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Point for discussion this month **Is trained river a death trap?**

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Eternal Words

We won't have a society if we destroy the environment

- Margaret Mead

"The animals of the planet are in desperate peril... Without free animal life I believe we will lose the spiritual equivalent of oxygen."

- Alice Walker

The earth we abuse and the living things we kill will, in the end, take their revenge; for in exploiting their presence we are diminishing our future.

~Marya Mannes, *More in Anger*, 1958

Till now man has been up against Nature; from now on he will be up against his own nature.

~Dennis Gabor, *Inventing the Future*, 1964

Dear Readers,

Summer brings in monsoon. This year the monsoon is most needed because of the severe drought in Maharashtra. Actually, one must understand the nature's cycle of drought and rains and administer the eventualities with pre-planned management action plan. Action plan and funds cannot be planned at the beginning of the calamity. Imminent natural calamity can be monitored for its indicators continuously and analysed for its scale of occurrence. The planner should be like a drongo as shown in the cover photo - always vigilant, analytical and ready for action at any moment irrespective of the scale of the problem.

Himalayan and other mountainous areas are always prone to natural calamities. The major reason is the changes brought in by infrastructure in the natural watershed which is gradually encroached upon by urban development. Therefore, the policy and objectives of the development become the key factors of civil progress in the river basins. The naturalness of the river is the measure of civility and environmental governance. Sandeep Joshi's article on Pune's rivers tells about the need of localized river policy to conserve and protect the rivers and maintain their natural state sustainably without converting them into wastewater drains!

Rivers in Pune or rivers in other parts of nation or world are facing the challenges of pollution and governance. The news brief on Ganga spells out the dire condition of the river due to improper sewage-effluents-solid waste disposal practices and apathy towards the ecological health of the river. Ministers for Environment, Government of India agree to pathetic conditions of river in the parliament sessions but the reckonable, quantifiable action is needed in addition to words and funds.

This demands the team of green surgeons who can undertake the "ecohealthcare" programme for the ailing rivers of India & SERI is always ready to offer assistance, guidance, policies, strategies, plans and designs to restore the rivers for their usefulness for the dependent poor! & rich also!!

Thank you,
Chief Editor

Pune's Rivers: Eco-cultural Epitome of Urban Development and Economy

- Sandeep Joshi

Introduction

Pune's Rivers ranging from zero order (for example Rivulets of Parvati- Panchgaon hilltops -table lands) to fifth order (for example Mula - Mutha Rivers) are under tremendous stress of urbanized developmental processes. In which permeable soils are covered by impermeable infrastructure layers. In last two decades, urban-semi-urban- periurban -rurban areas have seen the growth of concrete jungle by decimating green jungle (it is not just perennial trees but seasonal grasses also). Riverscapes & greenscapes (including agricultural & forest lands) have lost their natural glory completely to wear the cosmetic modern architectural sheen of manicured look of urban green composed of non-native species majorly. In short, the urban watershed of Pune's rivers is changing with lightening speed.

Transformation of urban and rurban watersheds of Pune's rivers have changed water-cycle severely by disconnecting lentic (lakes) - lotic (rivers) from aquifers (ground waters). It's civil engineering principle to dewater the area for better strong infrastructure and buildings. Increased impervious layers & hydro- modification are the cause of accelerated flood frequency & intensity in recent pasts. It's a nature's warning to give due respect to water balancing in the watershed. Moreover, dewatering of surface water bodies is making' water-lands' available for notified-denotified encroachments. In essence, Pune's rivers are facing enormous pressure of exploitation & pollution. A visionary of policy to retain, restore & sustain ecological health of rivers is essential for the livability & nature-friendliness of Pune to bring back glory of harmonious habitat!



Importance of Pune's rivers

It is a very fine network of various forms of rivers such as rills, rivulets, streams, sub-tributaries, tributaries, in the Pune's urban watershed blessed by Sahyadri's mountain ranges. This entire macro basin is providing clean & safe water for the development of residential, commercial & industrial establishments in Pune. It's estimated that though Pune receives about 1.5 lit water per sq. m per day, it borrows about 60 liters per sq.m per day from Sahyadri Mountains. Its kind a water vacuum filled by surrounding watersheds, micro & macro-basins!

Returns from Pune

It is well accepted fact that more than 150 nascent, juvenile rivers of Pune are either dwarfed encroached, diverted or killed knowingly or unknowingly by the city administration and engineering management with stated legal-illegal consent or neglect. The rivers which could not be braised by infrastructural development are flowing with pollution- a poison for the aquatic ecosystem! Pollution of rivers is so severe that Mutha has earned second position in Methane generating potential in the state! Its fecal coliform count (indicator of pathogen) is in millions indicating the unstated, unnoticed dreadful epidemics. The situation aggravates with inadequate sewerage systems, decentralized waste management system and sinful act of some hospitals and medical practitioners of disposing infectious wastes near the water bodies!



Visions for Pune's Rivers

Fine network of Pune's 150 rivers is unique watershed of upper Bhima basin .it contributes maximum water to Mula river a major tributary of Bhima River.

Restoration of ecohydrological characteristics of Pune's rivers using ecosystem approach integrating with policy tools well informed institutional & people, participation with sustainable finance for adoptable, affordable technologies should be the prime goal. It can be furthered by adapting eco-space-friendly urban architecture giving equal importance to conservation of resources & protection of waters ,lands & air from unhealthy contaminations & finally to eliminate methane generation from tail-end ujjani lake. The vision shall take the guidelines of Indian constitution emerging from the Article 21, 48(A), & 51 (A) (g) to facilitate the restoration of rivers with well structured immediate, short term & long term actionable remedies implemented in time-bound manner irrespective administrative delays, political interferences & inadequate finances.

Mission for Pune's Rivers

Mission for the rivers is to restore the ecological health of water bodies in the upstream catchments & highly polluted stretches in the urban watershed by assigning time bound tasks to all government and non-government stakeholders. The immediate, short term & long-term tasks shall be centered on minimizing the pressure of water demand.

Performance criteria

Adjacent basins by promoting decentralized rainwater harvesting for consumptive uses. Achievable micro-annual targets can be decided to attain the vision goal in next decade by 2023!

The pathway

In order to regain the ecological health of Pune's rivers, the methods, techniques which are socially acceptable and environmentally less damaging, shall be adopted .the very first task should to prepare Urban Water Map to reckon the quality & quantity of water in the city's watershed by documenting all known-unknown influxes, losses & uses.

In the second phase all the basins & sub basins of tributaries & sub-tributaries shall be assessed on the basis of current & future development plans& pressures to enable a charter for conservation and protection of urban water bodies. This exercise will facilitate a policy for water governance in Pune city.

Thirdly, monitoring & pollution eliminating mechanism can be strengthened with citizen's participation & ownership. Students from various science, commerce, arts & engineering can be involved in these activities as inference in short term training modules. Academic co-operation for environment (ACE) programmes will ensure consistency, constancy & continuation of institutional memory for the water governance of Pune comprising all government stakeholders for equitable sharing of resources.

Finally all concerted action of restoration and revival will lead to very sustainable, futuristic water culture to make city first of its kind responsible for keeping rivers, lakes and aquifers alive.

The assessment criteria

Every policy should have assessment mechanism to know the changes by the actions taken under the aegis of umbrella policy and review procedures. Identified institutions and experts may help in assessing policy impacts after undergoing rigorous capacity building programme.

Assessment criteria will involve ecological –ecosystem quality indices, health indices and socio economic parameters. These indices shall be involved in order to cost futuristic trends for reforming action plans, resetting targets and revisiting policy principles.

Pune's culture will be again built along the clean rivers with a very vigilant population ready to conserve clean surface sub surface waters having sustainable healthy life for centuries.

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River Ganga in dire state of pollution and governance affairs

- Pradnyesh Agre



Till date we have seen Stunning visuals of the river Ganga as a holy river but at the same time the pollution giant is creating very alarming situation by plaguing the river waters.

Once a clean, pure river is now trapped in tons of solid and liquid waste coming from the settlements on its bank.

In old days people use to take bath at home and wear clean cloths while going to take a dip in the Ganges, but now, people go to take bath there and wash their dirty clothes and animals.

Jayanti Natarajan, Environment Minister, "There is no doubt that our holy river is very polluted, and the flow of the river also is not to the extent that it ought to be to maintain the purity and the continuous ecological flow of the river as we desire ... All along the river, the industrial effluent



accounts for about 20 per cent; 80 per cent is basically the domestic untreated sewage which flows out from the cities along the river Ganga," 90 per cent of the Ganga water is contaminated. In Banaras, it gets 250 MLD (million liters per day) of untreated sewage from municipality and chemicals from 1,400 factories. Between Gangotri and Rishikesh, there are lakhs of houses and commercial establishments; all human waste from there is diverted to the Ganga.

The ground water analysis in the states of Ganga Basin i.e. Uttarakhand, Uttar Pradesh, Bihar has shown presence of different pesticides residues.

Jairam Ramesh, Minister of Rural Development, Drinking Water and Sanitation, with reference to IIT-Delhi study quoted the presence of moderately high levels of pesticides; even some of the residues are of long-banned pesticides such as DDT in the groundwater in Palla-Burari region near Delhi.

Larger study on the entire Ganga basin covering Uttarakhand, Uttar Pradesh and Bihar has revealed land use pattern dependent presence of different organochloride pesticide residues in different regions of the river basin.

In the mountainous stretch of Uttarakhand, HCH, a by-product of agricultural insecticide lidane, was detected mostly; while the water in Uttar Pradesh and Bihar region contained more of endosulfan and residues of aldrin group of pesticides respectively.

Ganga the most sacred river to an Indian that originates from Himalaya and traverse for 2525 km through 7 states of India and part of Bangladesh and finally merges into bay of Bengal in Bangladesh was now ranked among the five most polluted rivers of the world in 2007, with fecal coliform levels in the river near Varanasi is more than one hundred times the official Indian government limits. The river Pollution threatens not only humans, but also more than 140 fish species, 90 amphibian species and the endangered Ganges river dolphin.

Though Thames in London, the Nile in Egypt and the Zara in Dubai, flows through densely populated cities, yet are crystal clean. Then what about Indian rivers? The answer stood in front row is the sorry state of affairs of Indian rivers while comparing with these rivers in abroad.

All the sewage treatment plants that were set up during the regime of Rajiv Gandhi in Allahabad, Kanpur, Banaras, Patna, Bihar and West Bengal have been non-functional for years.

Pointing out that lack of coordination between the Central and State agencies were affecting proper implementation of various projects, Ms. Natarajan said: "Money is allotted for sewage treatment plants and for central effluent treatment plants. But unfortunately, all those plants do not work, perhaps, because of lack of electricity and perhaps, because the network of sewers is not connected to the central plants in that particular city."

The government is implementing GAP since 1985 for undertaking pollution abatement activities in the identified polluted stretches through implementation of works like interception and diversion of sewage and setting up treatment plants.

The project, involving an estimated cost of Rs. 7,000 Crore, has been approved under the National Ganga River Basin Authority, while Rs. 1,441 Crore has been released for the implementation of various pollution abatement works in towns along the Ganga, and sewage treatment capacity of 1,091 million litres per day has been created.

Crores of rupees being spent on saving the Ganga from pollution does not seem to be working as bacterial contamination in India's most sacred river has crossed the maximum permissible limit at several key cities due to discharge of sewage.

Ecologists, environmentalists and scientists unanimously agree that various barrages/dams that the government started building from 1950 on the rivers, especially on the Ganga, like the dams in Maneri, Tehri and Cheela, lower Ganga dam in Narora and a recent one built in Kanpur have resulted in restricted flow of water. Farakka Barrage constructed in 1975, between the rich biodiversity area of The Sunderbans and the upper Ganga, was the most unfortunate one as it has resulted in the rapid declining of various species of fishes which would go from the sweet waters of the Ganga to the sea to breed and come back, as also fresh water prawns. Similarly the dams made on the Gandak, Gomti, etc have further affected the lives of water animals and plants".

However, though the proven, pragmatic and inexpensive solutions are available the government halted at traditional tendered systems on health issue of millions.

The Eco-restoration of 5 drains that carries sewage to Ganga in Allahabad was demonstrated by Shrishti Eco-Research Institute (SERI), Pune in association with Ganga Seva Abhiyan. With help of Green Bridge and Grin Roll Ecotechnology the sewage was treated in-situ and that also without electricity giving 95% pure water effectively.



U.K. Chowdhury, the Department of Civil Engineering, BHU'S IIT wing, suggested separation of pollutants in the rivers through sand beds. He said, "The Kumb Mela gets four to five crore visitors. All the human waste during that time is deposited in the Ganga's sand bed. It has the potential to merge pollutants. Just about 12 km downstream from the ghats are large, empty sand beds. When the river dries up, the temperature of the sand bed becomes as high as 55 degree Celsius; here all the pollutants can be deposited without extra electric expenses (hydraulic process)."

There are also suggestions to break down some of the dams to increase the ecological flow of water and avoid the flood due to deposition of silt in the dam. It is suggested that the income of State governments from organizing Kumbh Melas should be spent on cleaning up the rivers.

To address the issues in the Ganga river basin an authority named ' National Ganga Rver Basin Authrity'(NGRBA)chaired by Prime Minister of India, is formed under the NGRBA act in 2009. discussed cleaning up of all rivers in every State, especially the Ganga was product got born as result of In an international conference on environment held in Rishikesh two years ago cleaning up of all rivers in every state was discussed and it is reflected unanimously that the participation of civil and corporate bodies as well as common people is required for the purpose.

We need to establish "mind set" for prevention of pollution. A region specific, workable pollution abatement process that includes ecological principle and supportive engineering aids, strict regulations, best management practices. The most important is willingness to tackle the curse to save our beloved Maa Ganga from being polluted and restore her health.



Faith of Urban Lake Ecology

- Pallavi Patil

Increasing population and infrastructure in the catchments of the urban lakes are posing threats to the aquatic biodiversity and ecology of these lakes. Untreated domestic and industrial waste is a curse of the problem of these polluted lakes.

Created in 1864, Kukkarhalli Lake is located in the heart of the Mysore city. It spreads over 62 hectors and its catchment area is about 414 sq. m. Once supply of fresh drinking water for the Mysore city, the lake has now become a victim of pollution, encroachment and governance apathy. The water quality of this fresh water body has been deteriorated severely with lower concentration of dissolve oxygen and higher concentrations of nitrates and phosphate. The lake has become eutrophic due to sewage in grace from the catchment.

On the basis of classification published by Central Pollution Control Board (CPCB) Kukkarhalli Lake is a 'D' Category water body means water is suitable for Wild life and Fisheries but not for drinking, bathing etc. The recent studies show that the bacterial population and toxins concentration increasing day by day affecting the ecological cycle of the lake.

As per the studies, 176 bird species including various migratory birds used to visit this lake every year. Last month, death of two spot-billed ducks was observed at the place where sewage enters into the lake. Several birds died under similar circumstances in the past two years. The reason behind the death of birds is not yet confirmed. One city based Naturalist claimed that in the early 1990's more than 210 species including migratory and local species of birds has been recorded but recent studies shows more than 40% decrease in the bird population in the lake area.



Fresh water bodies are the life line of human settlements and development. Not only social but economical development is directly related to the availability of water resources. If developing urban populations are engulfing such natural fresh water reservoirs then it is not sustainable development rather it's a suicide by human settlement.

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