MAZHAPOLIMA

Recharging Open Wells in the Coastal Riverine Island of VP Thuruth through 'Mazhapolima' improves water quality

Implementing Partners

Department of Revenue, GoK.
Thrissur District Administration
Methala, Eriyad & Edavilangu GPs
KIDS- Kottappuram
Mazhapolima Monitoring & Coordination Unit - Thrissur

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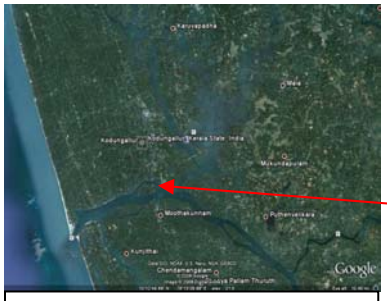
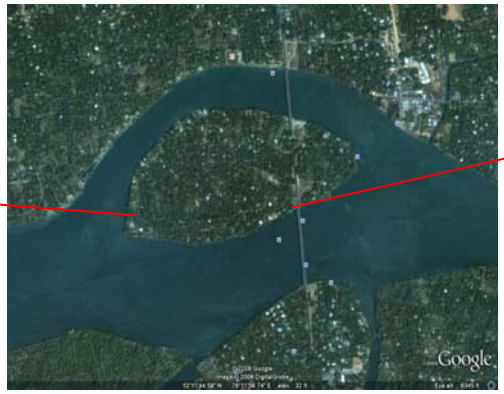
Introduction: Valiya Panickan Thuruth, more popular by its acronym, 'V.P. Thuruth' is the 13th ward in the Methala Grama Panchayath, located adjacent to Kodungallur[1]. It is a riverine island located close to the confluence of Periyar River with the Arabian Sea. A series of islands[2] formed in the Periyar confluence as a result of the massive flood in 1341[3]. Consequent to the flood, the Kodungallur fort was inundated and got closed with natural embankments created by the flood. VP Thuruth[4] was one such island formed in the Periyar as a result of the 1341 flood and resultant process.



Satelite image of VP Thuruth at the confluence of Periyar River.



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A series of socio-political and economic processes converted VP thuruth from a low lying water logged land mass to a densely populated settlement colony today. These processes include reclamation and cultivation of the land using the services of tenant farmers, landlordism, tenant struggles, land reform laws enacted by the Government, redistribution of land to the tenants, creation of massive infrastructure related development projects like roads and bridges and influx of people into the Island to settle down. These processes not only changed the social and political profile of the island, but it also created problems of water scarcity, as a result of the man-made changes and interventions.

The VP thuruth is today facing major issues in terms of scarcity of good quality water for domestic use. Water issues in the coastal areas are mostly related to scarcity of good quality water. Traditionally, shallow open wells and ponds have been serving the domestic water needs of the coastal communities. But recently most domestic water sources in the coastal belt are non-potable with high levels of dissolved solids, discolouration, turbidity, salinity, acidity and presence of faecal coli form bacteria. The water resources are under constant pressure due to increase in demand and deteriorating water quality. The shortage of potable water and unsanitary conditions prevailing in the coastal areas often lead to epidemic diseases which have serious social and economical implications. The major reasons for the water scarcity are:

1. Loss of natural water recharge mechanisms (reclamation of paddy fields, ponds & vegetation)
2. Unscientific constructions (latrines, drainages, wells, roads, buildings, landfills etc which are not suited for the locality)
3. Loss of traditional practices (local mechanisms like bund construction at canal mouth for prevention of saline intrusion, annual cleaning of wells and ponds etc)
4. Loss of biodiversity (either because of deteriorating water quality or direct destruction for want of space)

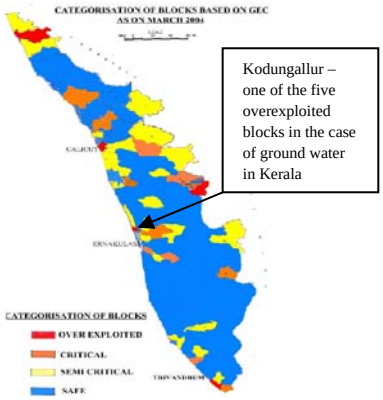
[1] Kodungallur is a municipal town in Thrissur district. It was known in ancient times as Mahodayapuram, Muchiri (anglicised to Muziris), Muyirikkodu and Muchiripattinam. It was a famous and prosperous seaport at the mouth of the Periyar (also known as *Choorni Nadi*) river in the southern Indian state of Kerala. The name Muchiri denotes the three branches of the Periyar river which open into the Arabian Sea near the town.

[2] Some of these islands thus formed as a result of the flood of 1341 include, Kochuthuruth, Valiyathuruth, Katta thuruth, Kurumba thuruth, Gothuruth, Pattani, Pazhampalli, Pallan, Kakkamadan, Paliyam, chekuthan, Vasthiyan, Mazhaplavu etc. Thuruth is a common suffix to the name of the place, as it notes island (place surrounded by water) in the local language.

[3] The eventful history of Kodungallur ended and that of Cochin began with the massive and historic flood in AD 1341. It closed the port of Kodungallur and threw open the estuary at Kochi, till then a land locked region, turning it into one of the finest natural harbors in the world.

[4] The name,'V.P. Thuruth' stands for an elaboration of Valiya Panickan Thuruth. In the local language, Valiya Panickan means, the elder Panickan. Panickan is a designation of respect given by the King of Cochin to such prominent people in his Kingdom, who had rendered services in the army or other sectors. Pilapully Vadakkedath Valiya Panickan was gifted with what is now known as VP Thuruth (island) by the Maharaja of Cochin. From Valiya Panickan, the island came into the possession of a Jewish lady called Sarah who sold it to joint family known as the 'Ambukkan'. The Ambukkans sold the lsland to Ahammed alias Janu Settu, a wealthy Muslim of the Kodungallur region. As Janu Settu did not have any issues, he bequeathed the VP Thuruth to his younger Brother, Ismail Settu, who bequeathed the island property to his son Babu Settu in 1944. The Settu family kept the Island in their possession and cultivated it with Coconut and other crops, using the services of tenants. There were 28 tenant families in 1942 at the VP Thuruth. After Independence, the Island property attracted provisions of land reforms act and the tenants were given land titles for 50 cents of land each per family.

5. Saline water intrusion in to the drinking water sources
6. Acidity in the open wells and drinking water sources
7. Turbidity in the open wells and drinking water sources
8. Water logging in the homesteads during rainy days
9. Energised water withdrawal from the surface aquifers.



Making an assessment of the hydro-geological situation of the Kodungallur coast, Dr. P. K. Thampi, retired scientist from Centre for Earth Science Studies (CESS) comments; "The Kodungallur area shows the typical ridge and runnel topography with the ridges having more thicker coastal alluvium and runnels with lesser thickness of sand. The area is affected by tidal influx and any attempt to draw more water either by pumping or deeper extraction results in salinity influx during the dry season. Generally the sand thickness near the cost is 1 - 3 m only which is underlain by black organic clay. The water is available only in the sand horizon. Away from the coast where the sand thickness is more (over 5 m) filter points are feasible for limited extraction. In most of the areas saline water comes inside through channels and almost all wells in the area turn saline. In several areas weirs are established with shutters to close the seasonal influx of saline water into the land area thereby preventing salinity influx into wells. The wells will not sustain mechanical withdrawal. Any attempt to draw water with pumps will result in lateral migration of saline water from the nearby Kayal."

The area of VP Thuruth is 116 acres. Originally the island was only 90 acres. There was some reclamation of land from swamps and water bodies to make it 116 acres today. There were just 28 households in 1942 which increased to 48 in 1972. There are around 460 households today in the island, supporting a population of around 2000 people. The density of population is around 4400/km^2, almost five times that of the State of Kerala. The number of inhabitants was limited to those who were supporting the landlord with tenant labour even until early 1970s. The National Highway- 17, connecting Mumbai to Edapally (Erankulam) pass through V.P. Thuruth. Work on the two bridges that connect the island to the mainland commenced in 1983 and completed in 1986. The facilities of road, bridges and drinking water (The VP thuruth was connected to the Vainthala Drinking Water Supply Project of the Kerala Water Authority, under Government of Kerala.) perhaps were the contributing factors in making the island an attractive destination for settlement. As population grew, people found encroaching of the commons a convenient way to expand their living space. Width of the canals reduced. The traditional water regulation system using canals and bunds was neglected. The residents of the island recall that there existed 96 cross canal streams in the island with 8 major openings into the Periyar. Most of these canals are broken, partly reclaimed, width reduced today. 5 out of the 8 openings to Periyar are also permanently closed. There were only a few ponds in the earlier days to support the water needs of the community here. Management of fresh water reserves by opening and closure of the canals in congruence with the annual climatic calendar was the main method by which fresh water needs of the small community that inhabited the island was met. Dams built in Periyar and Chalakkudi River led to the reduction of fresh water inflow to the region. Roads were built across the canals without giving any attention to the hydrology of the landscape. Canals were converted into narrow rectangular pools and got broken at several points. Overhanging toilets open into the water commons. Canal water bodies slowly became the dumping yards for the village. These invariably evolved into dirty swamps that worked as breeding ground for mosquitoes.

Mr. Prabhakaran Tharayil, one of the earliest occupants of the Island, explains that this road in VP thuruth was built by reclaiming and filling a canal. Activities such as these have unsettled the environmental balance and the Island ecology, mainly affecting the freshwater availability in the Island.

When water shortage became common, settlers dug wells. The quality of service level from the government water supply scheme became unsteady and erratic. Stand posts went dry as periodicity of supply became irregular and inadequate. Wells supplied only saline water. Life became tougher as boats went to the other side of the shore to bring water in pots. The people had to spend money in hiring boats and bringing water from the mainland, the water bills touching Rs. 50-100 per week/ household

A crisis was fast precipitating. People started protesting against their plight. They blocked the national highway in

protest against the administration's failure to ensure regular water supply. Women carrying empty pots stormed the office of the Kerala Water Authority (KWA). However, nothing much changed and the water taps continued to remain dry.

Grama Panchayat started supplying water using tanker trucks. It was an expensive affair for the Panchayat as it had to spend Rs. one to two lakhs a year to supply water to the islet. This happened to a community, who once collected water from the ponds in their courtyard or canals in the vicinity. Even as the water problem was fought on the streets, the islet slipped into the grip of Chikungunya, which grabbed the village with all its fury three times at a stretch. Water-borne diseases were becoming a regular occurrence. And there were no easy answers for its plight. KIDS introduced Rain Water Harvesting Tanks in the Island. However, it soon became clear that rain water harvesting alone was not enough to solve the water problem of VP Thuruthu. It became necessary to look for cost effective solutions that suited the locality.

Some interventions prior to Mazhapolima to solve water scarcity included rainwater harvesting tanks introduced by KIDS[5]. There was resistance initially as people had doubts about the purity of rain water collected from roofs and kept in containers. However, this was overcome through continuous awareness building. Later, Planet Kerala[6] and KIDS experimented with injection of fresh water into the wells in one of the collaborative development projects at VP Thuruth. The practice of well recharging got a fillip with the introduction of Mazhapolima in the Kodungallur block under assistance from Government of Kerala. VP Thuruth, 13th ward of Methala GP was included in the Mazhaplima[7] Programme. Of the total of 465 households at VP Thuruth, 139 households have open wells. All these open wells are recharged with rainwater through three development projects.

Rainwater falling on the multi-storied building at KIDS campus is collected and diverted to the well, which is given a tank like coverage structure above ground. The quality of water in this well and surrounding areas drastically improved as a result of this measure. KIDS attempted injection of rain water from a 600 square feet auditorium in to a large contaminated well in their own campus in 2005, taking advice from Mr. Terry Thomas of PLANET Kerala. This turned out as remarkable success. Water quality of this contaminated well and other wells in its vicinity improved. This is a clear example of how injecting rainwater in to one large well could influence the near by areas. The process of quality improvement of water is more effective if the soil is mostly sandy in nature. Back washing is most effective, in the sandy soil as the water could move through the interstitial space of the sandy soil, thus flushing out the excess nutrients and contaminants found in its midst.

These three projects are, 1) Green coast- IUCN Programme facilitated by PLANET Kerala and KIDS in the wake of the Tsunami; 2) CBDP- Watsan programme component supported by Caritas India and facilitated by KIDS and PLANET Kerala; and 3) Mazhapolima intervention by Thrissur District Administration. 14 water sources were recharged under Green coast- IUCN programme, 23 wells under the CBDP and 102 wells under Mazhapolima Mazhapolima programme in this riverine island. The intervention is emerging as a model in mitigating drinking water scarcity in coastal- lowland- water logged region in Kerala. The cost of the intervention is rather on the lower side and the effects are far more. Being a high water table area with serious water quality issues and salinity intrusion, the only way out was to adopt methods to improve surface water sources. That is what was done through injection of fresh water to the ponds and wells in VP Thuruthu. They connected gutters to the roofs and directed rain water to ponds and wells. It was an effort to create a fresh water buffer around the wells. Excess contamination would be typically around the wells. Injection of fresh water helped flush and dilute these and create fresh water zones around wells.

[5] KIDS- Kottappuram Integrated Development Society is the social and development arm of the diocese of Kottappuram. It has ample experience in providing sustainable drinking water models for coastal and hilly terrains. It has also done pioneering contribution to upgrade the quality of screwpine handicraft products and improving the skills of rural artisans engaged in it. KIDS has been recognized by the Ministry of Textiles, Govt. of India as "National Resource Centre for Natural Fibre Craft".

[6] PLANET Kerala – Participatory Learning and Action Network Kerala is a network of individuals and associations committed to participatory processes and methods. It contributed to the development of a method to improve quality of well water in coastal Kerala zone by recharging rainwater into the open wells.

[7] Mazhapolima is a participatory well recharge programme initiated by District Collector, Dr. V. K. Baby IAS on behalf of Thrissur district administration in May 2008, using funds provided by Government of Kerala and other agencies. Under this programme, domestic water sources are recharged with rainwater harvested usually from roof tops.

Water falling on the roof is collected through a PVC gutter and diverted through a pipe to the domestic open

The district administration allocated Rs 40 lakhs to Kodunagallur block out of the drought relief fund of the Rs 1 crore it received from the state government. Methala Grama Panchayat seized the opportunity and decided to accord priority to places with acute water problem such as VP Thuruthu. The Panchayat was impressive in overcoming the ward-wise-allocation-syndrome commonly seen in such cases. The Panchayat decided in favour of supporting back washing/ fresh water injection systems for all the wells in VP Thuruthu, and the project was implemented by KIDS, through a tripartite agreement that included the Panchayat, the district office of Jalanidhi, besides the KIDS.

KIDS selected and trained local animators for community education programmes. The animators visited each house, collected base line information as a bench mark for future monitoring, and interacted with the household regarding the system to be installed. The MMCU arranged trained plumbers for installation. MMCU also prepared valuation statements for works done. As the animators were leaders of various SHGs, dissemination of information happened also through informal routes.

What is the result of the Mazhapolima programme? “Water has become clear after the rains”, says Meeru Nibeesa Kuzhithadathil, a resident housewife of VP Thuruth. She felt that even the salinity is reduced. Nabeesa used to filter the well water to remove its colour before washing clothes. For this she had made a filter on her own using sand, brick pieces, and broken roof tiles. “At this rate, we will be able to drink this water after the next rains”, she says with confidence.

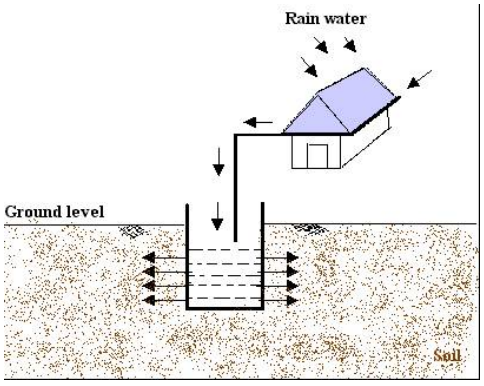
A pond in the homestead of Mr. Sasidharan, the ward member of VP Thuruthu stands testimony to what back washing system can do to a small once-abandoned pond. The pond, which used to cater to the drinking water needs of several households years back had met with the same fate as the other ponds in the Thuruthu. Three years back he installed back washing system with the support of Planet Kerala and KIDS, and collected roof water, diverting it to the pond. The pond is rejuvenated in three years. Sasidharan used to cut channels to drain out water from his homestead to the river during rains to avoid flooding; but not any more. He has also planted medicinal plants such as Ramacham, Brahmi, and Vayambu around the pond. Now the water is clear without any colour. Neither does it have any odour. “We can use it for drinking once the water quality is confirmed through tests as there is no bad taste”, says Sasidharan.

Benefits of well recharging: The following benefits are observed as result of well recharging.

1. Most wells with discoloration or salinity problem can be recovered to quality drinking water standards.
2. Visual change in water quality can be achieved within a few rainy days.
3. Recharging process is most successful in sandy and loamy soils.
4. Cheapest method of purifying well water in high water table areas or coastal areas.
5. Water from few square meters of roof area is enough to recharge a well in high water table areas.
6. Ponds, another dependable drinking water source in coastal areas can also be recharged.
7. Recharging wells in the coastal areas are not only is useful for the wells but could also generate a fresh water zone in and around the well which is in turn beneficial to the eco restoration of coastal areas.
8. Injection of rain water in to several wells at a locality not only creates afresh water zone but resist the intrusion of saline water from the sea.

From isolated well recharging, the efforts henceforth should be to see the coastal region as a flood plain, a sort of watershed and should include all water sources, adopting an integrated water resource management of the coastal watersheds.

How does the well recharging bring benefits? Most of the wells in the coastal area contain saline water. These wells can be converted into freshwater sources through rainwater harvesting and recharging. This can be a process called ***back washing***. This process enables replacement of or exchange of existing contaminated ground water with soft fresh water. Once the water column in the wells is filled, the excess freshwater slowly seeps into the surrounding aquifer. Thus continuous recharging of wells enables exchange of contaminated hard water with soft freshwater. Back washing does not involve any additional storage structures as that of conventional rainwater harvesting units. The rise in the water level causes seepage into the surrounding aquifer thus diluting the water containing high dissolved solids with freshwater. This results in reverse flow of water concentrically resulting in diffusion and cleansing action. Essentially, back washing of well is a ground water exchange process whereby quality of the ground water is improved through diffusion process. Over a continuous period, it is expected that the excess accumulation of chemicals and other contaminants will decline, thus improving the water quality. The process of backwashing can be presented as given below.



As a result of backwashing, a fresh water zone is created around the backwashed well. So the water in the well is assured to be clear and safe all the year The physical and chemical properties of water become more acceptable.

Conclusion: As we search for answers to water problems haunting us, experiments such as that of Mazhapolima give us hope, as these are simple, cost effective, appropriate and locale specific. Mazhapolima demystifies the problem a bit. In coastal sandy zones such as that of VP thuruth, the solution to water scarcity lies in integrating the harvesting of abundant rains, sustainable use of assets like wells already created by the community, modifying attitudes and behaviours of the user community and generating a knowledge on the problem and its solutions and not forgetting and neglecting traditional water practices and behaviours. Vynthila, the location that sources water for the Kodungallur water supply scheme is 45 km upstream. This scheme has been supplying water, however erratic it is, to VP Thuruth as well. 'Increasing water miles' is not the solution for water scarcity. We have to fall back on our rains, our intrinsic insights and traditional practices, our existing decentralised water assets to solve our water scarcity.

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