
biome
Environmental
Our Open Well
Heritage

This document has been made to be used as a community resource and is meant to evolve with the contributions and experiences of everyone working on open wells. Please write to us with your contributions.

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What is an open well?

An open well is a lined or unlined hole in the ground that accesses the shallowest groundwater available in the local area.

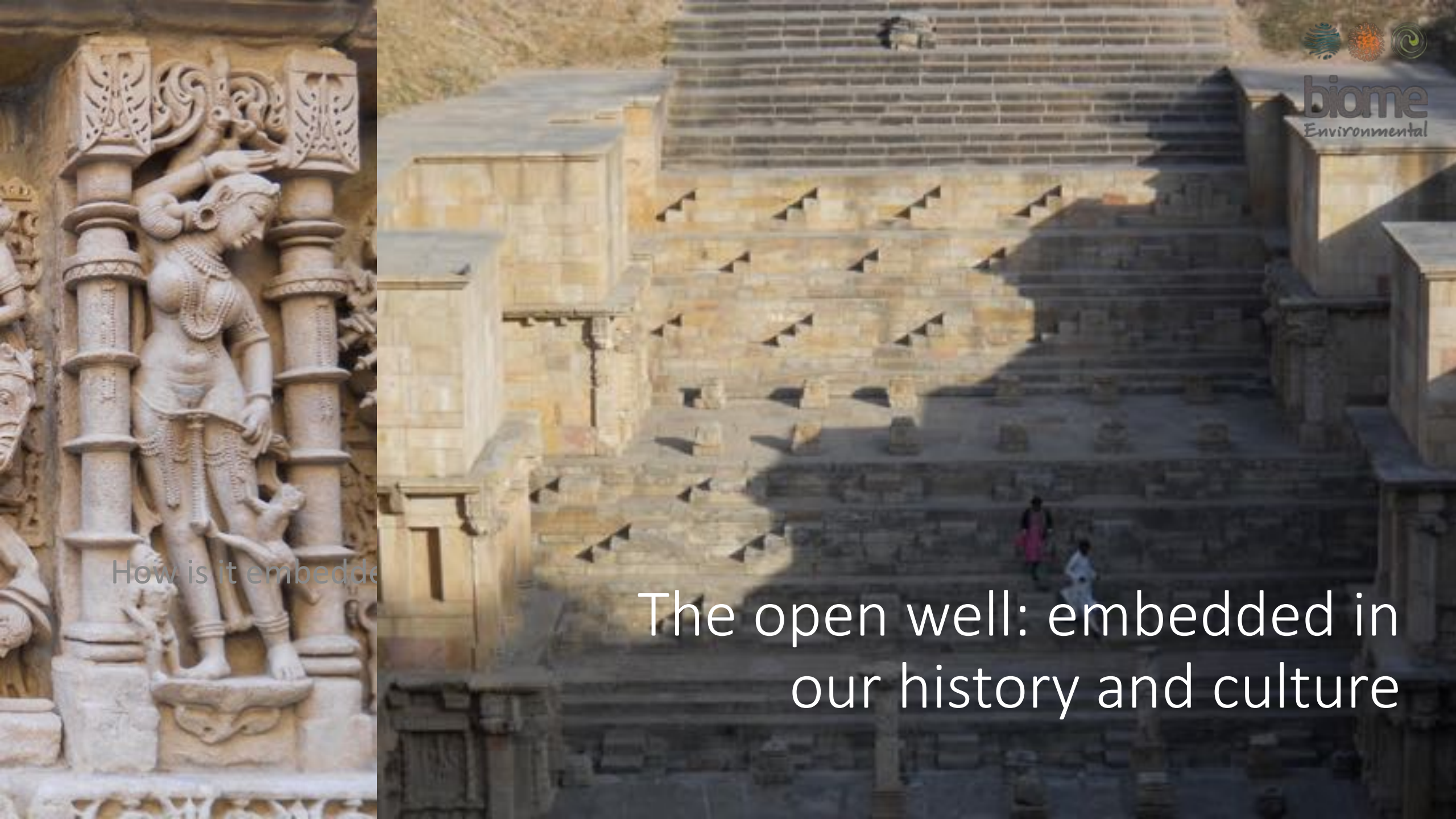
Open wells typically get water from the “unconfined shallow aquifers”, i.e., water-bearing soil or rock layers at shallow depths, that is not under any pressure.

Open wells are perhaps the earliest tool invented by mankind to access groundwater.

Once invented, the open well has saved humans from the tyranny of rivers as humans could move inland away from rivers and water sources.

Historically, they have been used primarily for irrigation. They have since been used to access groundwater for domestic and non-domestic purposes.

Over centuries India's open wells have played a major role in conservation and optimum usage of water during times of water-shortage. Apart from their obvious practical value, some of them are crafted exquisitely enough to be called works of art.



The open well: embedded in our history and culture

The open well is deeply embedded in our culture

Open well from Dholavira, in Gujarat. Dating back to the Indus Valley period. Note the exquisite brickwork.

Much of the Indian sub –continent has developed as an open well culture

Some of the oldest wells date back to the Indus Valley Civilization, from 3300 to 1700 BCE.

In medieval times, the step wells (called vavs in Gujarat and baoris in Rajasthan) are some of the most elaborate symbols of local culture blending mythology, culture, architecture and hydrogeology.

Other empires such as the Vijayanagara empire also boast some exquisite open wells

And here’s an open well in Sarnath from 500 BCE. The Buddha may have drunk from this well!

A mesmerizing open well from The Vijayanagara Empire in Hampi. From 500 years ago.

Rani-ki-vav in Patan in Gujarat is an eight hundred year old step well.

A multi storey well, it was built during the Chalukya dynasty.

Rani-ki-vav in Patan is an architectural marvel, an oasis that served as meeting point or caravanserai, and a people's weather instrument.


Rani Ki Vav

Depending on the time of the year and the number of levels submerged by water, the open well served as an indicator of the availability of water, and in turn whether it was a water scarce year or a plentiful one.

For example, in Rani ki Vav in Patan, each space was not only a floor of the well where people could meet, it also helped people understand seasonal variations – so if the water level was a few levels or floors lower, it meant that water was scarce and its use would be measured. In better times, the water level would rise and flood the higher levels.


Rani Ki Vav

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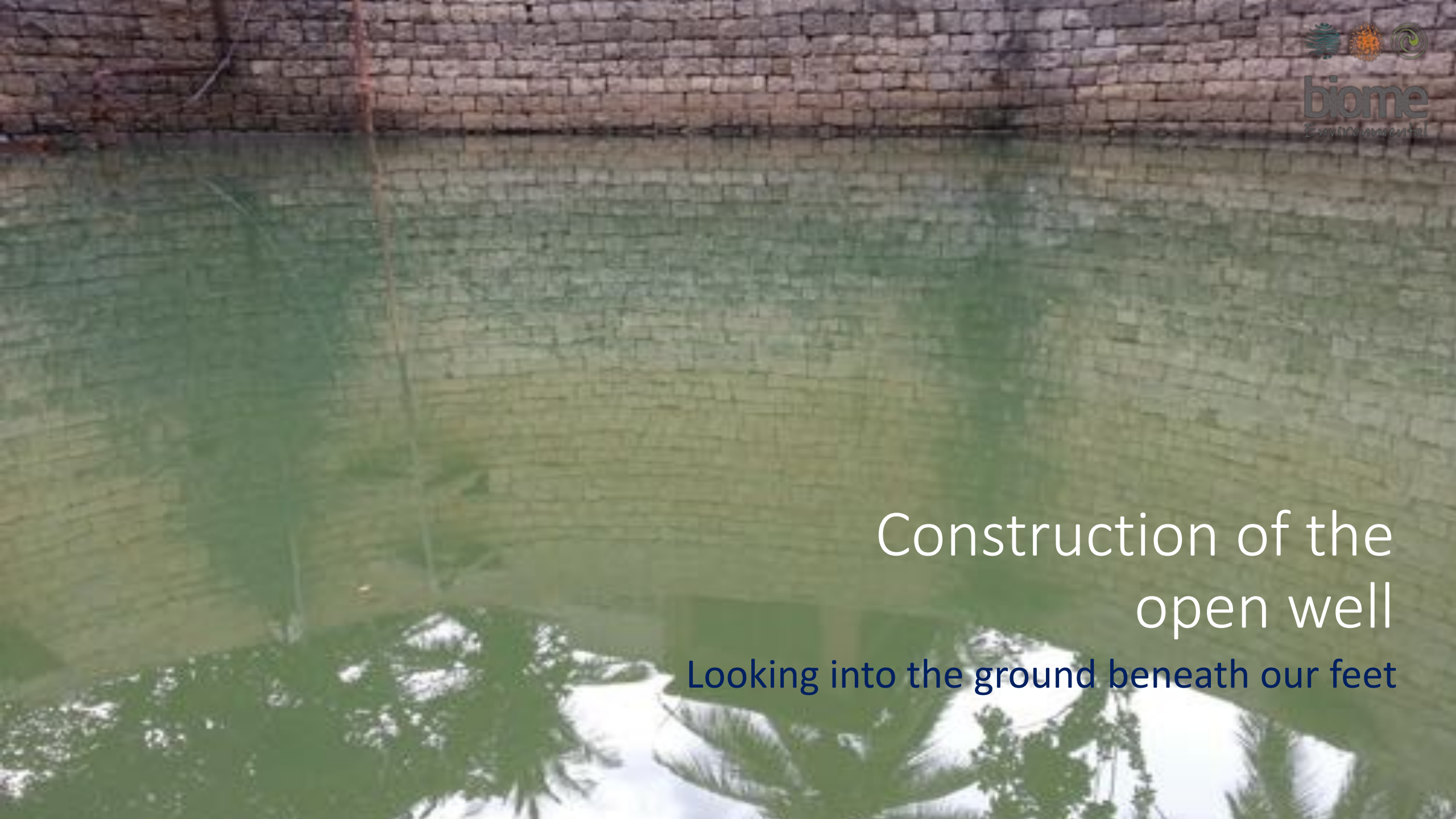
By its very nature the open well created a culture of sustainability.

They taught us about water availability, and access, but also of water pollution.

What’s in a name?

- Called Vavs in Gujarat
- Baoris in Rajasthan
- Baavi in Karnataka and Andhra Pradesh
- Kinar in Kerala
- Bhala in West Bengal



Construction of the open well

Looking into the ground beneath our feet

When you dig a hole in the ground to build an open well, you're looking to tap into the shallow aquifer.

You could hit rock, where water passes through cracks in the rocks

Or you could hit soil, which holds water. Or it could be a mix. Either way, the well structure has to be reinforced so that it doesn't collapse.

Hence, wells are lined – either by traditional dry stone masonry, like the one on the left, or using modern cement rings.

Here you can see how the open well meets the hard rock of the shallow aquifer

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And here you can see how the rings of this well are reinforced with jelly


Here is a disassembled well. You can see the pile of dry stone rocks on the left

The architecture of the open wells has evolved over time

We see two broad kinds of open wells today – those used for domestic purposes, and irrigation wells

Earlier, built of dry stone, using only rocks without mortar to bind them together

Devices like the Persian Wheel used a chain of buckets hung around a wheel

Today, most modern wells are built from concrete rings today

Most modern urban domestic wells look like this one on the left

Most urban wells are either for **use** or for **recharge.** They all tap into the shallow aquifer

They are lined either with stones or cement rings, their size and depth varies depending on the use

This water is always soft, does not have geogenic contamination but can have bacteriological contamination

How do we extract water from the open well?

People would walk down the granite steps to collect water from the well

And then as the water levels drop, the the centrifugal pump arrived

As the shallow aquifer dried up the search for water goes deeper into the ground and into the deeper aquifer via the borewell

Unfortunately for this well, even the borewell has gone dry.


How do we use the open well?

Uses and Extraction of Water

Open wells are used for irrigation and domestic purposes

The water from open wells is traditionally drawn manually, either using a pulley or a pot, or by walking down the steps of the stepwell

Some, like the Persian Wheel used the power of the animal to draw water

With the introduction of the electric pump, extraction has become easier

This has resulted in the exploitation of water within the shallow aquifer, leaving many aquifers dry and forcing us to dig deeper into the ground in search of water

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The Persian Wheel

The Ghanti Yatra, the Rahat, the Araghatta….

The Persian Wheel offers a mix of human ingenuity, raw animal power, and the heady sound of water being drawn up from the well. They use a chain of buckets hung around a wheel to continuously lift up water and channel it out for irrigation or domestic use using draught animals like buffalo.

Many of these Persian wheels are obsolete today due to the introduction of the electric pump. Here, the wheel and sprocket mechanism from an Araghatta in Karnataka lies unused and locked to avoid theft.

A pulley from an open well. The pump has largely replaced the pulley in many regions

And then there's this: memories of fighting the blistering summer heat

But the well has another use – it can tell us about our environment

Unlike borewells or tubewells, the open well talks to us

You can look into an open well and know if it's been a year of good rainfall, or if water levels are receding, the well tells us that summer is coming, and that we should store our water to tide over the summer months

If well water is dirty it means that the water towards the surface is dirty, and that's a sign of water pollution

If we recharge open wells we can directly see the rise in water levels

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Open wells today –
lost but not forgotten

What has happened to wells over time

The exhaustion of the shallow aquifer has led to the search for deeper groundwater

And as we switched from the open well to the borewell, many open wells fell into disuse and disrepair

Many have disappeared from view, their stones dismantled and reused

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A common site – a dry open well, with a borewell at its centre and an disused pump house

Unfortunately, the borewell too has gone dry.

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This is what happens to wells that fall into disrepair

They become sinks for contamination

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… and garbage.

The open well is not a thing of the past.

It is alive.

Can we see a future where the open well regains the place it used to occupy in our lives?

The open well in Bangalore

An open well in Classic Orchards

Open wells in Bangalore

Bangalore's landscape was once dotted with open wells

These wells were dug typically up to a maximum depth of 80 feet

Many open wells have deteriorated due to real estate development and neglect, driven partly by the perception that open well water was not clean or as long lasting as borewell water

More recently, a revival or restoration of sorts of open wells in the city

Rainwater harvesting also helps channel water into wells, which may raise water levels

Wells in Bangalore range from the glorious, like this step well at Devanahalli

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To wells like this one, near Jakkur Lake

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We still use many of them. Here is the well at Koramangala Police Station

This well, for example, is from a dhobhi ghat, where the city's clothes are washed.

The well on the left is from an apartment complex in Cooke Town.

And this well on the right is a temple well.

And here is an open well in Mestripalya

Desilting the Kaikondrahalli Lake well

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Any guesses?

Why opt for an open well?

For a household, it’s typically cheaper to build an open well than to dig a deep borewell

The water is cheaper than borewell water as well

The open well is an easy choice for the poor who find it easier to access and afford domestic water from the open well

If maintained well, they could last for centuries

Open wells inculcate good water practices by regulating usage depending on the level of water available

The laws around recharge wells in Bangalore

If you live within BBMP's jurisdiction or have a BWSSB connection, then the laws apply to you.

If your property has a built up area exceeding 100m²/1100 ft² on sital area of 200m²/2150 ft² (BBMP) or a built up area of 1200 ft² and above on sital area of 2400 ft² and above (BWSSB),

You need to provide for a recharge well of a minimum of 1m dia and 6m depth (3 ft dia and 18 ft depth).

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Digging an open well

step by step

First the soil is excavated to the desired depth. You may encounter rock or water inflow/seepage.

The hole is normally 6”-8” wider than the external dia of the concrete rings.

These wells can cost anywhere between 20k and 100k INR.

The soil is excavated to the required depth

Concrete rings are lowered in one by one into the well

Aggregate or jelly stones line the gaps between the rings

This reinforces the well structure

Wells are fitted with electric motors. They are covered with a safety grill, or an RCC slab with a manhole or peephole. This helps sunlight enter the open well, creates an access point for maintenance. It also helps us look inside the well and monitor water levels

Some points to remember when digging an open well

The recharge well should be as far away from any soak or toilet pit and any building foundation and basement

Place the recharge well as close to any borewell

The soil should be excavated to a size about 4” larger than diameter of the well and reinforced concrete rings are laid into the hole.

The space between the rings and the soil should be packed with jelly or rocks measuring about 40 mm.

Don’t forget to place a concrete slab over the well, with an opening to look inside.

A simple way to manage your groundwater

A simple way to begin to understand groundwater would be to put a meter on the withdrawal pipe from an open well

Take a reading every month to understand how much water is drawn from the aquifers below

Test the water quality for drinking water standards once in 6 months at least

Make recharge wells by connecting them to rooftop and surface water from clean catchments. Filter the water and recharge the open well

Open wells are more susceptible to microbial contamination than borewells, and so should be covered, and protected from sewage leaks.

If you are recharging more than you draw you are allowed to sleep soundly

The Well Diggers

The well diggers of Bangalore

Well digging is a traditional skill passed on through the family.

There are few families left from this Manuwaddar or Raja Bovi community. Many of them live in and around Sarjapur, in a neighbourhood called Bhovi-palya (or home to the well diggers).

When borewells became popular in the 1980s, many of the traditional well diggers shifted to digging toilet pits of foundation digging

“Just as no machine can replace our hands that know how to dig a well perfectly for water to percolate from all sides, no borewell can replace the goodness of an open well,” Muniyappa, a well digger says.

When the rainwater harvesting policy was introduced in Bangalore, it had an important side effect: it created jobs for plumbers, well diggers, and concrete ring manufacturers.

As more and more people in Bangalore look to manage their groundwater better, many of these well diggers are back to digging wells across the city.They can dig 20ft deep wells in two to three days.

They have been instrumental in reviving countless open wells across the city, as well as digging new ones.

Most have dug over 250 wells each! Some have dug over 3000 wells.

Contact details of well diggers in Bangalore

- A good time to dig wells is when the water table is low – the wells are easier to dig
- Here's a list of well diggers in Bangalore
- They can dig upto 40 ft
- Many of them have dug wells outside Bangalore as well, in places such as Ooty and Hyderabad. They understand the lay of the land, and are are willing to travel.
- Some of them are now on WhatsApp and will send you pictures of their previous work

- Krishna : 99862-03022
- Pedanna : 97424-23145
- Antony: 80507-95139, 90357-10920, 91006-91501
- Kanthappa: 99169-85003
- Muniyappa: 94485-70684
- Mohan: 99869-22193
- Gurappa : 98809-74502, JP Nagar
- Muniswamy: 99457-66502
- Ramkrishna: 97435-38649
- Rajappa: 96554-64055
- Ravi: 96558-52399
- Venkatesh: 98864-08665, 95852-90354,
- Muniraj : 98866-32599

Examples of urban open well revival and use

Mr George found a disused well in Silverdale Apts in Cooke Town when he moved in.

It had been there for over fifteen years.

He led his community in cleaning and reviving the well.

The water is now used for gardening and car wash for the entire complex.

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This is a temple in Fraser town. The very camera shy Smt Mageshwari tells us that her family has been priests of this old temple…..

The Temple runs on this well. The well yields throughout the year.

“How old is this well ?”

“Just like the temple, about a 100 years old”

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“Do you drink the water from the well ?”

“Of course, it is water from our mother’s feet”

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Dhobi Ghats are where the city traditionally washed its clothes.

Many are run by the washer community, or “Madivalas” as they are called in Karnataka.

The Dhobi Ghat needs land, water, Electricity, water storage and pumps.

This stone lined well runs this Dhobi Ghat.

The well yields throughout the year and overflows in monsoon.
It is home to fish and turtles too.

Belagavi – a city of wells

Belagavi, the city of wells

Belagavi, a city in North Karnataka used to rely on shallow wells till it switched to centralised water supply some decades ago

A drought in 1995 spurred RS Nayak, the City's Environmental Engineer to consult with its citizens

The senior citizens suggested reviving the city's open wells

Since 1995, nearly 40 smaller open wells including 21 high yielding wells have been revived. This includes the 'Congress Well' a historic city landmark.

Revived wells supply 50-60 lpcd to 50%of Belgaum's population at only 0.76 Rs / KL, making it the cheapest source. They are integrated into city's water supply and are the lifeline source during droughts.

Citizens have been an integral part of their revival. For example, some filtering units attached to wells are funded by Rotary/Lions Club, private entrepreneurs or communities.

The ‘Congress Well’ in Belagavi was built in 1924, to supply the Indian National Congress party's annual convention that was presided over by Mahatma Gandhi

At that time, it cost Rs.4,370 and 3 annas to build and it supplied water to half of the city. It was called *‘Pampa Sarovara’*

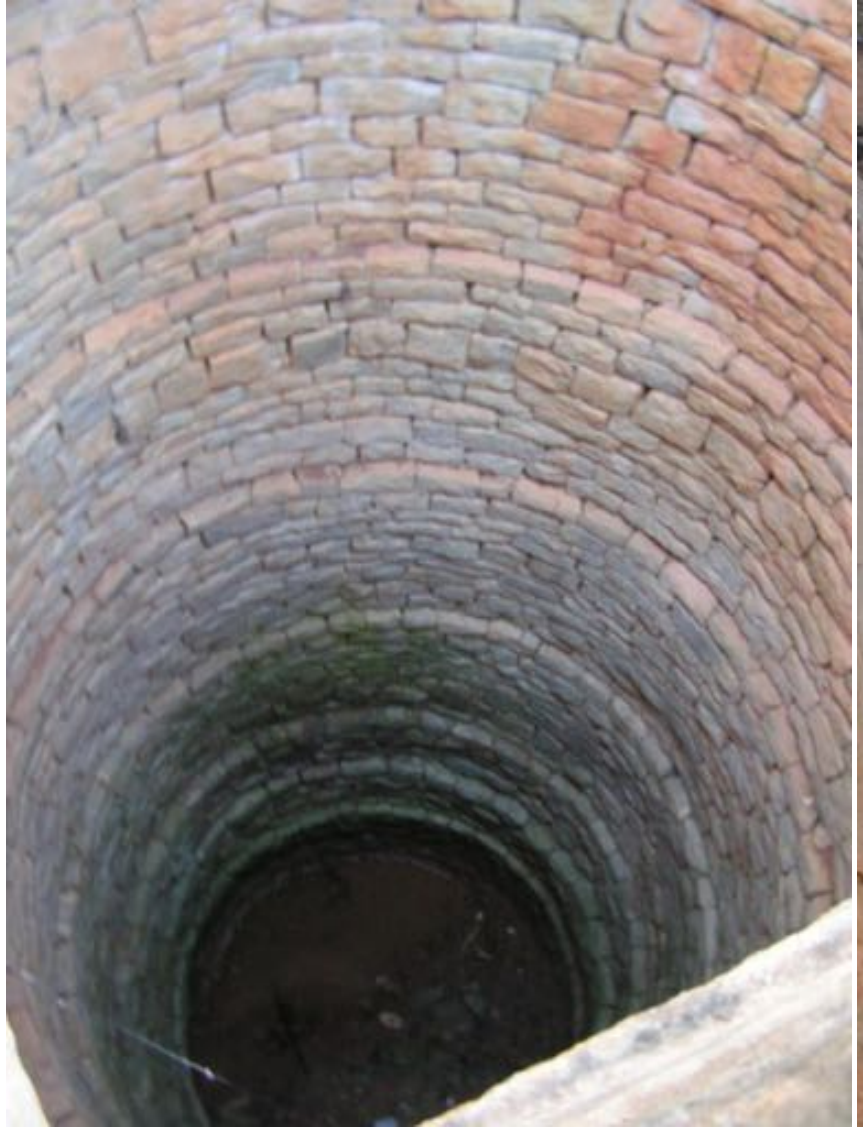
The Congress well today delivers 50 Lakh litres per day.

Since then, in Belagavi, 12 lakes are being cleaned and a sewage treatment plant is being built. The treated wastewater will be reused.

Here is a well in Belgaum Cantt with 60 ft of garbage. It is being cleaned up. It can provide about 20.000 people water throughout the year.

A twenty minute drive down Hennur Road and you find this well.

One of many dry wells.



Despite being over forty years old and dry, Sharadamma still takes care of it. She says,
“We used to get our water from this well, and who knows, we might one day get water from it again.”

Get in touch with Biome Environmental Trust at water@biome-solutions.com

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