

CASE STUDIES

CLIMATE ADAPTIVE PRACTICES GRASSROOTS INITIATIVES



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Population	As per 2011 census, Sikkim has a population of 610,577, and Ranks 29th in India in terms of population. ¹
Climate	The state has five seasons: winter, summer, spring, autumn, and a monsoon season between June and September. Sikkim's climate ranges from sub-tropical in the south to tundra in the north. season (June to September) and north east monsoon season (October-December).
Climate Vulnerabilities	Changing weather patterns and rising temperatures, water scarcity, spatial variation in rain fall, increase intensity of extreme rain fall.
Average Annual Rainfall	2756.3 millimetre ²
Economy	Sikkim's economy is largely agrarian, based on the terraced farming of rice and the cultivation of crops such as maize, millet, wheat, barley, oranges, tea and cardamom. ^{3,4}

¹ 2011 Census of India.

² District-wise monthly rainfall data from 2004-2010 for the whole of India by Indian Meteorological department from www.indiaportal.org

³ Dutt, Ashok K.; Baleshwar Thakur (2007). *City, Society and Planning: Society*. Concept Publishing. p. 501. ISBN 81-8069-460-7.

⁴ Bareh 2001, pp. 20–21.



Sikkim is a northeastern state of India landlocked in the Himalayan range. It is home to one of the world's highest peaks, Kanchenjunga. Like most of the Himalayan region, Sikkim is rich in beautiful springs, lakes, mountains, deep valleys and biodiversity; making it a sought after tourist destination. Water is one of the most important sectors on which climate change (increase in temperatures, evapo-transpiration, spatial variation in rain fall, increase intensity of extreme rain fall and drought events) can have a profound impact, which in turn can have cascading impacts on other sectors. The agricultural sector is highly dependent on the climate, and given the low productivity increase of the last few years compared to population growth, climate change is likely to have serious consequences for Sikkim's agriculture¹.

¹ <http://www.moef.nic.in/sites/default/files/sapcc/Sikkim.pdf>

Lake Revitalisation

Key Messages

- Lake revitalisation, a successful initiative recharged the ground water along with promoting eco-tourism.
- Convergence with a national flagship programme, MGNREGA revitalised local water resources and facilitated building resilience of local communities.



1. Context

1.1. Need:

Amidst the high mountains of the Himalayas and picturesque rivers and streams, the North-Eastern state of Sikkim is rich in flora and fauna. With only around 10-15% land available for cultivation; the main source of livelihood in Sikkim is agriculture, horticulture, and animal husbandry. Lakes, streams, and springs essentially form the main source of water for rural households.

However, drastic changes in climate with it have brought about a change to all the natural resources. Due to increasing temperature over the years, the already drought prone area of south Sikkim has become more averse to water scarcity. With

the temperatures rising at the rate of around 0.2° Celsius per year, the monsoon rains have become sporadic, while the winter rains have become scanty. The springs and lakes while decreasing in their discharge over the years have in many places dwindled away. Lake Doling, which used to be full of water a few decades back, had turned into a marshy land. This severely affected the natural ground water recharge of the region and further, reduced the flow to the aquifers of the springs in the peripheral areas.

Apart from the climatic changes affecting the flow of springs; the 2011 earthquake in Sikkim caused the spring sources to change its location, as a result they got blocked. Since 100% of the rural population was dependent on spring water for their day-to-day and

¹Cheerapunji is credited as being the wettest place on Earth

²<http://www.ehsst.org/PL00702-376.pdf>

³<http://sikkimforest.gov.in/climate-change-in-sikkim/1-chapter-Climate%20Change%20Synthetic%20Scenario%20over%20Gangtok.pdf>

cultivation purposes, lack of access to spring water were causing grave hindrance in their lives. Women had to walk for 2-3 km to collect water from neighbouring sources; especially, during the lean period of November to April.

1.2. Response:

The resurrection of Lake Doling was made possible by a unique attempt of the government of Sikkim, to ensure that this once seasonal lake now has water throughout the year. In order to provide a solution to the problem of water scarcity while sustaining livelihoods, Rural Management and Development Department (RMDD) with funding support from MGNREGA initiated the revival of Lake Doling. In 2008, Block Administrative Centre (BAC), Ravangla with the help of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), diverted a nearby stream located in the middle of a forest, through a pipe into lake Doling. It is modelled on the concept of increasing infiltration of water to enhance recharging of ground water, essentially recharging the aquifers that feed of the springs.



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Women carrying water during lean period

2. Objectives

- Recharge the ground water to increase the discharge of springs in Ravangla.



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Pipeline used to revive lake Doling

- Promote the lake as an eco-tourism site.

3. Approach

In 2008, an initiative was made to revive the marshy land lying between Kewzing and Barfung, Gram Panchayat Unit of Ravangla. Under the technical advisory of the Rural Management and Development Department, water was diverted from a stream around 300m above the lake through a pipeline into Lake Doling, to replenish water in the lake throughout the year. This stream was not being used by people due to difficulty in accessing it.

4. Key Stakeholders

The initiative was driven at a local level with the following key stakeholders:

- Rural Management and Development Department: Facilitated and guided the initiative.
- Block Administrative Centre, Ravangla: Implemented the initiative on the ground.
- MGNREGA: provided support for funds and labourer to work on the initiative.
- Locals: The beneficiaries of the initiative, who got access to water.

- Department of Forest, Environment, and Wildlife Management: Granted permission to carry out the task of digging the lake.
- Gram Panchayat: Implemented the initiative on the ground.



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Lake Doling, 2008: Pre-revival

5. Key Components

The entire process of resurrection took approximately two years for completion, from 2009 to 2011. Given that the work was carried out by MGNREGA stakeholders, on the technical side the task was not very intense. The initial steps of the resurrection involved digging of the marshy land up to 40 feet deep to the centre. A pavement was constructed around the dug land. The water was replenished by diverting the water from an upstream into the man-made lake, through pipeline.

6. Outcomes and Impacts

The interaction with local communities of Barfung Gram Panchayat Unit indicated that the revival of the lake has:

- Directly benefitted approximately 80-100 households by a connecting pipeline for drinking and cultivation purposes.
- Recharged ground water of peripheral area of about 5-8 km, essentially the gram panchayat units of Kewzing, Barfung, Bakhim, Kyongsha, Banyakhol and Sangmoo.
- Improved livelihoods of the local people, as now they have the opportunity to cultivate various kinds of vegetable like cabbage, beans, spinach, cardamom, etc. and they are able to sell them in the rural product market of their gram.
- In the Banyakhol ward, the National Hydroelectric Power Corporation has access to the continuous flow of water due to increased spring water discharge.
- The cardamom field located in the area of Barfung is now flourishing due to the ground water recharge of the vicinity.
- The project was completed within an amount of Rs. 1,68,264 the sanctioned amount for the project was Rs. 2,88,232.



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Lake Doling, 2011: Post-revival

Since the water of the stream never dries up, Lake Doling today, has become perennial and

lasts throughout the year. Lake Doling has emerged as an added retreat to those visiting the nearby monastery. The concept of resurrecting Lake Doling has been seen in the revitalisation of four other lakes in Deythang (2010), Nagi (2011), Karthok, and Datum.

"Lake revitalisation was seen as a successful initiative to recharge the ground water along with promoting eco-tourism"

7. Lessons Learnt

- The presence of the monastery near the lake was initially seen as a bottleneck to the project. The cultural barrier within the locals, and the mind-set that the lake

is holy, caused problems for initiating the process of renovating the lake. To tackle this barrier, a Monk was called to preach the locals regarding the benefits of the lake. However, the potential of converting the lake into a fisheries business is on a standstill.

- Revitalisation of the Lake Doling is an excellent example to ensure resilient and replicable methods for controlling the adverse impacts of climate change.
- Introducing methods of lake revitalisation in other states, through a flagship programme under MGNREGA is an aspect that can be promoted.

Source:

<http://www.indiawaterportal.org/articles/spring-s-hope-film-revival-dying-springs-sikkim>