

A pilot based on PES principles for securing water resources for Coonoor Town

1. Context

Coonoor is an urban center that is a popular tourist destination in the Nilgiris. It has upto 2.5 Million tourists passing through in a year, compared to a local population of approximately 45,000 people. Tea and tourism are the big economic drivers in this area. A detailed description of the local context is given in the Social-Ecological Profile (Annex 1). In this note, we examine the possibilities of an intervention based on the Payment for Ecosystem Services model to address the water crisis in Coonoor.

The Coonoor Municipality is responsible for providing safe and sufficient water for drinking and other domestic and commercial use to all the inhabitants as well as institutions in the town. The total storage capacity is estimated to be 18.44 Lakh Litres Per Day. According to the Municipality, it is providing 90 Litres Per Day (LPD) per capita to the local population when water is available in plenty, and around 43 LPD once in five days during the summer.

This in turn is directly dependent on the state of the water resources that the Coonoor town is tapping. The municipal water sources for Coonoor town are given below in Table 1.

Table 1: List of Sources of Municipal water supply to Coonoor Town

S No.	Name of water source
1	Ralliah Dam
2	Gymkhana
3	Guerency
4	Highfield
5	Bellattimattam
6	Bandhumi Dam
7	Karadipallam
8	Upputhotti
9	Attadi
10	Brooklands
11	Old Forest
12	Adaar
13	Ambikapuram
14	Nariyani

The sources include two dams, Ralliah which has a height of 43' 6" and Bandhumi which has a height of 15'. The others tap streams that carry runoff water during the rains and base flows during the non-rainy period. These are either by building retaining structures and pumping the water or by digging open wells that are used to pump water to storage structures. The origins of these flows are in springs within the catchment areas of these sources. The map below shows the locations of the water sources.

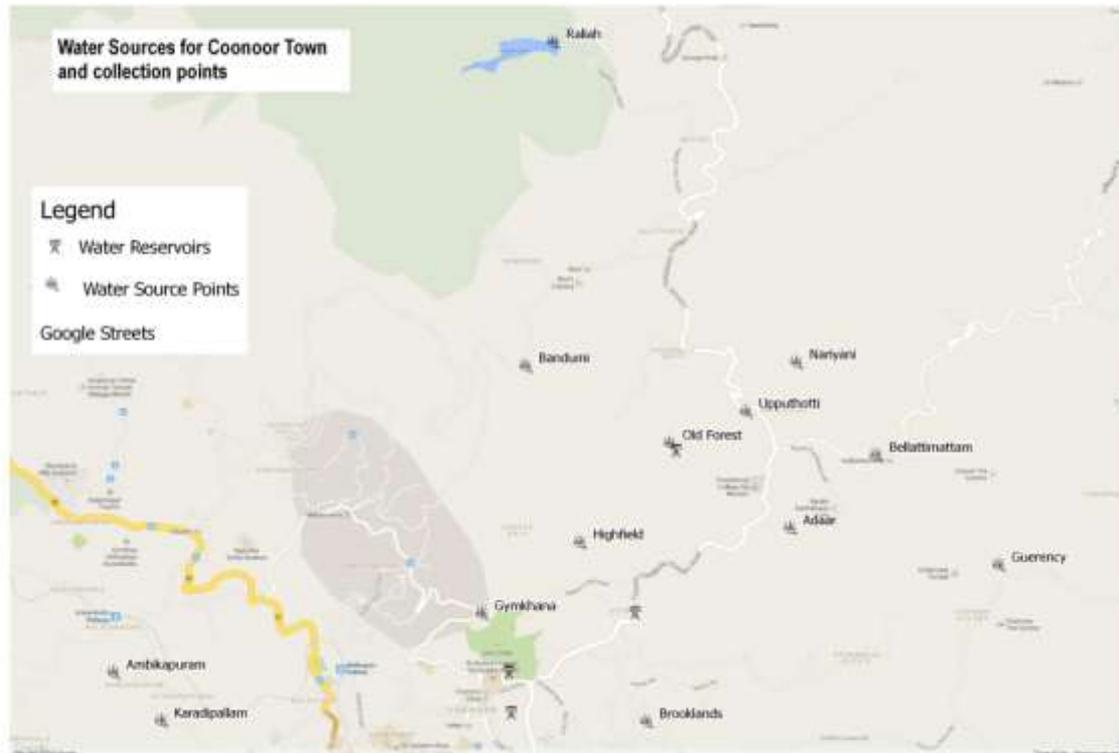


Table 2: Quantity of water drawn from different sources by the Municipality of Coonoor

S No.	Name of water source	Water drawn (Lakh Liters per day)
1	Ralliah Dam	2.20
2	Gymkhana	2.85
3	Guerency	6.80
4	Highfield	3.00
5	Others	5.65
	Total	20.50

Source: Coonoor Municipality, 2014

From the above table, it is clear that there are four main water sources that provide nearly 75% of the water supply to the town. Of these, the Highfield source falls within the catchment of the Gymkhana source. The Ralliah dam's catchment is mostly

under the control of the forest department and is covered with plantation of exotic tree species. Given that the Municipality is planning to divert water to the dam from upstream reservoirs, soon there will be little relationship between the catchment characteristics and the amount of water impounded in the dam.

We had planned to set up a flume on municipal land in the catchment of the Ralliah dam to measure base flows. However the heavy rains in 2015 meant that we could not install it. We did set up an automated rain gauge which records every rainfall event and records it. We have been sharing this data with the Municipality. The data is also available at <http://nilgiriswaterportal.in>.

Given the plans of the Municipality as well as our inability to collect base flow data from the Ralliah catchment, we decided to shift our focus to the two other main catchments of Coonoor, namely Guerency and Gymkhana. We mapped the catchment of these two areas with the help of satellite imagery from Google Earth. The details of the hydrogeological aspects of these catchments are contained in the Report by ACWADAM (Annex 2).

In 2015, we initiated work on mapping of springs in five village panchayats of Coonoor as part of another project. One of these areas is the Ambikapuram valley in Hubbathalai Panchayat, where we found a good representation of the larger nilgiri scenario. There are springs in the upstream portion and habitations on the ridges which draw water from wells in the valley as well as the spring. The waste from some of the habitations is conveyed into the valley where it mixes with the wetland. The land use is largely tea plantations. The Municipality also has a check dam in the valley and a well below it for supplying water to the town area. This valley is thus a representative of a sizable portion of the upper areas of the Nilgiris where habitations lie within tea estates and farming takes place in the valleys alongside water supply wells.

Thus, we looked at the three catchments within the larger area supplying water to Coonoor to look at the possibilities of developing a model for applying PES on water resources.

2. Developing the basis for a possible PES

Palampur in Himachal Pradesh is a small town, which has entered into an agreement based on PES with the Village Forest Development Society that is managing the common lands which form an important recharge area for the springs that supply water to the town. The VFDS has prepared a plan for the protection of the recharge area of the Bohal springs, and subject to its implementation, the Municipality of Palampur is bound to pay a lumpsum amount to the VFDS for the ecosystem service rendered, which in this case is the spring water discharge.

The basis of the agreement was a study by the Advanced Centre for Water Resources Development and Management (ACWADAM) which analysed the hydrogeology of the catchment area of Palampur town's various water sources and

established the link between the land use in the recharge area and the water supply to the town through the Bohal spring system¹.

We planned to follow a similar geohydrological mapping approach to understanding the possibility of developing a PES based system in Coonoor region. To this end, ACWADAM were commissioned to conduct a field study in 2015 to map the geohydrological characteristics of the catchments of Guerency, Gymkhana and Ambikapuram Valley and provide recommendations that could form the basis of a PES.

3. Hydrogeological Assessment of the three catchment areas

The details report of the hydrogeological assessment by ACWADAM of the three catchments of interest are given in Annexure 3. For each of the three catchments, the locations of the main spring sources have been earmarked and the recharge areas for improving spring flows have also been identified. From the point of view of enhancing the quantity of water flows for the town these areas are likely to give maximum benefit for the investment made.

4. Recommendations for Development of a PES Project

We have worked together with scholars from Cornell University in exploring the range of PES arrangements tried out worldwide and providing recommendations for the Coonoor region. A report of this effort, which explores various possible models, is given as Annexure 4.

Unlike the Palampur scenario, the catchment area of Coonoor's main water sources has a complex geohydrology, multiple aquifers, highly privatised land use and villages that are not actively involved in natural resource management. The opportunity cost of land is very high given that it is a tourist destination and a very popular haven for those looking for second homes. Thus the catchment areas, being mostly under private ownership are always threatened by the possibility of being sold off piecemeal for construction of houses or guest houses. Mining of groundwater is also increasing with potential conflicts between village panchayats and Municipality likely to arise. E.g. Near the Nariyani spring in the Guerency catchment area is the source of water for the village of Bellattimattam. There is an old spring box that taps the spring water and supplies water to the village through gravity. As of December 2015, there is a new well being dug by the Coonoor Municipality to supply water to the town. We have initiated monitoring of the spring flow to assess what, if any, is the impact of the pumping by the Municipality on the spring discharge on which Bellattimattam is dependant.

A PES arrangement in such a complex situation cannot just involve the Municipality as a buyer and the village panchayat or private land owners as sellers. It is a collective resource on which the villages, private estates and the town are dependent. There is thus a need for the state to invest in improving the water recharge and quality for all the parties concerned by incentivising favourable land

¹ Kulkarni, Himanshu, Mahamuni, Kaustubh, Upmanyu, Amit. Managing the Bohal Spring System – A Strategy based on Geohydrological Mapping. ACWADAM, Pune. 2010.

use.

This project has laid the ground for an exploration of the landscape of water resource management in the Coonoor region. There are possible alternatives that have been developed. A multi stakeholder dialogue process is needed to come up with alternatives that are viable. Borrowing from the SES perspective, we realise that many influencing factors lie outside the focal system itself. These include state level policy makers, heads of line departments as well as the district administration, who can leverage various ongoing programmes that influence land use and steer them in a way that incentivises land use favourable to improved water quantity and quality for all the stakeholders in the system.