

New approach to discharge groundwater in Myanmar with climate change

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1. Global climate changes started since last three decades. Seasonally weather forecasting is changing. It is quite different year by year. Heavy rain in a region whilst draught is happening in another region. On the other site, temperature is higher than normal. Happening are out of systematic time scale.
2. In Myanmar, climate change is high-risk since Cyclone Nargis 2008. Myanmar peoples suffer effect of climate change in their economy, water supply, water resources from that 2008 turning point. Flood, draught, and shelters are serious, mostly in coastal region and central dry zone of Myanmar. Water supply is serious year after year, mostly groundwater discharge in land are difficult to regular practice. Deeper drill but less water get is facing in regular drilling practice in land because recharge is less but discharge is more.
3. Author aware these points of groundwater supply industry in our country. I wrote this status quo in the article "Water Climate Myanmar" in Myanmar version. And give a hint of new approach. Display in newspaper, Journals and Facebook post.
4. Nowadays, communities are facing water supply shortage in countrywide, especially in dry zone of central Myanmar. Societies and regional authorities supply water boxers to those peoples. Villagers from some of the villages closed to the sand stream / rivers are digging shallow hand dug well in those sand stream to get water. But they have to wait the whole day to get enough water for their house use.
5. More than 500 number of sand stream are available dry zone of central Myanmar. The author a thought "The new approach to discharge groundwater from the dry sand stream at a depth. I have confidence that this method is a best way to discharge groundwater for community during climate change in Myanmar. This type of well is not common use in public. We have to make practice to peoples to become famous and common use.
6. It is called "Radial Collector well".
7. The cost is reasonable and well is cost effective quality service for community water supply. Discharge capacity is more than normal large diameter well in land. Governmental, non-governmental organizations can do with the regional societies.
8. Let start do! The general design and construction practice are below:

Basic Design and Construction of Radial Collector Well

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Climate change in globalization because of global warming. Myanmar is suffering the climate change since 2008. Cyclone Nargis notorious introduced in Myanmar. Myanmar has a monsoon climate with three main seasons, called summer, wet (raining) season, and cold & dry season. Nowadays, those seasons are not distinguished. Climate change directly affects surface water and indirectly effect on groundwater.

Regarding this, the author wrote the article “water, climate & Myanmar” in Myanmar language. The article displayed in Myanmar Water Portal, Facebook Post, and *Than Daw Sin* Journal in June 2020.

I wrote an emphasis on the risk of groundwater utilization in Myanmar. Regular water well drilling on land is gradually facing difficulty in quality as well as quantity. Recharge and discharge are unbalancing because of less filtration and less rainfall due to climate change.

So, I displayed the highlight of a new method of water well drilling to get proper groundwater discharge for community water supply. Some of the readers are happy to read that subject and asked to write more detail about that.

Here, I write about it. It is technically called “Radial Collector Well,” construct in dry sand stream/ river or on a riverbank.

Why call radial collector well? Well is a large diameter with small radial G.I pipe at the bottom of the well. These pipes are perforated or slotted to filtrate water in the tube and flow to the well. The perforated G.I pipe penetrates to the eight directions in the saturated sand bed. Water is through the pipe and flows in. The large diameter well collects the water to pump out. That why called “Radial Collector Well.”

A radial collector well can construct both in a dry sand stream and on the river bank. Recharge is already in saturated sand and or river. The water is clear and clean, better than the tube well. Those wells are using in the arid region in Western countries and Africa.

Infrequent well, similar to the type of Radial Collector well, but it is not real, just large diameter well at a dry stream in Dry Zone only.

Now, here, I introduce to Myanmar peoples to get started with real Radial Collector well. There are more than five hundred numbers of dry streams at three divisions, namely Mandalay, Sagaing, and Magwe in Dry Zone. Most of the villages have no water wells for potable water and far away from freshwater rivers. So, villagers have to go to that dry stream to collect water, but they can’t quickly get water. What they have to do? They have

to dig sand out to appear water and let collect the water. It is not easy in a few minutes; it takes time. Villagers spend many times to get water for one household.

Radial Collector wells are ready to use by pumping the water out at designated places for community water supply. Each of the wells is capable of producing between 10 to 15 million gallons of water per day.

A. Radial Collector Well

A collector well consists of a central concrete shaft or caisson equipped with horizontal screens radiating out into the water-bearing sand layer. Water is drawing into the central caisson through these horizontal screens or laterals where it collects and pumped to the ground surface. Collector wells are particularly well-suited for developing unconsolidated aquifers where recharge comes from a surface water source.

The following surveys conducted to get the perfect design and construction of radial Collectors well.

1. Topographic survey

(Survey onsite or collect data and information form the Department of Metrology and Hydrology)

to know to reduce the level of proposed well location

to the topographic plan view of proposed sand stream area or riverbank

to riverbank high

to get the highest flood level

to get the correct water level

Those facts are the essential requirement

2. Surface Geophysical Investigation

- Apply Vertical Electrical Sounding method

- The study area should be 300 – 500 meters long along the streamline,

- from proposed well location to downstream and to upstream

- draw profile based on resistivity value and depth

The above data and information are valuable to decide the depth of the radial collector well and position of radial perforated pipes.

3. Hydrogeological Survey

- Do the permeability test

- Grain size analysis of stream or river sand

- Analysis of the test results to know the specific yield, porosity and to decide the opening size screen on a radial pipe and primary caisson diameter to collect water

- to determine the discharge rate and pump capacity

4. Basic Design of Radial Collector Well

- Based on the above paragraphs 1,2 & 3, draw the radial collector well design
- Well diameter and lateral perforated pipe diameter & length
- The lateral perforated pipe above the sand stream bed
- Height of the collector well
- Depth of the well below the sand stream depth
- Height of the well above the sand stream
- Height of the well above the height flood level

B. Radial Collector Well Design and Construction requirement



C. Construction of Radial Collector Well (Brief)

After Paragraphs 1 and 2 completed, construction can start at a designated place in the sand stream or stream/river bank.

One excavator sits on the steel plate safely to start excavating. First, excavate the top sand. The excavated sand area should be more extensive than the designated well diameter to make reinforcement for sand slope stability.

The concrete reinforcement first ring is setting up by using a crane. The first ring must set properly at horizontal with vertical measurement is essential to raise the rings to the top without tilting. Using a crane is necessary and safely work in perfect progress. The base has to reinforce concrete plate with perforated holes. The holes are essential to release uplift pressure.

After installation of the second ring, lateral horizontal perforated G.I pipe with a spear has to drive in as per design drawing. Sandy water inside these pipes has to clear and temperately plug until the installation of rings complete. The total horizontal pipes are placing in eight directions.

Pump the sandy water out is essential to set the rings one after another without watery, and safely installation will complete. Finally, the well is rising.



Radial collector wells construct systematically using perfect materials and a lateral horizontal drilling machine use, as shown in the photo. During the water supply project period (1980 – 1990), Rural Water Supply Division has had a similar machine donated by the British Government. But nobody knows where it is. Times and material and technical know-how were covered.

After construction of Radial Collector well, pumping tests have to do to know the yield, discharge, specific yield, and Transmissibility. So, Hydrogeologist can estimate the water well life with safe yield.

This type of well is useful for community groundwater supply. The well is the better than typical well inland. So, we can say, “ New Normal @ water well drilling industry in Myanmar.”

If anyone questions regarding this construction issue to know more, please contact me via email, as shown below.

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Toward New Normal @ Water Well drilling System in Myanmar

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