CONCLUSION

The traditional water management systems in Bombay city consisted of tanks and wells; many of which were constructed by the wealthy people of all creeds in the city. Rainwater harvesting was also not uncommon. In times of scarcity right up to the 1850s, even under the East India Company, tanks and wells continued to be preserved and improved upon. Further, scarcity prompted an increase in works of a perennial nature, since native attitude towards water was one of charity. Though scarcity was an accepted problem it was confined only to the months of summer.

The water crisis of 1845 proved to be a turning point in the water history of the city as it led to the appointment of a two member committee to look into the problem and subsequently engineers were called upon to suggest measures which finally led to the proposition of Vihar in the region of Salsette. But the original Vihar scheme, of Capt. JHG Crawford, changed with the entry of Henry Conybeare, Superintendent of Repairs. Considering the promising prospects of the city as a centre of commerce and trade, the latter interpreted the scarcity in the light of Bombay’s future growth and suggested a bigger venture which would supply copious amounts of water.

Thus, Vihar, instead of being an undertaking to supplement the existing sources, emerged as an independent enterprise that would supply the city irrespective of its traditional systems. However, the gestation and execution of the scheme were mired in controversy. Executed in the absence of Conybeare, its chief architect, initially under a surveyor and thence under an unscrupulous Resident Engineer, Heneage Walker, and equally deceitful contractors, the works, emerged as extremely defective structures causing immense problems to the public, apart from imposing a huge debt on the fledgling Municipality of Bombay. Nevertheless, they set the blueprint for the future growth of the hydraulic systems in the area of urban water supply management.

In the post-mutiny years the British policy, guided by the needs for safety and security, further encouraged the proliferation and ascendency of the hydraulic system. In this period sanitation emerged as the buzz word and became the new instrument to control
the traditional systems. Thus, commercial considerations and technology combined with
the sanitary sword to create a hydraulic empire which completely changed the shape of
the city. This resulted in the rapid shutting of tanks and wells; an act which was decried
by the natives.

Rapid demographic and commercial growth of the city increased water consumption
phenomenally. Ironically, water works such as Tulsi, Tansa and the service reservoirs,
which provided employment opportunities, actually contributed to the growth of the city
thereby straining its water supply system. Therefore, the Municipality was constrained
to create Tulsi, Powai and Tansa within the next 97 years in quick succession. Improper
regional planning in the post independence period added to the problems. The city thus
came to rely increasingly on water resources situated at longer distances in the
hinterland.

Since water supply projects required thorough investigations regarding source, quantity,
quality, methods of distribution of storage and water supply, they marked the beginning
of surveying techniques in the urban areas. In this way the British were able to establish
a thorough hold over the city.

Though based on scientific knowledge and planning, the water management system of
the period could not solve effectively the problem of water scarcity for the masses since
the benefits of the new system did not percolate to them; they being seen as a part of the
sanitary problem and their otherness being used as an excuse to justify the treatment
meted out to them. As a matter of fact, the Government seems to have been guided by
the principle that the charity of the rich natives could still relied upon to cater to needs
of this class.

Planning could not solve even the most important question, regarding the minimum
amount of water required per head per day as the perspectives, on this, differed among
the engineers and sanitary authorities. Ironically, though the majority of the natives did
not have access to piped water supply, their habit of using more water was, in some
measure, taken as the index for determining the increase in supply. Leakages and
wastage of water during its supply, distribution and consumption completed the chaotic scenario.

Further, the question of water supply was focused on more from an engineering and financial point of view. Thus, the concept of need was defined with an engineering bias, and with constant reference to the future. In the implementation of all these works the British were guided by the firm belief of the superiority of the English engineering skill over that available in India. Hence, for a long time the works came to be supervised by the engineers brought from abroad. Native engineering skills were therefore conspicuously ignored. Sadly though, the arena of engineering was riddled with professional rivalry and differences of opinion with regard to engineering practices. Experimentation loomed large in all cases. Inevitably therefore, the nature and size of the original schemes changed.

The process of technology transfer was also complex. This was so as technology was not without its flaws. It was used in a rather theoretical than practical manner resulting in frequent failures. All subsequent works proved the defects of the preceding technology, thus showing that engineers learnt from their failures and that though the cheapness of any project was the guiding factor, the end costs exceeded the original estimates. But this was not all. Even in the case of technology, slack supervision and corruption, besides the tardy working of the Government machinery, which took agonizingly long periods of time for decision making of any kind, contributed no less to this failure. This was evident in the case of Vihar and Tulsi. Thus, work was kept pending which affected its quality. These problems continued to bog the Corporation, even in the post independence period.

Rigid fiscal and administrative policies of the Government of India added to the difficulties. Thus, the municipality was very often left to struggle with the finances of the water management schemes. Loans, when tendered were delayed and terms of repayment made difficult. Besides, the Government refused to pay water rates on its property much like the ordinary consumer.
Municipal governance too lacked efficiency. Although there were financial constraints with regards most of the schemes, yet, the needs of good clear specifications, letting of contracts, competent supervision and severe penalties for non performance and shirking of work, necessary for economical works were conspicuously absent in the execution of all the schemes, which added to their final costs.

Municipal reorganization with centralization of authority in the hands of the Commissioner emerges as yet another conspicuous feature of the British policy, especially to deal with the challenges created by the new centralized water supply systems. This resulted in tightened control over the city, its people and its traditional water supply system.

Waste water management systems, as important an aspect of water management as provision of water supply, were not provided immediately after the entry of Vihar. Thus, although the declared objectives of the Government policy were to execute the Victorian sanitary paradigms, which gave great importance to the removal of waste water, Bombay, in the immediate post Vihar period, did not witness a commensurate improvement in drainage and sewerage.

Right up till 1877, this area remained an arena of controversies and debates. The drainage and sewerage of the island was even otherwise a difficult proposition since reclamations and its own geographical formation had made the island prone to flooding. Administrative procrastination, popular colonial prejudice against the available engineering talent in the city and delays in surveys further impeded performance in this area. Thus, several schemes submitted up till 1857, were cast off on account of their cost, lack of perfection, or simply due to their absurdity. Strangely enough the question of drainage was considered so important by the Government that it insisted on entrusting this work to only a few select engineers who were ‘experts’ but not familiar to the city thereby resulting in gross errors. Ultimately though, experience was gathered via experimentation.

In the 1860s, schemes submitted by engineers such as Tracey and Russell Aitkens suggesting the sewerage of the island with multiple outfalls on the eastern and southern
sides were rejected as it was feared that the harbour would be affected as a result. From the 1860s, the drainage and sewerage issues also came to be tied with the rising fortunes of the city as an important port and trading centre. The method of sewage disposal and the location of the outfall emerged as the most difficult questions at this time. The debates on this as well as the proposals for sewage irrigation, which received attention from the engineers and doctors, indisputably bring out the experimental nature of sewage disposal, thought of by administrators at this time. The other disputed areas were underground drainage, type of drainage and night soil disposal.

The 1870s however, proved to be a turning point in this area. Due to the spectacular growth of the city, especially towards the North, the need for additional land on the Flats, for building purposes and the insistence of the Army Sanitary Commission to remove the system of open drains which caused disease and death and were costly to maintain, Governor Sir Richard Temple’s reign saw the introduction of the new underground system of sewerage with the water carriage system, with the sewerage outfall at Love Grove in Worli. It was met with resistance from people as well as engineers.

Sewering the city did not prove to be an easy job either as the Municipality did not receive any monetary assistance for the same from the Government, despite being compelled to accept the dictate. Engineers were faced with a difficult terrain, and opposition of natives from whose lands the systems had to pass. Indian flora such as Banyan trees created problems which were tricky to overcome. Even ventilation of sewers emerged as a vexatious problem.

Introduction of water closets, a must to complete the picture, proved equally challenging. Inadequate quantities of water, required for flushing the systems, the complexities of the designs apart from the costs which had to be borne by the people, its foreign nature and their caste compunctions came in the way of the successful functioning of the system. Equally sticky were the native habits of misusing the system as a result of which sewers choked up very often. Even so, in the in the wake of the subsoil controversy and plague in the 1890s, the bouts of malaria in the 1900s and
recurring cholera, the move towards house connections and water closets intensified. From 1939 onwards, in order to accelerate the conversion of the basket privies into water closets in the unsewered areas, subsidies began to be given to owners. But the shortage of water supply, and the enormous congestion and overcrowding came in the way of the success of the schemes as well as the cleanliness of the city. Besides, the initial plans of sewerage did not encompass the whole city. The sewerage, which came into being, therefore, was defective, incomplete and inchoate.

Once again, Government policy looked at the municipal law as the panacea to many of these problems. But this too did not prove particularly effective. Thus, the responsibility of maintaining the house connections was thrown upon the people. Further, to prevent the committal of public nuisances, public conveniences were erected. These and the different types of conveniences designed for the Europeans and the natives reflected the prejudices of the British.

Sewering the city did not solve its biggest problem that is disposal of night soil. The inhuman halalkhore system, which the new sewerage system was supposed to have annihilated, continued alongside. Nor was the city emancipated from the recurring problems of rising subsoil water and flooding leading to the referral of these questions to engineers such as Baldwin Latham and Santo Crimp. But to no avail.

Other problems that assailed the sewerage at this time, besides the huge quantity of sewage, were its acidic nature and enormous detritus component. These made disposal of sewage an energy intensive area with high maintenance costs. Eventually, even Love Grove was grudgingly accepted as the outfall of the city due to the prohibitive costs of shifting it to another point and the Activated Sludge Disposal method was used to treat sewage before its discharge into the sea. This method had to be recoursed to because of the engineering difficulties encountered in the extension of the outfall deeper into the sea at Love Grove.

Sewerage systems however, evolved in the suburban areas slowly and in a dissatisfactory manner. The city thus emerged with a very complex drainage and sewerage system which required to be refurbished at regular intervals at huge costs. Its
development also highlighted the striking differences among the engineers themselves as well as administrators and doctors. Furthermore, it brought to light the subservience of the Municipality to the Government on the one hand and the mismanagement of the whole issue by the former on the other.

Flawed water distribution and waste water disposal made the city environs insanitary. Thus, diseases such as cholera, malaria and plague, apart from others continued to trouble the city. But since they were threats to the imperial trading in the city they brought about changes in the water supply management. The manner in which diseases were handled also reflects the attitudes of the Government towards the masses besides, revealing their living condition. Moreover, these diseases had a great impact on the quantitative and the qualitative aspects, of the traditional and the new water supply systems.

The significance of cholera stemmed from the fact that Bombay had earned international notoriety on account of this disease which acted as a serious threat to its trading prospects. Despite the creation of a new water supply system on scientific lines the risk of cholera was not annihilated for several reasons. An intermittent and defective distribution system and supply to the natives via faultily constructed dipping wells ensured an impure supply thereby increasing the threat of cholera. The risk increased further as these pipes passed through dirty subsoil water which resulted in the entry of sewage or sub soil water in the pipes.

The increase in supply of water without a commensurate sewerage system increased the subsoil water. Therefore, completion of the sewerage systems was insisted upon. But this did not solve the problem effectively. Since there was no reliable explanation for diseases, the colonial prejudices about race and culture were reinforced. Instead of filtering water the British policy recoursed to exclusion, isolation or destruction of the source from which the poison emanated. Further, the onus of purifying water was thrown on the people with the recommendation that every house should have a filter. It was only in 1875, with the rumour of contaminated water, being supplied to the ships, that filtration of the lake was recoursed to.
In the case of the Tulsi, it was the unusual amount of sickness of the troops stationed at Colaba, which was supplied with Tulsi that caused a stir. Filtration at Tulsi was also accompanied by the development of service reservoirs with the inclusion of a Settling Tank, Filtration Beds and a storage tank under one bed, under the Malabar Hill Reservoir. Tansa water was however not filtered till 1900 as the areas available for creation of filter beds, at an elevated level, were limited. Besides, the Municipality was convinced that it was good drinking water, even if withdrawn under the worst possible conditions.

Technological intervention to deal with the problem from 1876 onwards was only partially successful. In case the lake levels were low, the water to the city could not be filtered. Faulty construction of the service reservoirs was an additional problem. Non performance on the part of the contractors and lax supervision on the part of the Corporation were additional reasons for the ineffective performance in this area. All the same it must be admitted that the disease prompted the use and growth of water purification technology.

In the years that followed Koch' discovery of the comma bacillus, cholera was firmly accepted as a water borne disease. Wells and tanks came to be universally decried during this period. Thus, began a new move towards the sanitary education of the people thereby marking a shift of responsibility from the Government to the people, in the area of cholera prevention as well. But, this idea was resisted by Indians as they felt, that it was the business of the Government, more than the Municipality, to supply pure drinking water. In the 1920s, chlorination was introduced to purify water but this had a corrosive effect on the plant thereby increasing the maintenance costs. Other attempts to purify water included the use of Gourami fish copper sulphate and cleaning of the Vihar Lake.

Malaria did not cause much mortality, but was directly associated with a loss of wage earning capacity and indirect monetary losses to the city. Besides, it gravely interfered with the work of the Port Trust and the GIPR owing to the absence of workers and the staff. From 1902 onwards attention began to be focused on tanks and wells where
mosquitoes were to be found to a limited extent. From 1903, a regular system of cleaning tanks and wells came to be organized. The severe malaria epidemic of 1908, which impacted Punjab and Bengal, prompted the Government to execute more draconian measures resulting in the appointment of an expert Malariaologist, Dr. Bentley. His report, which indicted the Anopheles Stephensi, the villain that prospered in the wells of the city, mentioned very stringent measures against these water bodies.

From now on, mosquito breeding was declared a statutory nuisance and the Municipal Commissioner was empowered to take action himself for the abatement of such a nuisance and also to delegate power to the Executive Health Officer or to a responsible assistant. Registration of wells and acquiring licenses for the same became mandatory from now on. Suitable amendments were also made to the Municipal Act to aid the Commissioner in his move to prevent Malaria. The drive against the tanks and wells of the city also received a boost on account of this campaign. Ignoring the protests of the planners, engineers and natives, against the move, the Government went ahead and transformed the city's landscape by shutting them down in large numbers. However, it showed a distinct leaning towards the mill owners, by allowing them concessions, as their case was represented by Homi Mody the chairman of their association. The malaria campaign also highlighted the land grab politics of a space starved city.

The move to stamp out malaria also impacted the water supply arrangements within the houses and elsewhere in the city. The campaign, on the whole, was however not totally successful, as the railways and the mill owners refused to comply very often. Therefore, it also played up the weakness of the Municipality before these authorities. With the merger of the suburbs the drainage problem increased. Excessive and uncontrolled use of waste water for irrigation, by grass cultivators, from open drains in places like Bandra, Kherwadi, Bramhanwadi and Chembur, further aggravated malaria.

The plague of 1896 brought about a direct attack on the insanitation of the city, resulting in the consumption of large amounts of water to cleanse the city and provide to the suburbs. The plague made water supply more public as standpipes were substituted for water taps in a large number of areas.
This was followed by a demolition drive of the houses characterized as UHH (Unfit for Human Habitation) if they could not be adapted to the new sanitary requirements prescribed by the Municipality. Inaccurate surveys conducted by the house inspection establishment, of the Municipality, for this purpose, condemned 90% of the houses. The plague thus proved to be a turning point from the point of view of construction of sanitary housing. Here onwards, great importance began to be attached, by the Government to the space, ventilation and plinth of the houses as also water supply arrangements, within the house wherein specifications were made for all washing places, courtyard and nahanis.

At the same time it also catalyzed the Government’s move towards sanitary housing for the workers with the provision of water supply, sewerage and ventilation as its major constituents. Therefore in 1898, the City of Bombay Improvement Trust and in 1920, the Bombay Development Department, inaugurated a new era in the sanitary housing of the working class of the city.

The Trust however, was unable to provide the promised cheap housing as, the provision of water supply and sewerage, ironically, added to the cost of these houses. The workers could not afford these rents. Thus, though the Trust increased the road network to 168 miles, housing still remained a problem. But it made matters worse by adding to the congestion, in the city and the financial burdens of the Corporation thereby jeopardizing the city’s water supply schemes.

The continued insanitation and the bouts of labour strikes, as well epidemics faced by the city in the post World War I period, forced the Government to direct its attention to sanitary housing again. Hence, the Bombay Development Department was created to provide sanitary accommodation to the workers.

The construction of these sanitary chawls of the BDD too had to be preceded by the provision of essential services such as roads, water supply, sewage and storm water drains. But, the provision of these two sanitary services never figured in the initial cost of construction. Further, owing to the lack of pressure in the municipal mains and to the want of low level sewers of adequate capacity in the neighbourhood of the chawl areas.
only temporary water supply arrangements could be made to these buildings. Water shortage was also experienced on account of heavy charges imposed by the Corporation on the Development Department. Flooding of the chawl sites was also a recurring problem due to absence of adequate sewers. The water supply shortage to the site of Worli especially, could never be addressed as the Municipality refused to provide the additional mains required for the purpose. For the rest of the sites the idea of centrally located water supply tanks could not be provided either, as the work of the BDD and the BIT was uncoordinated. Therefore, it was accepted that these conditions would prevail indefinitely and rectification would entail considerable work and expenses in the years to come. Even the BDD chawls lacked the desired occupancy, on account of high rents despite the poor water supply and ventilation, and remained a burden for the Government. Though the Congress Government took up their cause in 1937, it was unable to successfully solve the problem. Sanitary housing therefore remained an unfulfilled dream. Thus, poor planning combined with conflicting imperial and local interests further thwarted the dream of sanitary housing for the labour in the city.

Sanitary needs of the city however, drove the idea of suburban expansion; a plan which had been entertained since the 1860s. But it was the plague of 1890s and the congestion caused by the haphazard growth of the city that really gave a momentum to suburban migration and thence its development. By the first decade of the 20th century, Town Planning began to be viewed, as a solution for insanitation in cities, all over India. In Bombay, the Salsette Island with its favoured areas of settlement Thana, Kurla, and Bandra began receiving much attention. The passage of the Town Planning Act in 1915 gave a further impetus to suburban development.

The greatest requirements for the development of Salsette were water supply, drainage and sewerage and effective communication. Typically however, the Government followed a contradictory policy of encouraging migration while at the same time creating hurdles in the form of taxes. This stopped the rush of people to Salsette, and deterred capitalists, from escalating their area of operations. Prospects of the growth of the island were further hampered by the dismal state of its local self governing bodies.
Multiplicity of municipal authorities and inter suburban hostility, also posed a serious challenge to the growth of water supply and drainage and sewerage here.

Yet it was the water management policy of the Government that emerged as the biggest hurdle in the development of this area. Here it had to choose between two arrangements: that of supplying the suburban region from the mains of the Bombay Corporation or an independent scheme; a question that could never be resolved. Pending the settlement of this question, up to 1920 therefore, various ingenious means were mulled over by the Government to facilitate the growth of this area. These ranged from the consideration of supply of tail water of the Tata plant at Khopoli to boring experiments, both of which were discarded as soon as they were conceived. Later, the Aarey valley scheme was pursued in a lackadaisical manner by the Government and even the idea of utilizing the Powai Lake, as a temporary measure, was revived when water shortage began to jeopardize the development of an industrial corridor from Kurla to Thana, in the Eastern Salsette region. This too was abandoned after considerable expenditure. Even though the suburbs continued to be supplied water by the Bombay Municipality, the rates and the quality of water remained a source of friction. The Government also showed a distinct inclination towards industrial consumption over domestic consumption.

At the end of the First World War, the Government formed the Development Department as well as the Bombay Suburban Division, with a view to systematically developing Salsette primarily for the sake of the middle class and the lower middle class. When the Development Directorate took over in 1920, it worked with a different vision; that of Salsette being developed as an urban area with a view to its ultimate inclusion in Bombay city. Therefore, it worked with the idea of a single water supply system. Hence, it was decided to continue water supply to the suburbs from Tulsi and Vihar. The Powai works were reserved by the Bombay Municipality for being incorporated with the city’s water supply. Hence all the works of improvement at Powai were wasted. Even the Aarey scheme was dumped as it was felt that the scheme would not be able to supply sufficient water after 10 years.
Expecting cheaper supply of water the suburbs looked forward to the takeover by the DD which however, took place only after 1925 as the sale of lands to the suburban areas dropped by 1923-24. Plots were however sold without any definite promise of water supply, especially in areas such as Trombay. Besides, there was much wrangling over the terms of water supply to the DD by the Bombay Municipality. Water supply via the DD ultimately proved to be as disappointing as ever before. Being simply a delivery boy, the DD proved to be a risk-averse body that refused to take over schemes that did not promise profits. Water was therefore supplied on the basis of financial forecasts. Even if water was urgently required, people could not get it, till the schemes became self supporting in nature. Although the coordinating agency, for the development of Salsette, the DD was not directly responsible for anything, except to ‘advise and assist’ the existing municipalities in the process of development. The actual responsibility devolved on the local Municipalities which were financially weak. Money for the planning of water supply and drainage schemes was extracted from these bodies, irrespective of the acceptance of such projects. The terms of supply imposed by the DD also proved to be very harsh as it wished to free itself from the control of Bombay Municipality and at the same time exercise rigid control over the suburban municipalities.

High water rates, to earn profits as well as recoup the losses, suffered on account of Powai, poor quality water, hostility of the Bombay Municipality, therefore continued to characterize the water supply management in the suburbs. The policies of the DD actually retarded the sanitary progress of the suburbs. The suburban citizens therefore agitated for delivery from the delivery boy and mooted the idea of a Water Board in place of the DD and also suggested direct contracts between the several Local Bodies and the Bombay Municipality. But their wishes remained unfulfilled.

Suburban drainage and sewerage suffered in a similar manner due to multiplicity of authorities and the inability on the part of the Government to decide the outfall issue.

In 1931, the Bombay Municipality took over the suburban water supply once again. In 1933, the idea of the amalgamation of the suburbs by dividing the Bombay Suburban
Division into 2 divisions was reconsidered but rejected. In 1936, with the agreement of the Bombay Municipality, to supply water to Salsette about to expire, the idea of a lake and dam at Kanheri valley and alternately the Powai resurfaced. However, none was taken up.

Soon after the war, alarming congestion in the city yet again drove the idea of the annexation of the suburban region. In 1945, the jurisdiction of the Bombay city police was extended to the suburbs to obtain greater control over the criminal activity there. By this time, the Government was keen on improving the civic administration of the suburban area as they were losing popularity on account of their inferior social and civic services as compared to those at Dadar and Matunga. It was felt that if the development of this region was not regulated then the health conditions in the suburbs would be seriously jeopardized, which in turn would affect the health of the Bombay city. People of the suburbs were attracted to the idea as they anticipated better facilities. Bombay, on the other hand, required the suburban region for thrusting the surplus population and dirty industries.

Finally, after much debating the suburban region was annexed to the city in two phases; 1950 and then 1957. Even after the merger within the limits of the city proper, the people were disillusioned with the poor civic amenities provided to them, and the additional taxation that was imposed. Complaints of water shortages were frequent due to inadequate sizes of connections, absence of connections and manipulations of supplies by landlords.

The new water supply system came at a cost. The visible cost came in the form of direct and indirect taxation at the city level. Further, it created certain issues that defied solution. Finance, the very basis of the new systems was always a source of problem. The solution was found in increased taxation. Although the water supply was eventually appropriated by the affluent and the powerful they refused to bear the increased taxation caused by these schemes. An aversion on the part of this section, to paying taxes and rates for the sake of the new supply, led to the imposition of town duties, even on the necessaries of life such as ghee, legumes pulses and so on, resulting in immense distress.
to the poor. Vihar thus, unleashed the trend for calculating town duties in advance for every extension of water supply. Consequently, town duties emerged as a permanent source of revenue for the finance of the water supply schemes.

By 1870s, due to the Government policy of decentralisation it became necessary for municipalities to raise their own finances. With increasing revenue from Vihar and the impending construction of Tulsi, for which money was once again required, water came to be seen as a source from which the schemes could be financed. Right up to this time, water was regarded as a service since it was not laid on all houses. To give it the legitimacy of a tax, it was necessary to lay it on all houses. This was done through the instrument of the Municipal Act of 1872 and the assessments of properties and surveys, carried out at this time, greatly aided in this process. The Municipal Acts of 1878, and 1888 increased the tax net further. As the number of properties assessed, in the city, grew so did the incidence of taxation and proportionately the income of the Municipality. The incidence of taxation, per head of the population thus grew.

Throughout, this period however, great favour was shown to the GIP Railway Company, Port Trust and Peninsular and Oriental Steam Ship Company. Similarly, concessions were granted to commercial premises. Despite these favours conflict could not only not be avoided, rather, misuse was made of the concession so granted.

With changed consumption patterns, waste of water emerged as a significant issue. Easy availability of water and faulty distribution made the problem of waste a grave one. Typically, the blame was laid at the door of the native although road watering consumed a lot of water. Introduction of meters in the 1860s could not control the problem. Therefore, bye laws were made stricter and even reporting against those who violated rules was encouraged. From 1880 onwards, fixing of meters in dhurumshallas and mosques as well greatly heightened the sense of betrayal and alienation among the Muslims. Notwithstanding these measures, by the beginning of the 20th century. 43-44% of the water supplied was being wasted on account of defects in the distribution system. Remedial measures included fitting of Deacon’s meter, reorganization of the Water Works Department and the creation of the Waste Prevention staff. Waste of water
continued nonetheless. Up to 1950, most of the supply for domestic use in the city was unmetered. With the merger of the suburbs a new policy was adopted after some litigation. From now on, new buildings in the city, old buildings with flats and all the buildings in the suburbs were to be wholly metered. This process proceeded vigorously for a few years but the pace slackened after 1960.

Although the new supply systems came to free the city from the bounds of environmental limits, the city, at this juncture failed to realize its interconnectedness with the fringes and the hinterlands that were tremendously impacted. The inhabitants, of the latter areas, bore the real but unacknowledged costs. Visible in the form of land acquisitions leading to displacements, and forest regulations these changes became a part and parcel of the urban and rural administrative scenario.

The compensation policy of the Government, for the people displaced due to the water supply schemes, did not take into account the serious problem of loss of occupation. Money was paid only for the capital actually spent on the improvements of these lands in the past. It even refused to take the consent of the affected parties in this matter. The Tansa settlement in particular, impacted a large number of villages, dragged on for many years and yet proved to be very faulty. Displacements in this case, happened 4 times. It left a large number of parties dissatisfied. But any form of resistance was sought to be resolved through legislation and courts.

The municipality was not spared either. Even as regards the land acquisition policy, the Government always had an upper hand vis a vis the municipality. Acquisitions were always done through the agency of the Government with no municipal representation, even though the latter made all the payments, as a result of which the municipality found itself at a disadvantage.

Driven by the desire to earn profits from the proceeds of the Forest Department, the Government did not demur from exploiting the forest surrounding the lakes. This imperiled the purity of the water. This once again created a dilemma for the
municipality which was caught between the demands of the Government and the need to preserve the purity of the lake waters.

Yet restrictions were brought about on the activities of the forest dwellers who depended traditionally on these for products, agriculture and as grazing land. The conversion of these lands into reserve forests therefore resulted in the loss of livelihood for a large number of forest dwellers such as the Thakoors, Katkaris and Kolis etc.

However, the worst sufferers of these policies proved to be the Dhangars, Charans, Gavalis, Vanjaris, Lamans and Khilaris who were some of the communities principally engaged in grazing cattle. The operations of these milk trading classes especially the Gavalis, who used to supply milk and milk products in abundance to the neighbouring villages as well as distant towns, were severely curtailed resulting in an injurious effect on the milk supply of the city.

Milk supply to the city therefore, emerged as a big problem by the end of the century. The two major requirements for a good supply of milk were plentiful water supply and forage. But these were circumscribed by the forest conservancy rules and the sanitary requirements of the city, thereby affecting the quality, quantity and ultimately the cost of milk. Within the city, stricter laws of drainage and sewerage, higher costs of water to cattle sheds, and finally the city’s need for building space, drove the cattle stables outside the city limits finally resulting in the creation of the milk colony at Aarey in Goregaon, which resulted in further land acquisitions and displacements.

To sum up it can be said that water management policy, through the implementation of hydraulic technology, was evidently not aimed at addressing the seasonal water scarcity faced by the city, but rather was driven by an engineering ethos that looked at water as a source of profit and one which could propel the commercial growth of the city. Scarcity only acted as a catalyst in the creation of an apparently modern system. While Bombay got ample water from the hydraulic schemes, the means of distribution did not prove to be equitable, qualitatively or quantitatively. Excessive control of the Provincial and Imperial Government, multiplicity of authorities with conflicting agendas of growth,
inefficiency and corruption in the conduct of municipal affairs, financial problems, controversies, differences in perception among the administrators, particularly engineers, bureaucratic delays, inter departmental conflicts in the Government set up, the haphazard growth of the city, the experimental and flawed nature of technology and the lack of civic knowledge among the people themselves prevented the management of the new supply system from being efficient.