvania do mention a right to water, for instance. The Constitutional language of the United States, by its absence of any mention of water rights is indicative of its approach in this regard. The fact that the US has not been forced to resolve the problem of water scarcity, and that pollution levels were not posing danger when the Constitution was adopted, may explain this approach.

The Rivers and Harbors Act of 1899 (Refuse Act), was passed soon after the 1890 statute to emphasize and strengthen these restrictions. The Refuse Act is important as it was the first formulation of pollution control policy by the United States. The Secretary of the Army initially had the authority under this Act to permit the deposit of materials in navigable waters if and when, in the judgment of the Chief of Engineers, anchorage and navigation would not be injured as a result. If such permits were granted, the deposit of materials had to be compliant with the limits and conditions prescribed in the permits. The main thrust of the Refuse Act was not to prevent discharge of pollutants for the purpose of pollution control itself, but prevent interference with navigation and transportation.

The Federal Water Pollution Control Act of 1948 (FWPCA) was the first statute, intended to control water pollution in an extensive way. Prior to this, the frequency and volume of pollutant discharges into the waters of the US had spiked significantly. According to certain reports, in 1945 over 3,500

communities had pumped approximately 2.5 billion tons of raw sewage into different waters on a daily basis. This led to a report of the Senate Committee of Public Works, which stated as follows:

> *"...pollution of our water resources by domestic and industrial wastes has become an increasingly serious problem due to the rapid growth of our cities and industries. Polluted waters menace the public health by contaminating water and food supplies, destroy fish and game life, and rob us of other benefits of our natural resources."*

The Act in its final form was narrow in its scope and applied only to interstate waters but did not afford protection to water bodies confined within one state, regardless of the extent of the contamination. This also envisaged a limited role for the federal government. Congressional policy was stated to be "to recognize, preserve, and protect the primary responsibilities and rights of states in controlling water pollution", which further stressed the detached role that Congress had envisaged for the federal government. The main focus of this Act was to provide federal loans to states for the construction of publicly owned treatment works or sewage treatment plans, not the setting of standards, performance parameters, or the regulation of water quality.

The Act was also ineffective as it gave wide powers to individual states in terms of controlling water pollution, and restricted federal power. Abatement actions could only be brought after following cumbersome, bureaucratic procedures. The permission of the State where the pollution originated was necessary for an abatement action to be brought. Naturally, this vested states with a sort of overriding power to decide whether or not to implement pollution control measures. This diluted the enforcement potential of the Act. As the Federal Government lacked the requisite power to compel pollution control measures within states, reduction in discharges was inconsequential and levels of pollution continued to rise.

The Water Quality Act of 1965 shed further light on the problems policy-makers were facing with regard to pollution control. Under the law, Congress gave each state the power to decide water quality standards for water bodies within its own jurisdiction. As an incentive, states would receive federal funds if they set these standards. However, the Act faced difficulties in terms of enforcement. This is partly because when states sought to achieve their statutory obligations, they often lacked the requisite scientific information to determine the appropriate pollutant concentrations that were necessary to support the designated uses, and so on.

The failure of these laws led to a drastic shift in the legislative approach towards environmental federalism. In the wake of worsening water quality standards and lack of effective state-action, there was a drastic shift in the legislative approach towards environmental federalism. The Senate shifted from the ambient Water Quality Standards to technology-based effluent limitations and the federal government instead of the states set these effluent limitations. This was also the first statute empowering the federal government to determine standards which would be applicable nationally.

The 1948 Act witnessed a series of amendments in the following years. It was finally rewritten in 1972 and came to be known as the Clean Water Act, which has also undergone amendments. Almost simultaneously, the Safe Drinking Water Act was passed in 1974. The former is concerned with the standards and processes for provision and supply of water to consumers. The latter is concerned with water pollution control.

Therefore, Congress has not been guided by a unifying thread such as protection of the human right to water, conservation of the environment, or public health. The larger principles have emerged on the basis of the circumstances surrounding each legislation. Alongside these legislative changes, there was a parallel development – the concerning increase in pollution levels across sectors. This increase led to discussions on environment protection, and also to the establishment of the Environment Protection Agency in 1970.

Water Policy and Legislative/Regulatory Framework

Certain disturbing developments in the 1960s culminated in the establishment of the EPA in 1970. From the 1960s to 1970s a clear principle did emerge for legislative decisions, and it marked a shift in the focus of conversations from environmental protection to public health.

The EPA was created with the purpose of constituting a centralised, federal agency tasked with the regulating environmental protection. It was tasked with implementing environmental laws, making detailed regulations and organizing existing environmental programs that were under the control of various federal departments or offices until before that. Previously, there were several agencies that were entrusted with different roles. The creation of the EPA sought to unify these efforts under one agency. Many such powers and responsibilities were moved to the new EPA.

The roles and functions of the EPA were also outlined in the statement, such as:

(a) *The establishment and enforcement of environmental protection standards consistent with national environmental goals;*

(b) *Assisting others, through grants, technical assistance and other means in arresting pollution of the environment;*

Subsequently, the Clean Water Act of 1972 and the Safe Drinking Water Act of 1974 were fresh legislative instruments that recalibrated water regulation efforts and outlined powers of the EPA and other agencies. They also detailed the applicable regulatory structure, providing the EPA Administrator with extensive powers, and marking a strong shift in the direction of federal oversight.

The Clean Water Act established national goals of eliminating discharges of pollutants into navigable waters by 1985 and of attaining fishable and swimmable waters by 1983. Yet, the Act contains language that expressly asserts the rights of individual states over water pollution control programs.

The 1972 Amendments established the foundation for water pollution regulation in the United States, and outlined a division of powers.The Administrator of the EPA was in-charge of its operation and was vested with the power to develop comprehensive programs, as also to "make joint investigations with any such agencies of the condition of any waters in any State or States, and of the discharges of any sewage, industrial wastes or substance which may adversely affect such waters."

The wide-ranging powers of the Administrator include the establishment of national programs for the prevention, reduction, and elimination of pollution. In order to achieve these purposes, the Administrator was empowered to undertake research, investigations, surveys, studies, etc., to identify causes of pollution and strategies to address it. The 1972 Act divides regulatory power between federal actors, primarily the EPA, and states. This model of cooperative federalism, has also been described as "water federalism". A cooperative federalism framework envisages the federal and state governments working together in an overlapping manner to achieve common goals. The division of powers highlights the shift from responsibility on the state government to the federal government. While the Act provides the States with powers, the EPA plays a crucial supervisory role and has the power to both set and mandate compliance with pollution standards. The Act requires that States adopt and submit for approval, water quality standards that would apply to interstate and intrastate waters. The EPA Administrator is vested with powers of approval and implementation. If the Administrator determines that the standard adopted by states is inconsistent with the applicable requirements under the Clean Water Act, he has the power to notify the State and mandate changes the State must make in order to meet these requirements. In the event that the State fails to adopt the require changes required by the Administrator, he also has the power to promulgate changes in accordance with federal standards. The federal regulatory power in this regard applies to standards set by states both for interstate as well as intrastate waters.

In the event of non-compliance or the State's proposal water quality standards being inconsistent with the requirements of the Act, the Administrator is required to prepare and publish proposed regulations setting water quality standards for the State. State agencies are also required to hold public hearings to review, modify and adopt water quality standards, the results of which have to be made available to the Administrator. Even when a new standard is adopted by a State, it must be submitted to the Administrator. Therefore, although States do have the responsibility of setting standards, the federal government enjoys an overriding power to modify and approve the same, in accordance with the Clean Water Act.

States do, however, have primary authority to regulate nonpoint source pollution and waters that are not "navigable" under the Act. The Act specifically renders it illegal for any person to discharge pollutants into the "waters of the United States" or oceans from point sources, without a permit. In terms of the nature of federalism adopted by the Act, the Act sets federal lower limits that act as a floor for water quality. States are nonetheless empowered to impose higher, more stringent standards for water quality protection within their territories. This allows the States a certain degree of flexibility depending on the condition of their waters, for the purposes of drinking, fish production and sewage/industrial waste tolerance.

The domain of the Safe Drinking Water Act of 1974 differs from that of the Clean Water Act. In a complementary manner, they together cover the full extent of regulations on water contamination in the US. This Act was amended and reauthorized in 1986 and 1996. It is the federal law aimed at regulating and ensuring the necessary quality of drinking water received by consumers.

In terms of federal-state division of powers, the Safe Drinking Water Act follows the same scheme as the Clean Water Act. It authorizes the EPA as the federal body to set national standards for drinking water. The EPA works with states, localities and water suppliers to carry out these standards. The scope of this Act does not extend to individual private wells, but only to public water systems.

This legislation regulates the different types of public water systems, which exist in the US, as different standards apply to different types of public water systems. Uniform standards are not applicable to all kinds of public water

systems: (a) Community Water Systems (CWSs): These provide water to the same population all year-round, and therefore cater to domestic/residential accommodations, for example, homes and apartment buildings; (b) Non-Transient Non-Community Water Systems (NTNCWSs): These provide water to the same people for at least six months in a year, but not during the entire year. They mostly supply water to places such as schools, factories, churches, etc; and (c) Transient Non-Community Water Systems (TNCWSs): These provide water to areas where people do not remain for long periods of time, such as gas stations.

The mechanism by which wastewater treatment takes place, the steps involved and the magnitude of the process's impact is relevant in this regard. A wastewater system enables the conveyance of wastewater from sinks, showers, and toilets in homes and businesses to a Publicly Owned Treatment Work (POTW) as well as the outflow pipes that carry clean, treated effluent back to the environment. The first and most basic form of treatment is known as sedimentation during which suspended soils are filtered out of the water. Secondary treatment removes dissolved, biodegradable organic matter. Further advanced treatment may be required at certain plants for the purpose of removing other chemicals and pollutants which secondary treatment was unsuccessful in removing. The treated effluent is then disinfected and released back into the environment.

In terms of additional responsibilities, the EPA Administrator must promulgate national primary drinking water regulations which shall be applicable to public water systems, and specify contaminants which may have an adverse health effect. These regulations are required to specify a maximum contaminant level, treatment techniques to reduce the level of contaminants, criteria/procedures to assure a supply of drinking water which comply with the maximum contaminant levels, methods for quality control, proper operation and maintenance of the system, minimum water quality which may be taken into the system, etc. The Administrator also has the power to add other effective quality control and testing procedures which need to be published. Similarly, there are secondary drinking water regulations which apply to public water systems and are required to protect the public welfare. Therefore, the standards for drinking water, which is supplied through public water systems, are set by the EPA in exercise of its federal powers under the Act.

States have the primary enforcement responsibility for public water systems. They are required to show that they have adopted drinking water regulations which comply with the minimum standards imposed by the national primary drinking water regulations. This determination is to be done by the EPA Administrator. The States must further ensure that they have adopted adequate procedures for the enforcement of State regulations, which can include monitoring, reporting, record-keeping, inspections, as required by the Administrator, once again. The EPA also has extensive control over these regulations. If the Administrator concludes that a public water system fails to comply with the national standards, he is required to, first, notify the State and the public water system, provide advice and technical assistance to them such that the system is brought into compliance with the national requirements. In the event of the State not having commenced enforcement action as required, the Administrator is then required to issue an order requiring them comply, or to initiate a civil action. Where the State does not have the primary enforcement responsibility under the Act, these steps must be taken by the EPA against the public water system itself.

It is crucial to note that the Act mandates these actions on the part of the EPA Administrator in the event of non-compliance by states or public water systems. The text of the statute does not suggest that this is a discretionary power. The EPA enjoys extensive federal powers under the Act to set standards, as also ensure their implementation and enforcement. The States and local agencies are responsible for actually applying those standards in the specified manner. Non-compliance by the states and local agencies triggers the EPA's duty to take action under the Act.

The National Pollutant Discharge Elimination System (NPDES) Permit System is an integral part of the pollution control framework. Under the Clean Water Act, discharging pollutants through a point source into a water of the United States is prohibited without an NPDES permit. These permits contain limits on what could be discharged, the monitoring and reporting requirements (including in certain cases, generic best management practices), and other provisions to ensure that the discharge does not hurt water quality or people's health. The permit generally specifies an acceptable limit of a pollutant in a discharge. The permit system allows for the provisions of the Clean Water Act to be translated into specific provisions that could be tailor-made to the needs and operations of each person discharging pollutants under such permits. The NPDES permits ensure that a state's mandatory standards for clean water and the federal minimums are being met, as the permit will specify limits accordingly.

Financing Models

Under the 1972 Act, the EPA was required to fund the construction of sewage treatment plants under a program called the Construction Grants Program. In the year 1987, the State Water Pollution Control Revolving Fund, also known

as the Clean Water State Revolving Fund (CWSRF), was the form it took. This fund is a federal-state partnership that provides communities with a permanent, independent source of low-cost financing for water quality infrastructure projects. Prior to the 1987 Amendments to the Clean Water Act, the financing model entailed federal construction grants, which was changed to a state managed program through the CWSRF. In 2014, the Water Resources Reform and Development Act amended the CWSRF program.

Under this Fund, the EPA provides grants to all 50 states to capitalize state CWSRF loan programs. The states are then required to contribute 20% of the funds granted by the federal government. These CWSRF programs in every state operate in a manner similar to environmental infrastructure banks by providing loans at low interest to eligible recipients for water infrastructure projects. The repayments of loan principal and interest earnings are recycled back into individual state CWSRF programs to finance new projects that allows each such fund to revolve at the state level. By structuring these funds in a revolving manner, the resources continue to be available for the foreseeable future. The assets of the CWSRF may be used for several purposes and by employing different financial strategies/instruments, such as the security and repayment of municipal bonds issues, expanding the amount of funding for certain projects, providing assistance in the form of loans, refinancing, purchasing or guaranteeing local debt, guaranteeing loans of sub-state revolving funds, additional subsidization and purchasing bond insurance. They also have the power to decide on specific loan terms, such interest rates from zero percent to market rate and repayment periods of up to 30 years.

However, these federal laws such as the CWA and SDWA do not address questions of water pricing policy. Publicly owned systems are supervised according to federal statutes but these do not specify pricing practices in the water sector. These are dealt with by local and municipal bodies. Traditional pricing policy considers the costs of capture, treatment and supply. The pricing is determined by broad factors such as the service population's ability to afford stipulated rates, the effects of conservation rates on the revenues of a utility, and actual effectiveness in reducing water demand. Under this model, end consumers pay for water services through tariffs, user fees, etc. Pricing policy, according to the EPA, is required to consider and reflect the true costs of providing high-quality water and wastewater services to consumers in a manner that allows for the sustainable maintenance of infrastructure and plan for upcoming repairs, rehabilitation and replacement of that infrastructure.

Enforcement Challenges

The financial and other challenges faced in the US are fairly city-specific and depend on the circumstances at play in the problematic regions. Due to these problems in several regions, a number of cities and municipal departments offer customer assistance programs and preferential rates for water tariffs to consumers.

Another kind of problem in the implementation of water-related regulations and programs stems from inefficiencies and maintenance. Water that is treated by utilities but subsequently lost through physical leaks, monitoring errors, metering problems, unauthorized consumption, etc., is called "nonrevenue water". The problem of inefficiency-related water loss does not appear to be unique to the US, but is likely to arise in any country/city where infrastructure is aging and budgets are restricted. The concerns with aging water infrastructure are discussed in the next portion.

Outages or surface water releases are another kind of enforcement challenge. In situations where the treatment plant suffers an outage or there is excessive waste as compared to the capacity of the plant, untreated waste may be released to surface water. Incidents of this kind in the US have been on the rise over the last few years.

This is a significant problem, because combined sewers are representative of very early water treatment infrastructure. These kinds of sewers were not designed to handle the stream of wastes that they are required to at present. They were originally built and designed to solve problems of cities with smaller populations. For instance, according to the New York Department of Environmental Protection, a storm in 2014 triggered a release into Lake Erie from Detroit, Michigan of over 44 million gallons of raw sewage from sanitary sewers and 3 billion gallons from combined sewers. These instances and reports clearly illustrate that even with laws and regulations in place, the absence of strong infrastructure and maintenance has the potential to break down the mechanisms already in place.

In terms of the cooperative federalism approach adopted by the US as well, there has been severe criticism of the Obama administration in recent years. During the first term of the Obama administration, the EPA issued 95 regulatory disapprovals under the statutes, essentially rejecting implementation plans prepared by States. It has also been observed that Federal implementation plans, or FIPs, had been issued 54 times since 2009 till 2013. An FIP imposed by the EPA implies that the EPA usurps the state's regulatory authority under the CWA and CAA. This has been another strongly contested issue in terms of implementing water and air pollution control policies.

CONCLUSION

A clear pattern seems to appear from these studies: The legal and regulatory framework governing water in any particular country, and the way it has evolved, is in some part a function of its history and the availability of water resources. Historically, the abundance or scarcity, of water in a country, appears to have significant influence in the way these processes are shaped.

For instance, South Africa's unique geography and history has led to the focus of its framework being on ensuring basic minimum quantities of water for everyone. While in the post-apartheid era, right to water has been framed as a basic Constitutional right, the regulatory framework has the unenviable task of balancing this rights framework with sustainability principles given the country's water scarcity. Water in South Africa today; if one were to look at the inequalities prevailing in supply and sanitation facilities between the rich municipalities and the poorer municipalities; could easily become a metaphor for continuing class and race-based discrimination. How South Africa balances its neo-liberal policy objectives of treating water as an economic resource as well as a basic human right guaranteed by the Constitution will be an interesting evolving story.

On the other hand, in England; blessed with abundant fresh water; the history around regulation has been about providing last-mile services, improved quality of drinking water and water sources and prevention of outbreak of diseases. For all the criticisms of England's privatization experiment with water, it has been a success but that does not mean that this is a model that can be easily replicated. The English government's commitment to consumer rights and to EU standards will be tested in the coming years. On one hand, the price paid by English consumers for water derived from common public resources is steadily increasing and on the other hand, the confusion around Brexit is most likely going to be a roadblock on England's path towards meeting EU quality standards.

The US has followed an approach similar to the UK. The abundance of water resources resulted in initial water-based legislations to focus on intra-waterway trade and commerce. Water does not form part of the rights framework in the US. The Constitution, therefore, envisages no human right to water. Throughout the 1800s, themes of water conservation and pollution-control were absent from the discourse. The present frameworks, including the establishment of the EPA, finally arose as an abrupt response to a growing water pollution crisis in the 1960s. Over the last sixty years, these frameworks have been strengthened and weakened. The US model of 'water federalism' vests with the federal government with wide standard-setting and oversight responsibilities over water pollution and discharge. However, ensuring access to water, along with issues of tariffs, entitlements, cut-offs etc., fall within the domain of States. This has led to divergent approaches, and consequently diverse results, ranging from State to State. Similar problems do emerge in varying places, including contamination of water in public water systems, failure of old infrastructure and mass shut-offs to name a few. The overall condition of water pollution and access is far from positive in the US, and requires systemic overhaul.

These experiences derived from regulatory frameworks from various countries will not be constant and it would be impossible to conclude that one model is better than the other or even find a perfect model. The pressures on the planet's resources are constantly increasing and in the context of water – erratic rainfall and reduced flow in rivers due to climate change and rapid urbanization in developing countries would only exacerbate the problem. As mentioned earlier, the demands on our scarce water resources will come not only with the need for supplying drinking water to the population but also for maintenance of functioning sanitation systems in the new cities of the world. In this regard, any regulatory framework's first task would be to divide up the responsibilities in such a way that the rights of the citizens are balanced with the needs of the planet so that we do not outlive them.

SCALING CITY INSTITUTIONS FOR INDIA: SANITATION (SCI-FI)

Sanitation programme at the Centre for Policy Research (CPR) is a multi-disciplinary research, outreach and policy support initiative. The programme seeks to improve the understanding of the reasons for poor sanitation, and to examine how these might be related to technology and service delivery models, institutions, governance and financial issues, and socio-economic dimensions. Based on research findings, it seeks to support national, state and city authorities develop policies and programmes for intervention with the goal of increasing access to inclusive, safe and sustainable sanitation. Initiated in 2013, the programme is primarily funded by the Bill and Melinda Gates Foundation (BMGF).

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