

Radial Wells for lateral storage and collection of water

A simple, innovative and practical well model, Radial Well can be the most viable technology for tapping good quality water from the shallow subsurface soil in Kuttanadu. The model evolved based on the fact that in Kuttanadu, acidity increases as depth increases. The water quality can be ensured by tapping maximum water from near surface level rather than increasing the depth of the well.

Water scenario in Kuttanadu

Traditionally and even now, wells are found to be unavoidable drinking water structures of households in Kerala, India. The water needs of a family and perhaps the neighbourhood too are met by this earthen cup of water. Quite contrary traditional Kuttanadu enjoyed dependence on ponds for their domestic water needs. Increased concentration of ponds in Kuttanadu in the earlier times – at an average rate of two per household - is remembered by the old folk in the place. Wells were not commonplace as in other areas. Reasons may be attributed to the geography and specific soil characteristics unique to Kuttanadu. But later with population growth, increase in demand for inhabitation space and introduction of public water supply there was a flat decrease in the number of ponds, which were either converted to wells or land filled for construction purposes. There was also a sharp increase in the number of wells which were constructed without any consideration of the soil characteristics or a long term vision. Lack of location specific planning for water resources is evident from the poor state of wells in the region.

Participatory
technology development
as part of the
Integrated Water Resource
Management and Development
Programme
currently ongoing at
Kuttanadu, Kerala State
with the support of
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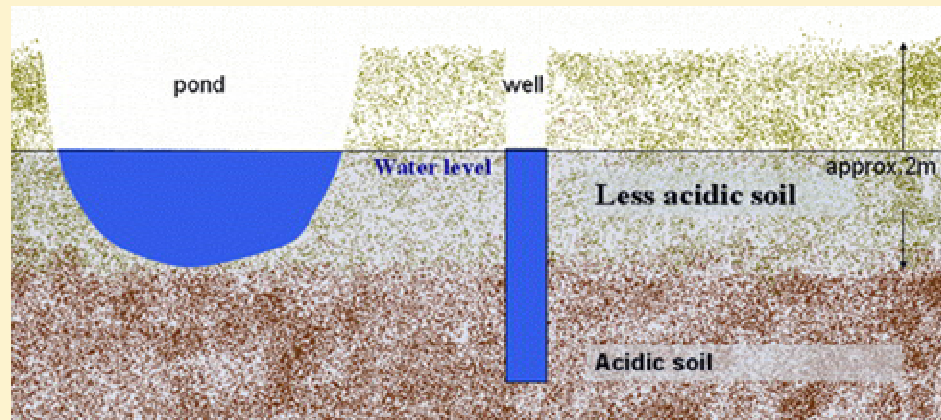


Abandoned wells in Kuttanadu due to quality problems

The background

Kuttanadu, part of the Ramsar Vembanadu wetland area, shows soil characteristics of high acidity and presence of soluble salts as depth increases. This can be cited as a reason for the acidity and other quality problems in conventionally built wells. Ponds are found to be

more harmonious to the Kuttanadan geography and they provide more sustainable solutions to the water requirements of the people. The idea was generated from the various discussions with the local people whose observation and experience showed that ponds (less deep, more diameters) in Kuttanadu provide quality water in comparison to wells (less diameter, more depth). Moreover deepening of wells to address water scarcity in summer-which is commonly adopted in Kuttanadu- have resulted in abandoning the wells forever. Deepening wells result in increased acidity and other quality problems. Furthering the problem is the use of pumps in wells which result in water quality deterioration at a faster pace



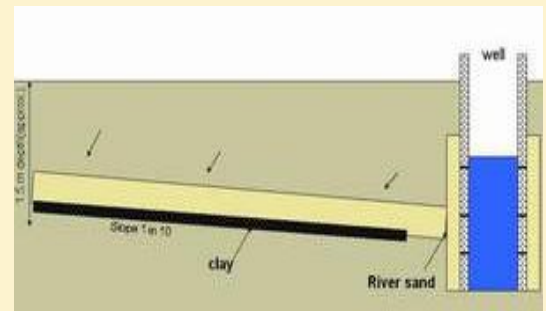
Acidity in wells increases as depth increases

The concept

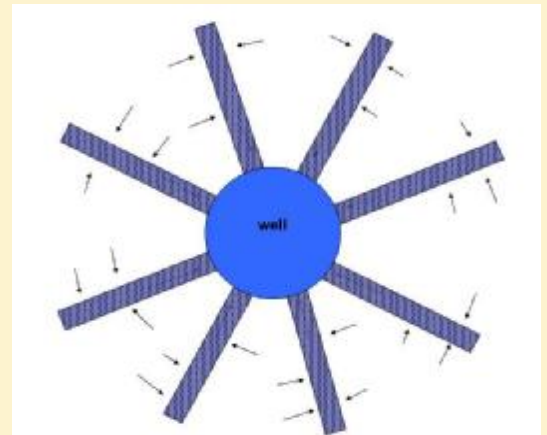
It is high time to realise that quality matters in relation to quantity in the case of water. A simple, innovative and practical alternative to conventional well models, Radial wells may be the most viable technology for tapping good quality water from the shallow subsurface soil in Kuttanadu area. Radial well technology emerged from the community knowledge that water quality can be ensured not by increasing the depth of the well but by improving the lateral storage and collection of water from the subsurface soil. This is sure to be a welcome idea to the community of Kuttanadu with explicit space constraints. Using this technology the effect of a pond is created around the wells, by focusing on minimum space utilization, similar to that of conventional well models.

The Technology

The technology involves making underground radials or filter paths towards the well at a depth in which soil is comparatively less acidic. The sand filled radials serve as earthen sponges which absorb rain water and thus improve the fresh water zone of the area. The uniqueness of the design is in the efficient use of locally



available materials like 'Katta' (Clay), river sand and loamy soil. Filling up of radials with river sand have also a filtration effect in addition to water absorption and storage. Various measures for recharging are opted for complete utilization of the available rain. Another possibility is the planting of locally available water purifying plants near the radials for better results. Precaution is required with regard to the presence of unsanitary latrines, cattle sheds or other waste dumping pits. Construction cost is in the range of Rs 5000-7000 only. Local community participation in fine-tuning the technology has also helped in cost minimization.



Plan of a radial well

The process

The depth of the well is limited to the zone of less acidity which can be determined by testing samples from different soil layers. Trenches are dug at a depth of 1 to 2 m based on soil test results. They should be of 30 to 50 cm width and with a maximum length possible,



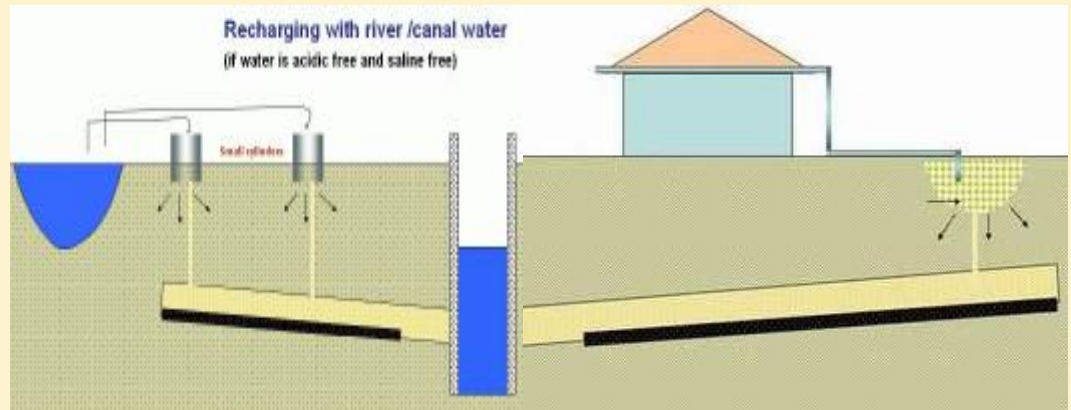
Mapping by the community for deciding the path of radials

considering the system boundary of each well and based on the availability of land surrounding the well. The trenches need not be straight and can be shaped according to the lateral spacing. The radials are clay pasted at the bottom to make them impervious to prevent the downward water drain. The clay pasting is stopped at a length of 0.5 to 1m from the well. The radials are then packed with river sand at 30 to 50cm



Taking trenches for making radials

height from the bottom and then covered with the dug up local loamy soil.

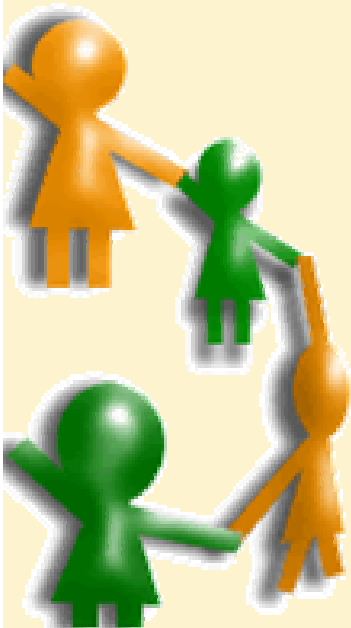


Recharging of radials with rain water as well as surface water

The recharging options include taking rain pits, making sand filled auger holes in the trenches etc. The rain water availability to the trenches can be maximised if the filter paths are planned so as to effectively make use of rooftop catchment area.

Advantages

- Functional utility of pond can be met with a small investment in respect of both money and space.
- Easy to construct (can be completed within one week when water table is lower)
- Addresses the problem of space constraints
- The existing abandoned wells can be easily changed to radial wells, thus the lost investment can be regained.
- Efficient tapping of summer rains for sustainable well usage



For More Information

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