



Water Efficient Nation

Water Literacy Foundation

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Stream water harvesting

(An alternative solution to Check Dams)

For

Sustainable rural water solution

***A confident challenge of
addressing water scarcity!!***

When whole of Karnataka is grimly affected by water scarcity, Maranbasari, Nagara and Neeralagi villagers of Gadag District are celebrating festival due to water abundance!!

Reason behind this celebration is a project done in the year 2008 – 09 by Water Literacy Foundation led by Founder Director Sri. Ayyappa Masagi.

Before the project, like thousands of villages, even these villages were water victims. The little available underground water had fluoride excess than dangerous level and very hard in quality. Water Literacy Foundation, under the sponsorship of Ashoka – Innovators for the Public of USA and Deshpande Foundation, Hubli-Dharwad, implemented its own innovative stream water harvesting projects. The results then were very impressive and won Ayyappa Masagi, The Jamnalal Bajaj National Award for Application of Science and Technology for Rural Development:

http://www.jamnalalbajajfoundation.org/media/pdf/JBA_2009_Bio_Ayyappa_Masagi.pdf and <http://www.deccanherald.com/content/35305/ipl-2012.html> in 2009.

What is the new success the villagers are happy about?

Earlier there was hardly any water available at 300 – 400 ft depths. But after our intervention, huge volume of water was found in borewells at depth of 50 – 70 ft only. Highest water was available at 130 ft deep. More importantly, the available water is potable, soft and absolutely free from fluoride.

From 2008 (after our intervention) around 17 (4 for drinking purpose) borewells have been dug and all the borewells have been successful with surplus yield.



Water flows like a stream

We need to harvest stream water because streams are treasures of water and can be used as percolation catalyst and evaporation arrestors

Different Water Tables

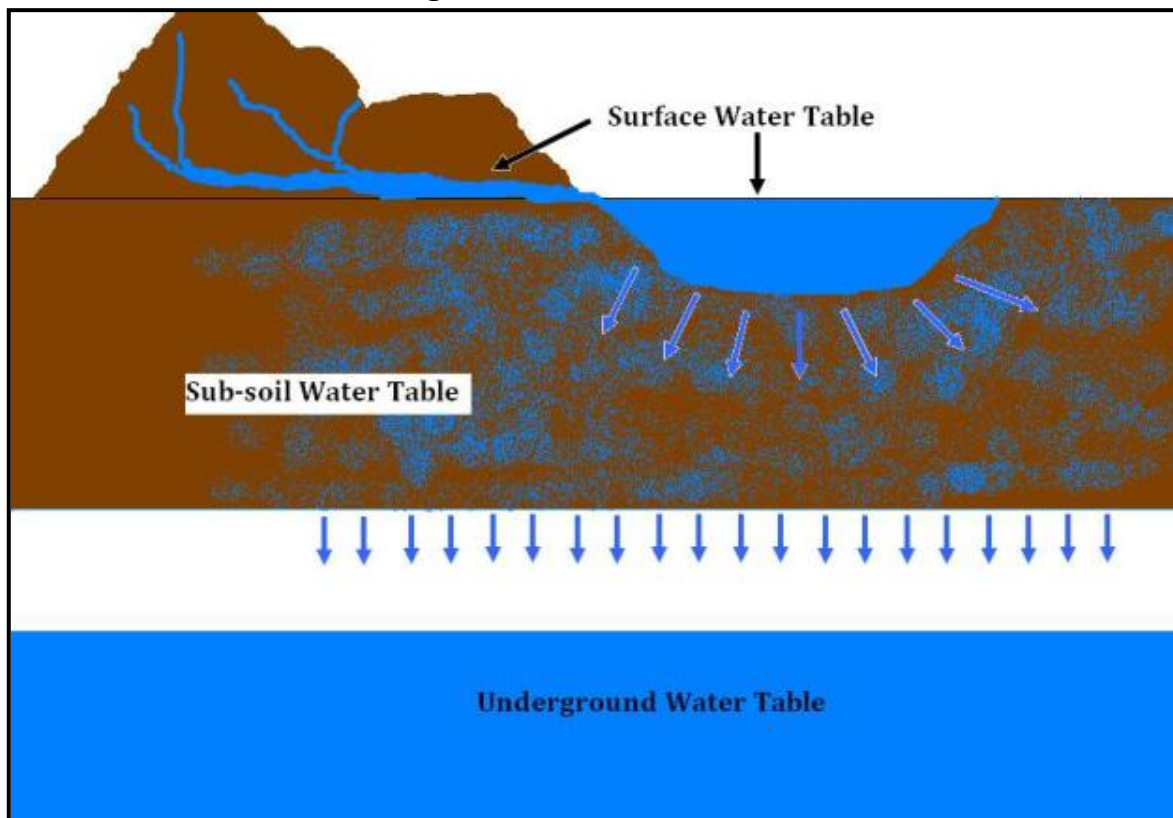
Most of the people are unaware about different water tables. In order to effectively manage water with the objective of addressing water scarcity it is very important to know the following water tables:

Surface Water Table: Lakes, streams, rivers, etc. that are on the Earth surface form Surface Water Table.

Sub-soil Water Table: This water table is formed by the regular percolation of huge volume of water from Surface Water Table. Openwells and shallow borewells/tubewells get water from this source.

Underground Water Table: This water table is the result of water percolation from Sub-soil Water Table. Water is stored in the aquifers, underground streams, caves, etc. It took millions of years for Earth to collect 1.7% of Earth's total water reserves.

All water tables in one image



There was lot of water in openwells and most of the streams were perennial just some 15-20 years back, what happened to them? Why have they gone dry?

Reason: 15 – 20 years back there used to be periodic and smooth rainfall. This used to give soil surface sufficient time to percolate the rain water into the sub soil. Because of this, our Sub-soil water table was very rich. Once the surface soil was saturated, the runoff rain water accumulated to form nalas. Several such nalas joined to become streams (Read in Kannada hariyuva nadige saavira kaalu) and later rivers. The streams would charge natural springs that were the source of water to openwells. That is the reason earlier all the openwells were full of water.

As India drifted towards globalization and industrialization, due to global warming, deforestation, encroachment of rain water catchment areas, unregulated drilling and over exploitation of borewells etc. sporadic rains became common. Due to heavy rains, most of the rain water ranoff leaving behind very less rain water percolation into the sub soil water table. Gradually available water from openwells and borewells and after few years most of the openwells became dry.

The same was true with streams; most of the stream water simply ran away to the rivers and eventually ended up in seas and oceans leaving behind dry streams and people water deprived.

We should also take the blame for not taking any measures of recharging and sustaining the sub soil water table Natural springs. The following quote certainly suites every one of us: ***'We take shelter during rainy season, we keep ourselves warm during winter season but start thinking about water only when we face water scarcity during summer season'***

Why most of the projects on water fail despite of spending crores of rupees?

Check Dams	<ul style="list-style-type: none">• Check dams constructed are of poor quality which get washed away during every rainy season• Check dams are inefficient as huge volume of exposed water gets evaporated• Exposed water is also vulnerable of contamination due to human and miscreant activities• Huge incoming silt reduces water percolation
Lake desilting	<ul style="list-style-type: none">• Lakes are desilted by contractors but hardly anything is done to its rain water catchment area• Feeder canals that bring water to the lake are encroached but government and contractors do not even know about its importance
Borewells	<ul style="list-style-type: none">• Government thinks if one borewell goes dry, drill another to supply water. What if every new borewell dug is dry? Concerned officials have no answer.• Government is spending money only on drilling new borewells but is not concerned about sustaining the water table from where the borewells draw water
River water	<ul style="list-style-type: none">• Unlike few decades ago, rivers are no longer perennial and go dry during summer. This is when most of the people are hit by water scarcity• Government is spending money only on pipelining, filter systems, etc. but is not thinking on augmenting river water

Is there a cost effective, sustainable and side effects free solution to the water scarcity? Does anybody have any idea that is better than many existing pocket burning solutions?

Yes!

Water Literacy Foundation, Bangalore has answers to address water scarcity not only in Karnataka but India.

More about Water Literacy Foundation

About Us: Water Literacy Foundation (WLF) is a citizen sector organization founded by Sri Ayyappa Masagi, Mechanical Engineer, with a vision to bring water conservation techniques to everyone. Before starting this organization, Ayyappa Masagi left his job with L&T Komatsu, Bangalore.

The goal is to create sustainable business models in rural areas, Industries, Layouts, Apartments, Individual homes and the bottom-of-the-pyramid (BOP) segment.

Vision: We visualize India of 2020 to be a water-efficient nation: a nation in which all people are able to enjoy their basic human right to water. This ideal will be achieved through a massive movement for 'Water Literacy' – knowledge about water issues and conservation methodology.

Mission: To strike a balance between water usage and water replenishment through transforming communities into Water Warriors: bringing basic knowledge of water conservation practices that inspire and inculcate a culture of water efficiency.

The proven water conservation techniques:

- **Roof Rain water harvesting** - A simple way of channelizing, filtering and collecting rain water as an alternative to river, openwells and borewell water. This means giving rest to river, openwells and borewells for 4-5 months during rainy season and using only rain water. By rain water harvesting, we can reduce pressurized load on existing water supply.
- **Borewell/openwell recharging** - It is a systematic way of channelizing and filtering rain water and finally using the filtered rain water to recharge borewells/openwells. Think in this way, if every one keeps taking water out of the borewells and no one thinks of recharging it, then wouldn't it go dry sooner than expected? Time has come to educate everyone that water is elixir of life and potable/fresh water percentage is going down alarmingly. If the same trend of 'Only use and no recharge' then our future generation would be left with only sea/ocean/contaminated water. Already sea level has increased by 7.4 inches in between 20th and 21st century.
- **Lake construction and replenishment** – This is ideal for customers who have huge rain water catchment area. After years of research on lakes, I recommend government that there should be a 1 acre sized lake for every 100 acres to bring back the golden days where openwells, rivers and streams were always full.
- **Grey water harvesting** – Grey water is nothing but the water that comes out of our bathroom and kitchen except the sewage. This practice is more effective than rain water harvesting. If every house adopts grey water harvesting along with rain water harvesting, I can promise that water scarcity can be ended. Also our water bodies can be saved from contamination as most of the grey water is let into them.

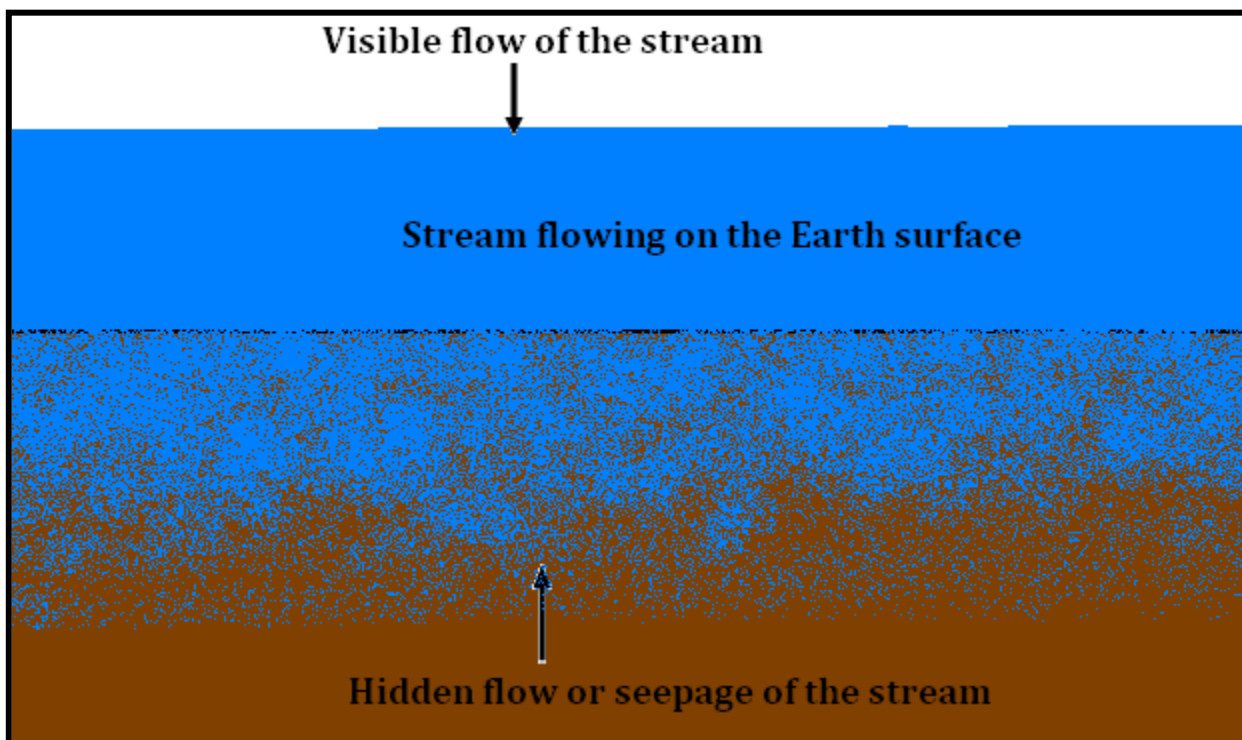
- **Non-irrigational Agricultural Systems** – These are rain water catchment area treatment systems – which means rain water is systematically stored in the top soil, sub-surface soil and sub-soil so that vegetation can retrieve the stored water during dry periods of the year. These systems also prevent soil erosion and thus assure crops be it flood or famine. These systems contribute in their own way in making streams perennial.

Patta Bunding, Soak Pits, Soak Trenches, Tree based Agriculture and Nala Bunds are the examples of Non-irrigational Agricultural systems.

- **Stream water harvesting** – This is the topic for this report.

What is Stream water harvesting?

- It is a simple but result oriented innovative way of harvesting rain water flowing in the stream by constructing series of underground lakes, underground check dams, percolation pits and Recharge Shafts to recharge our sub-soil, deeper soil and underground water.
- There are 4 types namely: **Surface Dyke, Underground Bund-cum-Lake, Lake with Lake Type Borewell Recharging Unit, Percolation with polyurethane sheet Tanks**
- Unlike surface check dams, stream water harvesting is done underground to harvest the hidden stream which flows below the stream bed.
- Hidden stream flow (as shown in the below image) is obstructed by the underground plastic dam or underground bund which results in recharging natural springs resulting in water in near by openwells and borewells.



- If ten such systems are created along a stream in 500 mts, water will be available all the twelve months of a year down stream.
- Nearly 10 villages drinking and agricultural water needs can be addressed.
- In this system no land is encroached for creating a reservoir, no loss of water due to evaporation, it is a one time installation, zero evaporation.

Images of various stream water harvesting systems







Success Stories in images

Before Intervention



After intervention water from the well bottom was flowing like a fountain several inches thick that filled this dry well in 10 minutes



Before Intervention



After Intervention





Stream water harvesting across old bridge in Jalagaon of Maharashtra



Earlier no water in this pump, now in just one pump hit, water comes out easily



When all the water sources dried up, the below lake that resulted out of our stream water harvesting project turned to be a gift to Neeralagi villagers



Images of recent stream water harvesting success story at Nagara, Maranbasari and Neeralagi villages

Sri Tontadarya Swamiji witnessing the results and success in 2012



Non-stop water from borewell







What does it cost? And how long does it take?

The cost of each system is around Rs 3.60 Lakhs. However, to show instant results, it is highly recommended that ten such systems constructed along a stream in 500 mts which costs in between Rs. 17 Lakhs to Rs. 20 lakhs.

The project has to be done before the rains. It will take 2-6 days to complete one dam. It is a one time permanent structure, does not need any further maintenance. Each year it increases sub-soil water table progressively.

Images of springs getting charged





Your generous contribution can result in such big success

If you donate **INR 25000**, you finance **two awareness programs**.

If you donate **INR 50000**, you finance **a water harvesting project for a school** or a **Water Day event**.

If you donate **INR100000**, you finance one farmer's **borewell recharging project** which in turn helps the surrounding farmers too.

If you donate **INR 250000**, you finance **250 acres of Non-irrigational Agricultural Systems project**.

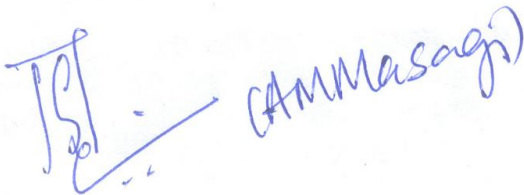
If you donate **INR 360000**, you finance a **Stream water harvesting project** that can permanently address water issues for one village.

If you donate **INR 3600000**, you finance the **bigger Stream water harvesting project** that can permanently address water issues for ten villages on the stream bank.

We sincerely appeal all the District Commissioners, CSR Heads, Industrialists, Philanthropists and Local Leaders to join their hands with us to fight water scarcity war.

Thanking you,

Yours truly,



Ayyappa Masagi