Impact of Urbanization with special reference to Water Bodies in Madurai city

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Abstract
In the era of urbanization Madurai is experiencing fast changes over the decades due to urban growth. The spatial structure of the city has become complex with increasing pressure on each land use types according to the needs of the population. The rapid urbanization leading to aggravated problems of open space defecation. The surface water sources are quite inadequate for both irrigation and drinking purposes. Groundwater table has declined due to heavy tapping by diesels/electrified pump sets and bore wells. Recharging the ground water has also failed due to frequent dry seasons and failure of monsoon. Disposal of sewage into the river Vaigai has been identified as the main reason that has affected the quality of water. There is water everywhere in Madurai city and its surrounding, but sadly lack of efforts to store or conserve it have affected the water situation now with the corporation having been expanded by 100 sqkm in 2011. Hence in the present study an attempt has been made to analyze the impact due to urbanization in Madurai.

Key Words: Urbanization, Population, Groundwater, Water bodies, Environmental Degradation.

OBJECTIVES DEFINED AND MET

- To study the impact of urbanization in Madurai.
- To assess the environmental status on the water bodies in Madurai city (tanks / river Vaigai)
- To find out the schemes introduced by public work department and non-governmental organization to conserve the water bodies in Madurai.

METHODOLOGY:

- Survey method to study the impact of urbanization on the habitats and pollution in Madurai.
- Questionnaire to the residents of different parts of Madurai in the age group 45-75 years and to find out the conditions of water bodies in Madurai. Data to be collected from primary and secondary sources.
INTRODUCTION

It is an universal truth that even in these days of scientific advancement the world cannot survive without water and it is confirmed by the divine words of Thiruvalluvar and Ilangovadigal who adore the rain with their divine words.

“Thanam Thavamirandum Tanga Vianulaku Vanam vazhanga thenin”

Neither charity nor tap as (self discipline and austerity) will aide on the wide earth if the heavens should hold back their showers. So, every one of us knows that the world is dependent on rain and it is the source for all natural resources, rivers, streams, lakes, hills, trees plants and all the living being (ie) for the external conditions influencing development (or) growth of people (or) plants, the root cause is rain. Our ancestors therefore began to worship all natural resources.

In India, particularly in Tamil Nadu people worship and hold sacred the above natural creations Special devotion is attached to sacred rivers. There are a number of rivers in Tamilnadu viz., cauvery, Thenpennai, paluru, vaigai, Thamirabarani etc. The rivers have a special place in the cultural life of Tamilnadu. the tamil literature abounds with such sacred references on these rivers. Vaigai river is mentioned Elagovadikal who authored Silappathikaram who adores the beauty of the river vaigai and calls it a never failing river.

One of the saivite saints, Thirughanasambandhar praises the river vaigai that its flow created beautiful new flowers and the sweet wind from south (ie) Thendral . In another stanza he says that the flow in vaigai contains gold, precious stone, costly logs and beautiful flowers. During sangam period vaigai is most important river in Tamil nadu. At present, vaigai is a river in Madurai, Tamilnadu state of southern India. the actual name is vaigai in tamil and the name has been referred as vaigai. Such a sacred river now a days poses a health hazard. the river is contaminated directly (or) indirectly by domestic sewage and to certain extent by small industrial wastes. the river is now polluted.

NEGATIVE IMPACT OF URBANISATION:

The organization has resulted in environmental degradation in a number of ways, such as:

- Encroachment of agricultural and Fertile land for housing, industries,construction of roads and dams, etc.
- Depletion in water resources due to increase in the water requirement.
- Pollution from the industrial and other urban activity, and
- Emergence of slums, which deteriorate the surrounding areas.

**Environmental status of the River Vaigai:**

Pollution due to human activities, population, industrialization, agriculture, slaughter house, fertilizer, domestic sewerage etc. is called man made pollution. Domestic sewer is the major cause of pollution of the river as brought out in the foregoing paragraph Regarding industrial effluent the effects is not considerable Fenner India, Sundaram industries and Madura coats etc. are located in the Madurai city.

The major industries let out the effluent into their own farm and therefore no considerable industrial sewer reaches the river except the effluents of small auto work shops foundaries, dying units, tea shops, which are located on either side of the river bank. From the bridge, across vaigai river in Dindigul road in the west to the bridge near Theppakulam in the east, automobiles, like lorries, autos are parked. therefore the auto wastes found their way into the river. Further bullock carts also have their parking on the bank. In some places, specially from Arappalayam to Theppakulam the slum dwellers have put up their cattle sheds in the river. Hence fodder wastes of cattle and dung are deposited in the river. The slum dwellers and low income group moving population are using the river for open defecation. The slum dwellers (ie) people of low income group residing near the river banks take bath, wash their clothes utensils etc. in the foul water of the river which affects their health and likely to spread diseases to other people. the abandoned irrigation channels have turned into filthy spots with the collection of untreated and raw sewer.

The river is collecting sewage. The ponds in the river bed contain sewage effluents with foul odor. There are many such filthy water stagnant locations in the river bed.

They breed mosquitoes besides polluting the ground water. Here it is worth mentioning that the ground water near Avaniapuram has been polluted and not potable because the discharge from sewer stabilization pond for farm irrigation spoiled the ground water through seepage as per the test reports of ground water wing of the public works department. Laboratory test water samples, collected from the river by the environmental cell division, Madurai of the WRO (Water Resources Organization) have been tested in the laboratory by them. The tests of surface water so collected with respect of P.H. conductivity, total solids and chlorides indicated that the locations in Madurai city limits are not good (ie) not up to the standard.

Girthamal has a pride place both in geography and mythology of Madurai. The river was flowing around Madurai like a golden necklace. Girthamal river in Madurai which supported agriculture, domestic purposes and supplied water to 76 tanks in three district of Tamilnadu once is now a drainage channel. Half hearted attempts have been made here and there disconnectedly on the resurrection of this river by means of patch work.

**Fig1.0 indicates condition of water quality in Madurai.**

46% of the respondent accept change taken place in color. 38% of the respondent said that change occurred in water taste and also 16% of the respondent strongly accept germs were also found in the water quality in Madurai. Because of population and pollution were increased in Madurai in the last decades.
MADURAI & ITS TANKS

With the ‘quote’ from the purananutru song we came to know that Urapanur kanmai is kaling is found in the inscription of the First Raja Raja cholan From the inscription we came to know that the village urapanur is quoted as Nattatrupurathu urapanur. This Nattatrupuram is the channel which stretch the water to Madakulam. This pasanagal comes from Urapanur to Sekkanurani and from there it reaches madakulam through Nagamalai Puthukottai. At present it comes to Kongar puliankulam, which is near to the Madurai kamaraj university (MKU) And later the old name Nattatrupuram is changed to ‘Viranarayana kulakeel’ which bears the name of the king paranthaka viranarayanan. Most of the tanks, channels, rivers of the pandyan territory bears the name of the water bodies.

During the reign of Pandya, the petty kings from various region concentrated in preserving the water bodies and they also brought various acts related to irrigation. Before the establishments of the British rule historically all the water bodies were the under the control of the people. Public on their rights and as their assets. For the welfare of the people, the kingdom of Arasosiya Pandi donate the land mainly to protect and preserve the banks. The above situation was carefully designed by the Pandiyan kings and continued by Nayak rulers too. Thus the Meenakshi temple, the Mandapa in the midst of the Mariamman teppam, the Nayak palace, the Managammal place(at present the Gandhi Museum), the Tamakkum ground were all surrounded by innumerable huge trees which provided the much needed cool shade to the city of Madurai during Agni nakshatram (or) katari days in the summer. At the same time precipitation in the air facilitated the arrival of the summer showers’ followed by monsoon rains. All the rain waters were stored in a number of tanks for which Madurai was proverbially famous until the end of 20th century when the unbounded greed of the ‘elected’ political rulers destroyed them irretrievable. Earlier a water body namely erie/thadakam was created which symbolized purity and sacredness.

SAMPLE OF THE STUDY:

On the basis of its location and extension areas in Madurai such as Thiruparankundram, Annanagar, Vandiyur, Anaiyur, Pudur, Harveipatti, Sellur, S.S.Colony, Bibikulam, Oomachikulam. Random sampling has been used by the researcher. Residents from Madurai city is selected randomly for the survey of the study.
The figure 1.1 shows pollution increase in Madurai due to extension of urban area 6% respondent accept and 56% of the respondent accept development of industrialization also one of the reason for pollution and 3% of the respondent agree with the development of modernization and 22% of the respondent agree with all the above were main reason for increasing in pollution in Madurai.

Condition of tanks in Madurai

Madurai had nearly 38 water bodies which were catering to the drinking water and agricultural needs of Madurai besides feeding the enormous trees all through the city and on both the sides of the roads. All these proved how Madurai until recently justified its name as “Kadambavanam” (a forest of Kadamba trees). Today ‘Kadambavanam” has become a part of a myth, and no one will believe that it was a historical fact earlier Madurai was surrounded by water resources. It was called by the people as “Aalavaai” Among the 38 tanks, the tanks of Anuppanadi, Anaiyur, Ulaganeri, Iravatanallur, Kochadai, Kosakulam, Sorikkulam, Sengulam, Thathaneri, Tallakulam, Pudur, Pudukkulam, Managiri, Villapuram, Viraganoor have been silted and turned into human habitations and government offices. Silaiyaneri, Mudukkaitan, Bibikulam, Aathikulam, Chokkikulam, Anuppanadi, Chinna Kanmay, Sinthamani, Avivillan, Ayan Pappakulam have all been shrunk into gutters. Besides the above, today Madakkulam, sambandar AlamkulamThirayathi, Puliyangulam, Naganakulam are being encroached upon and the government should take serious initiatives to protect these water bodies. Most of the tanks in the northern and southern parts of the city had shrunk into mere pools due to encroachments. Major feeder channels such as the Kiruthumalnadhi Channel, Thuvariman canal, Madakulam canals, Chinthamani canals, and the Avaniapuram channel have all been transformed into garbage dump yards.

Residents of Lourdu Nagar are frustrated. For nearly ten years they have been petitioning the public works Department to deepen and renovate the nearby Kosakulam tank. They have been calling for action to free the tank from encroachment and prevent letting out of sewage into it. But the work that began three months ago turned a misnomer annoying them purpose with fast urbanization. However, when ever there was good rainfall the “Bund Formation has blocked the supply channel. The size of the tank has been reduced considerably. The work has only enabled further encroachments and more sale of land. Previously serving as an irrigation tank, the Kosakulam tank lost its intended purpose with fast urbanization. However, when ever there was good rainfall the tank had been filling up till two years back. In the last three decades, most of the bore wells that were sunk in houses for only 40 feet went dry during the 2003 drought. It had to go for re-boring for up to 300 feet. However, after the bund formation, the supply channel has been cut and the tank was rendered one dry. More encroachments are coming up in the southern and western sides.

Conservation Scheme to Protect Water bodies in Madurai

A Pilot research project – Eco city: To propagate the environmental friendly concept department of environment has prepared as “Eco-City Plan” for city Development for Madurai through national environment engineering research considerations into urban planning.

Public work Department: Public work department – water resource organization (WRO), the Madurai Corporation also plays a major role in conservation activity of the water bodies. The PWD involves in conservation activity concerning with the fund availability. In 2009 – 2011 for weed clearance, the new
scheme has been introduced called IAMWARM. (Irrigated Agriculture Modernization and Water bodies restoration Management). The fund is provided by the World Bank. This weed clearance work is about to be done by PWD Madurai. For encroachment Tamil Nadu protection of water bodies and eviction of encroachment act of 2007, was introduced by which the demarcation of tanks are done and laying permanent stones around the Tanks.

**Environmental cell division:** A special division in the name of environment cell division in the year 1988 under the charge of an officer in the rank of executive engineer has been formed at Madurai two years ago and the division is presently collecting following for consideration collecting information regarding quality of the water bodies in the Vaigai Basin. Collecting information regarding various types of industries within the basin, water quality of their effluents released into the basin area and the resultant harmful effects on public health. Collecting information on Vaigai basin from various educational institutions, research organization and consolidating the details of problems and remedial measures.

This division is also (PWD) conducting public awareness program me both for officers and public, the officials are trained to enlighten the public of the importance of environmental pollution and on methods to be adopted for preserving water pollution free. Public awareness programme is structured to motivate the public to conserve water and dump their solid wastes in the proper places assigned for the purpose (ie) in the duping places.

**Suggestion and recommendations**

- Water pollution in the Vaigai river bed and tanks could be prevented by construction of parallel drainage channel increasing the capacity of sewage farms installation of new additional sewage pumping stations and encroachment near by the river showed by relocated by the authorities and also widening the existing sewage system and also under ground drainage. The ground water system and rain water harvesting should be increased then water level, bore well only the ground water level will be improved.
- The water improved programme of the city has to be solved by envisaging the word bank project to pump water from the Vaigai reservoirs through pipelines.
- Seminars/ Workshops / conferences /Heritage walks and celebrations of different days like World Ozone Day, World Earth Day, Water Day Pollution free day, World Tourism Day, World Environment Day have to be organized to promote sensitivity ecological concerns. People should like the environment and reduce using of polythene bags plastics and coated environmental valves and develop commitment to environmental issues.

**SUGGESTION BY PUBLIC**

- These are the environment issues identified by the public through survey analysis conducted and collected samples (respondent) from in/around Madurai
- One aged person living near Sellur said that in his boyhood he used to take bath in the river and he apprehends that the river may never get back its lost glory. many among them alleged that letting untreated sewer into the river is the major cause for pollution of the river. Cattle breeders told that their cattle get affected by the polluted water and even they fear to wash their cattle in the stagnant river water.
- A woman living near Theppakulam area is of opinion that fly’s and bad odor abound. because of waste dumps and silage area and her area is one such place. due to this pollution one person told that after taking bath in the stagnant water rashes appeared all over his body and he suffered very much. some feared that the dirty and polluted water is likely to seep into river bed and near by deep wells which may become a dangerous health hazards. A person living behind the Rajaji hospital is of the opinion that sanitary latrines for poor people in slums and other localities must be provided free of cost to prevent open defecation in the river bed.
Summary

Madurai has been classified as a town occupying a third place in terms of environmental pollution. High density of population in the town has led to an unhygienic living environment. Water bodies are polluted due to open drainage and garbage dumping etc. The existing tanks are the last solution to the increasing population of the city. Most places in Madurai such as Anna Nagar have their ground water table touching on all time low of 600 feet in many places. If tanks like the Vandiyur continue to be encroached upon and remain undeveloped, an irreparable water crisis will hit the city in coming years. To restore them, one of the major steps to be taken is the fencing of tanks to prevent pollution in the form of garbage dumping and also growing trees around to create a better microclimate. Desilting the tanks and trying to restore them without addressing the pollution issue will be useless because it will only lead to poor groundwater quality in the entire area recharged by it. So the government should control and protect there water bodies from pollution free.

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