Critical Water Resources, Kotagiri Town Panchayat

A report by Keystone Foundation, 2018

Introduction

In June-July 2017, Keystone Foundation inventoried spring sources in Kotagiri Town Panchayat. There are nearly 40 springs in the region. It was seen that some of the areas depend only on these springs for water. The report proposes to seek the possibility and the need for resorting some of those vital water sources with support from the Kotagiri Town Panchayat, community and other users of water.

In 2006, Keystone Foundation with support from Panchayat and community had initiated a restoration of spring-shed for the Mission Compound source. The source is a living model that depicts the benefits of conservation and bio-diversity to an ecosystem. The all grown shola patch in the fenced area near the source provides habitat for wildlife and birds. It has also stayed perennial throughout 2016 drought when other major water sources like Elada went dry. When a small patch of land less than one acre when restored could survive severe droughts, what could be the benefits from large areas of restoration.

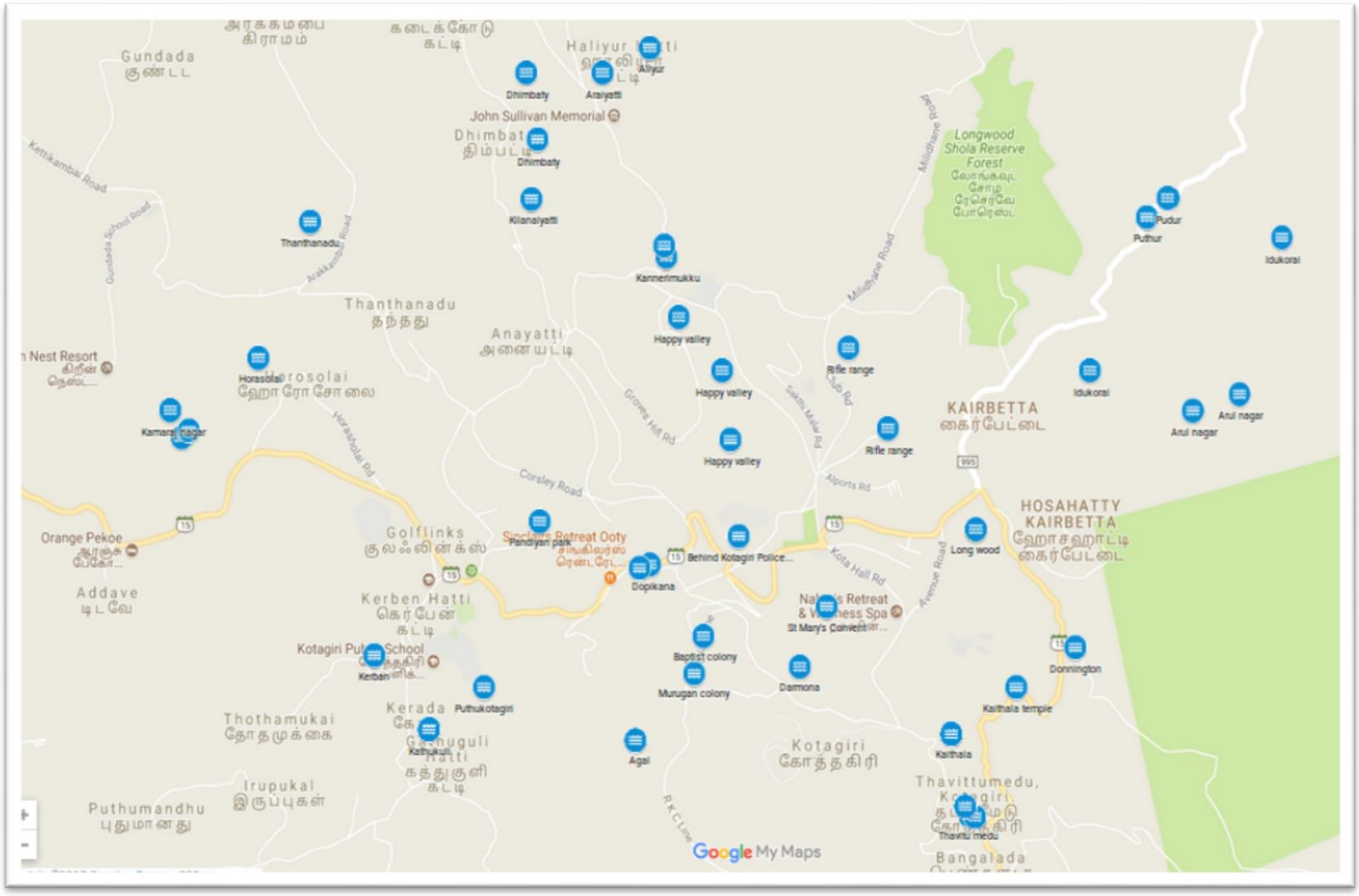
Eco-Restoration activities include:

1. Removal of invasive plant species and planting native grass.
2. Plant species in the spring-shed and recharge areas.
3. Spring protection –spring box.
4. Fencing and cleaning in spring-shed area.
5. Better management of solid and grey water wastes from households to prevent them from mixing with the source.
6. Construction of pits, trenches, loose boulder check dams, ponds.
7. Providing water sources for wildlife.
8. De-silting and repair of existing infrastructures.
9. Digging and recharge of open-wells.
10. Adding and/or improving storage of water.
11. Negotiation of water sharing.
12. Nurseries to raise suitable native plants.

The report gives the case-studies with current status of spring sources in the following areas:

- Mission Compound
- Dhobi Ghat Line
- Darmona
- Baptist Colony

Spring Inventory of Kotagiri Town Panchayat



Mission Compound (Happy Valley)

Status: Happy valley is a spring and wetland is located in the Valley part in the mission compound area and is an important drinking water source for Mission compound and Kambaikadai area. The spring catchment has 1 acre of Panchayat land which was used for open defecation and waste dumping by the settlement nearby. In 2006 under the Wetlands conservation program, Keystone along with Panchayat, School children and the neighbourhood community planned to restore the 1 acre land that was used as an open defecation site of the locality into a shola forest. The restored patch has now grown into a small patch of forest and has become a reason for the spring and wetland to be perennial. Happy Valley stream crosses 150-160 houses concentrated in 3 Panchayat wards- ward 17, 18 and 19. People from the locality had almost occupied land as close to the stream as possible. There are few houses located right on the stream.

Source details: During British period, the path from Happy Valley till *Kambaikadai*used be to call as *Kuthirai-vazhithotham* (Path for horses). The stream used to be 12feet in width. In the late 1960's, during NanjaaGowder period, Kotagiri town was in need of water. So, water from Elada spring, Mission Compound source and one other source were piped and collected in various places to supply to the town. Mission compound gravity scheme was part of Elada dam in 1968. The scheme included a check dam built near the spring source from where the water supply was till *Gore House*. The seepage water from the spring gets collected in the *Kambaikadai* well with help of a hose pipe. There is a settling tank in between the Mission Compound source and *Kambaikadai*well which collects water from the main spring, another spring in the valley and other seepage water. In late 1980's, water collected in the *Kambaikadai* well was supplied earlier till *Gore House*covering- *Rose Cottage, VinayagarKovil*and *Bazaar*. In 1989, *Seth line* had only around 15-16 houses and the quality water supplied till the area was clean. Over the years, as population in the town area has increased, the well is pumped only till Seth line. The stream that flows behind *Kambaikadai* well is the water from Sterling Factory spring. It is supplied to *Carsel estate, Dhobi ghat, down Savadi (below AyiyappanKovil)* and joins in the bigger stream that joins in the Mettuplayam River.

Things to be done immediately

- To clear the invasive plant species and other over grown plants around the spring-box.
- To have a covering for the spring-box that would prevent entry of solid wastes and run-off water during rainy seasons into it.
- To repair the spring-box to facilitate efficient monitoring of the spring discharge on a daily basis.

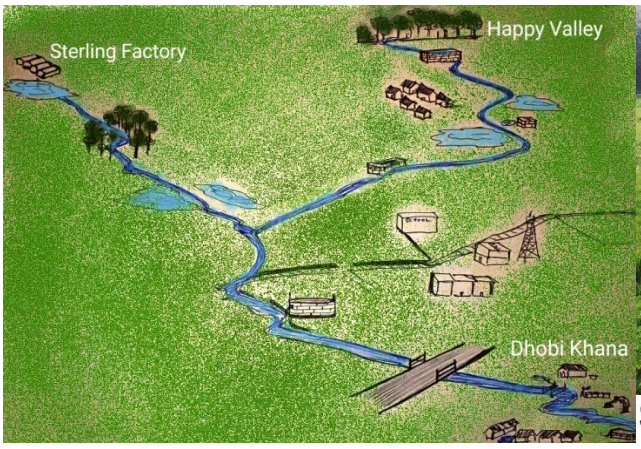
Water Quality Results of the spring source at Happy Valley

Tests	Results	Permissible limits
Source type	Spring	
Source name	Happy Valley/ Mission Compound source	
Date survey	21.3.2018	
pH	6.54	6.5-8.5
Tds (mg/L)	81	Below 500 ppm
Electrical conductivity	116	-
Temperature	-	-
Dissolved Oxygen	-	-
Residual chlorine	0.0	0.2
Turbidity	0	5-10
Chloride	18	250-1000
Nitrate	2	45
Fluoride	0.2	1-1.5
Phosphorus		-
Iron	0.6	0.3-1.0
Hardness	28	300-600
Ammonia	0.42	0.5
Calcium	8	75
Magnesium	2	30
Sodium	10	-
Potassium	5	-
Manganese	0	0.1
Sulphate	5	200
Phosphate	0.44	-
Fecal coliform tested	Yes	-
Fecal coliform	0	Absent
Alkalinity	22	200-500
Appearance	Clear	Transparent
Colour	Colourless	Transparent
Odour	None	No

Note: Water Quality test by TWAD, Ooty in March 2018 facilitated by Keystone Foundation.
Ref TWAD Report: 11228/11229

Photo tags

Transition from a waste dump to a shola



Sewage mix in the stream

Old police station

Status: Spring source behind Kotagiri Old Police station was the main source of water that was supplied to Kotagiri police quarters had been dried. Alternatively, there are two Panchayat wells that supply water to the quarters' area. Water from both the wells gets collected, and distributed from a GLR.

Source details: The spring-shed area behind the Old Police station is approximately 0.77 acres. The water is supplied to people in Kotagiri bazaar area. The type of spring is a depression spring with a spring-box with a 5ft depth from the ground level from where the water is diverted to a filtration tank. The filtration tank is filled with plants which make the water to be stagnant. The area around the spring is turned into a dump yard by the houses and shops in the region. There are few households who have diverted their drainage towards the spring source. Additionally, there are some unattended broken pipelines that carry household drainage from the locality, and because of over growth of plants the leakage grey water gets stagnant and contaminates the source. Thus, the grey water from households contaminates the source from both sides.

Things to be done immediately

- Informing the community residing in and around the spring-shed area to stop dumping household garbage in the spring-shed area.
- Clearing invasive plants around the spring to get a detail idea of the sewage system around the spring source.
- A broken pipeline has to be fixed to prevent drainage water entering into the spring source.
- Educating people in the locality aboutimportance of springs.
- Panchayat board was open to do some kind of restoration initiatives in the water-shed region. They also suggested that the place could be a replication of Happy Valley with the help and support from community and Keystone Foundation.

Water Quality Results of the spring water behind Kotagiri Old Police station

Tests	Results	Permissible limits
Source type	Spring	
Source name	Old police station	
Date survey	8/3/2018	
pH	8	6.5-8.5
Tds	Did not tested	Below 500 ppm
Electrical conductivity	Did not tested	-
Temperature	20	-
Dissolved Oxygen	9.2	-
Residual chlorine	Below 0.2	0.2
Turbidity	0	5-10
Chloride	95.715	250-1000
Nitrate	45-100	45
Fluoride	0.6	1-1.5
Phosphorus	0.1-0.5	-
Iron	0.3	0.3-1.0
Hardness	196	300-600
Ammonia	Below 1	-
Fecal coliform tested	Yes	-
Fecal coliform	Absent	Absent
Alkalinity	152	200-500
Appearance	Clear	Transparent
Colour	No colour	Transparent
Odour	No	No

Note:Water Quality test done using Jal- TARA kit in March, 2018 by Keystone Foundation

Photo tags


OLD POLICE
STATION SPRING


GREY WATER
DIVERTED INTO THE
SPRING-SHED AREA

Darmona Panchayat well

Status: The DarmonaPanchayat well is situated very close to drainage, and people have said that they could visibly see the sewage water getting mixed into the well through some seepage holes in it. During rainy seasons the water from the upper areas flows beside the well and thereby bringing all the litters from the roadside into the well. The water well tested positive for fecal pollution. The waterin the well overflows. The houses nearby to the well are finding it very difficult to deal with this problem.

Source details: Seepage water from wetland next to Kota hall joins in a stream that flows in Darmona. The stream carries drainage water from the locality. A Panchayat well that supplies water to Kotagiri market and Government Hospital (GH) is located next to the stream bed. Before 10years, the drainage path was much deeper with regular desilting works, and the Panchayat well water was cleaner. The well was protected with cement walls around it which helped to prevent seepage of drain water into the well. But, due to lack of maintenance the wall has been removed. Now, the stream bed has come up due to washing of soil with lot of bushes on either side of the stream/ drainage.

Things to be done immediately

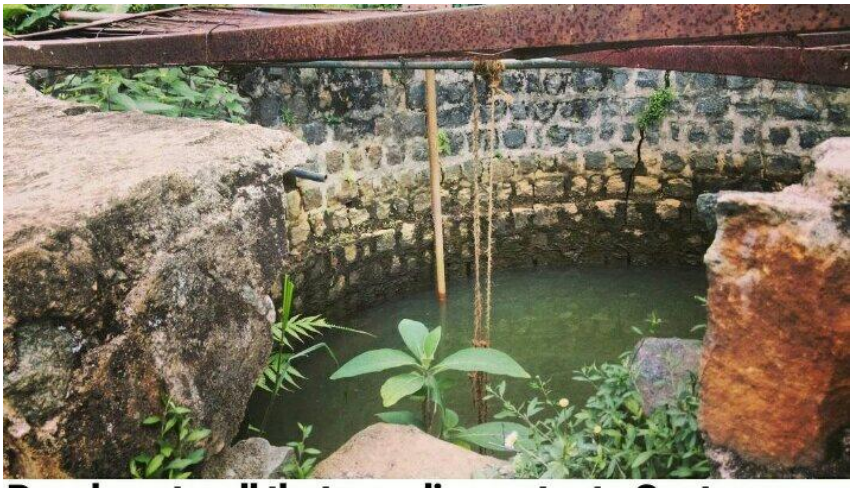
- Closing the cracks or gaps in the side walls of the well, and covering the space where the pipe that taps wetland water into the well especially during rains and prevent the well from getting it contaminated with sewage water.
- Regular de-silting of the well, at least once after every rainy season.
- Identifying the seepage hole in the well from where the drainage water gets mixed into the well.
- Informing the Kotagiri Government Hospital about the presence of fecal coliform in their well water, and taking temporary alternative measures to treat the water before direct consumption.

Water Quality Results of Darmona Panchayat well

Tests	Results	Permissible limits
Source type	Open_well	
Source name	Darmona Panchayat well	
Date survey	5/3/2018	
pH	6	6.5-8.5
Tds	Did not tested	Below 500 ppm
Electrical conductivity	Did not tested	-
Temperature	24	-
Dissolved Oxygen	7.6	-
Residual chlorine	Below 0.2	0.2
Turbidity	0	5-10
Chloride	92.17	250-1000
Nitrate	Below 10	45
Fluoride	0.6	1-1.5
Phosphorus	0.1	-
Iron	0.3	0.3-1.0
Hardness	108	300-600
Ammonia	Below 1	-
Fecal coliform tested	Yes	-
Fecal coliform	Present	Absent
Alkalinity	80	200-500
Appearance	Growth of algae in the well and lot of garbage inside the well.	Transparent
Colour	Green	Transparent
Odour	No	No

Note:Water Quality test done using Jal- TARA kit in March, 2018 by Keystone Foundation

Photo tags



Panchayat well that supplies water to Govt. hospital, Kotagiri market, Darmona

Stream beside Panchayat well

Dhobi Ghat

Status: The Dhobighat spring is located alongside a stream that carries the Kotagiri town's drainage water. During rainy season when the stream water flow increases, it results in drainage water entering the spring-box via its outlet and contaminating the spring water. In order to avoid this contamination, the locality people have blocked the outlet pipe where the spring water is collected. The people are satisfied with the quality of water from the source, but for this contamination during rains.As the spring-box has not been regularly cleaned, and due to the formation of algae in the floor and sides of the walls has made the colour of water green.

Source details: The spring source is used by people for household purposes, and by dhobis to do a final rinsing of clothes after washing them in stream water. The quality of water is not good as the spring is close to the stream which carries drainage and polluted water. There are no other water sources in the locality except for the recent bore-well by the Town Panchayat in June, 2017. When there are unattended issues with the pipeline, uninterrupted supply of water from the bore-well to the locality becomes a question mark. There are 15 houses and the people wanted a storage tank. The community practices OD as they don't have toilet facilities.

Things to be done immediately

- To seal the spring box facing towards the stream.
- To place a new valve for water outlet on the other side of spring to avoid sewage water seepage.
- Regular de-silting and cleaning of spring box.
- Providing a water storage infrastructure for the locality.

Water Quality Results of the spring sources at Dhobi Ghat

Tests	Source near stream	Dhobi Ghat Line	Permissible limits
Source type	Spring	Spring	
Source name	Dhobi Ghat spring	Dhobi Ghat Line	
Date survey	6/3/2018	5/4/2018	
pH	7	6.94	6.5-8.5
Tds	Did not tested	56.4	Below 500 ppm
Electrical conductivity	Did not tested	79.2	-
Temperature	19	19	-
Dissolved Oxygen	7.6	7.6	-
Residual chlorine	Below 0.2	0	0.2
Turbidity	0	0	5-10
Chloride	106.35	60.26	250-1000
Nitrate	10-45	Below 10	45
Fluoride	0.6	0.6	1-1.5
Phosphorus	0.1-0.5	Below 0.5	-
Iron	Below 0.3	Not tested	0.3-1.0
Hardness	144	80	300-600
Ammonia	Below 1	0	-
Fecal coliform tested	Yes	Yes	-
Fecal coliform	Absent	Absent	Absent
Alkalinity	112	68	200-500
Appearance	Clear	Clear	Transparent
Colour	Transparent	Transparent	Transparent
Odour	No	No	No

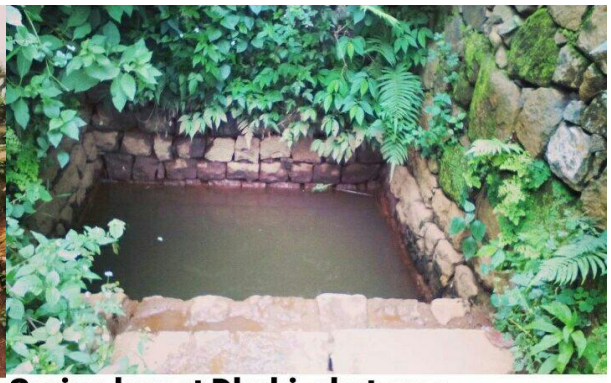
Note:Water Quality test done using Jal- TARA kit in March, 2018 by Keystone Foundation

Photo tags

Dhobi-ghat washing area

Dhobi-ghat spring source

Spring source at Dhobi-ghat line



Spring box at Dhobi-ghat area

Baptist Colony

Status: The spring at Baptist colony is in a very poor state because of the sewagewater from Gore House and RKC Colony has been diverted towards the spring. The locality people, especially women expressed that the water from the spring is not used during rainy season because of visible contamination. The water contains worms of red and white thread like structures. The drainage system from Gore House is diverted by digging a channel in the land above the spring source. The channel goes unsettled with the solid wastes from household in the upstream. This is the main cause of contamination to the spring water. During rainy season, the households take water from a private well in owned by one of the households to meet their drinking water demand. There has been a new well dug below the Colony to meet drinking water demand of the households, but this is not functional yet.

Source details: There are nearly 30 Households that are dependent on the spring as their main source of water. The spring-water storage tank was built by the then area Counselor before 10-15years. But, due to the defects in construction where drain water seeps through the tank, and mix with spring water, the tank has not been put to use. People directly take water from the tap using cloth filter. The water-shed area is over grown with lantana and other weeds. The community collectively collects around Rs500 to clear the patch. But, they are tired of collecting, and clearing the patch which regrows within a month. Added to the filth from water-shed area, it is also the heap of garbage dump next to the water tap that affects the quality of spring water in the tank. Sanitary workers from Town Panchayat come once a week to collect garbage, but people prefer to dump it on the road-side near water source.

Things to be done immediately

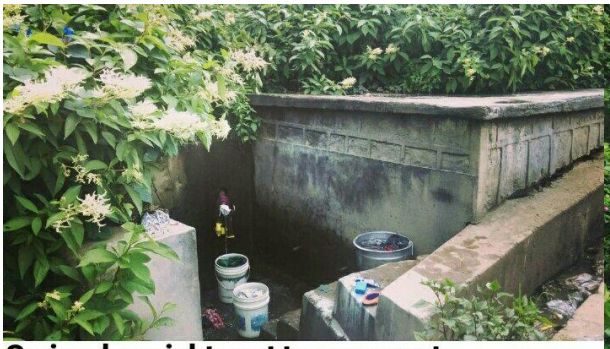
- Identifying the owner of the land from where the spring water has its source.
- To set a proper drainage channel to avoid mixing of sewage drain water with the spring.
- The drainage system of the RKC Colony has to be rectified to avoid further seepage of sewage water into the Baptist Colony's spring-box.
- To repair and maintain Baptist Colony's spring-box, and use it as a storage structure.
- To have a separate pipeline to channel water from the spring-box to households.

Water Quality Results of the spring source at Baptist Colony

Tests	Results	Permissible limits
Source type	Spring	
Source name	Baptist Colony	
Date survey	5/3/2018	
pH	6	6.5-8.5
Tds	Did not tested	Below 500 ppm
Electrical conductivity	Did not tested	-
Temperature	18	-
Dissolved Oxygen	7.4	-
Residual chlorine	Below 0.2	0.2
Turbidity	0	5-10
Chloride	141.8	250-1000
Nitrate	45-100	45
Fluoride	0.6	1-1.5
Phosphorus	0.5-1	-
Iron	Below 0.3	0.3-1.0
Hardness	192	300-600
Ammonia	Below 1	-
Fecal coliform tested	Yes	-
Fecal coliform	Absence	Absent
Alkalinity	112	200-500
Appearance	Threads like worms present in water.	Transparent
Colour	Clear	Transparent
Odour	No	No

Note:Water Quality test done using Jal- TARA kit in March, 2018 by Keystone Foundation

Photo tags



Spring-box right next to sewage at Baptist colony

Waste dumps near the spring source

Women worried about quality of spring water at Baptist colony