

Water wise

Hydro-fracturing Reviving dry bore-wells

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Over 90 % of the drinking water in rural Karnataka comes from deep bore-wells showing the high dependency on groundwater. In the cities and towns of Karnataka over 40 are dependant exclusively on groundwater and almost all others depend on it for supplementary needs. The city of Bangalore alone has more than 200,000 bore wells pumping anywhere between 100 million litres per day to 400 million litres per day. Many of these bore wells have yielded well in the past but now are dry. This is true of almost all the Southern states. When these life providing bore wells fail, they cause great trouble as alternative sources of water are sought.

Hydro-fracturing: The cause of the drying up of bore wells may be many but one of the causes can be the blockage of the fissure/s leading water into the bore well. This blockage can be due to mineralization effects or due to the clogging of the fissure with silt. Hydro-fracturing is one way of cleaning the blockage in the fissure and releasing water back into the bore wells. Hydro-fracturing can also open up the bore well to new fissures in the immediate vicinity not previously tapped by the bore well.



The hydro-fracturing expert team



The team observing the camera images from within the bore well

What is hydro-fracturing? As the terms suggests, it is applying water under high pressure for the creation, propagation and cleaning of fractures and fissures deep in the rocky layer of the earth. The creation or extension of the fractures is done using very high pressure water pumped into the bore well with pressures reaching as high as 3000 PSI (pounds per square inch). Mr. Ganesh of Ayyapas Aqua Solutions, Bangalore who manufactures hydro-fracturing equipment and conducts hydro fracturing with his team, explains the procedure. First an indigenously developed camera is introduced into the bore well to observe the correct depth of the casing, the presence of horizontal and vertical fissures at various depths and the total depth of the bore well itself. With the camera observation it is possible to come to a conclusion as to whether hydro-fracturing is needed and the probability of its success. Typically hydro- fracturing is attempted in bore wells with depths more than 100 feet and with the distinct presence of a fissure or more.

After determining the true depth of the fissures the team then introduces a top plug or a packer consisting of rubber gaskets into the bore well, which is then made to swell like a balloon using an oil pump. This expanded balloon like plug then prevents the upper transfer of pressure. Through a pipe inside the packer, high pressure water is introduced using a specialized pump. The pressure gauge is monitored to note the impact. In a typical successful scenario the pressure increases and then rapidly falls indicating the cleaning up and widening of the fissures. Two or three such pressure operations can be carried out depending on the depth of the bore well and the number of fissures present.



The packer plug with the central pipe for high pressure water being introduced into the bore well

Once hydro-fracturing is done the yield in the bore wells increase. This can be confirmed through a pump test by noting the volume of water pumped out in a given time. Mr. Ganesh and team have noted a success rate of over 90 % with yields increasing by over 200% in certain cases. Defunct bore wells can be brought back into life thus reducing sunk costs in such infrastructure.



Water under high pressure forced into the bore well to clean the fissures

Ganesh also insists on rainwater harvesting and artificial recharge to go hand in hand with hydro-fracturing as this is the only source of groundwater. Customers and clients who have seen a bore well fail understand the scarcity value of groundwater and the need to preserve and use it judiciously and the need for groundwater recharge too. The typical response of sinking a new deeper bore well with huge costs and less chance of success can be avoided by hydro-fracturing.

Bore well owners and the nation at large have to understand the science of hydro-geology and preserve this precious resource for themselves and for the future generation. Participation in this scientific understanding, using water judiciously and harvesting and recharging groundwater is the path to water wisdom. India with its hard rock terrain and its huge dependence on groundwater has to lead the way.