

Water and sanitation: struggle of rural households at Tinzir village of Namchi, south Sikkim

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Abstract

Increasing access to improved and sustainable water supply and sanitation services is vital to developing human capital to unleash the growth potential of rural areas. In spite of adequate fresh water, globally millions of people have to lose their life from disease associated with inadequate water supply and unfortunate status of sanitation and hygiene, mostly affected are the infants. According to UN each day 1,000 children die due to preventable water and sanitation related diseases. Beside health, poor water quality and inadequate sanitation might negatively affect educational opportunity of a child. A universal and equitable access to safe and affordable drinking water and adequate sanitation and hygiene can be maintained if the Sustainable Development Goals (SDGs) related to water and sanitation are accomplished.

Although the Central and State Government of India have been flagging wide range of programs to increase access to piped water supply and reduce open defecation, with a specific focus on strengthening institutions, building capacity, and employing community-based participatory approaches but not much difference is visible on ground specially in regards to Clean and safe drinking water accessibility in most of the rural areas of our country.

The study examines the water supply systems, and future of water management in some rural flanks of the south district, Namchi. The research was centred on issue of demand and supply, water and scarcity and stress water governance and sustainable conservation and management of water resources in a climatic change context and methodologically based on household surveys questionnaires, focus group discussions. Present study reveals that the study area suffers from the lack of an adequate reservoir facilities and frequent damage of water supply pipe during the monsoon and some of the Boomtar Revenue circle area of Namchi faces acute water storage all year round. The people of the Namchi faces supply of declining water discharge in springs sources, the lack of water infrastructure for repair, maintenance, and supply, and the glaring inequity between the higher middle- and lower-income groups are the immediate issue around water in Namchi.

Accelerated change in land use, climate and demography is directly impacting water security in the Boomtar. The study examines the water supply systems, their socio-political dynamics, and the future of water management in towns of the south district Namchi. The spring sources that supply drinking water to Namchi need immediate conservation measures to arrest the declining state of discharge. Micro-planning at the local level, reviving drying springs, and the adoption of appropriate soil and water conservation practices on a watershed basis are all important ways forward. The future strategy to enhance lean season, rural water security will lie in enhancing the storage of rain water either underground in natural aquifers or above ground in lakes and storage tanks. The development of water security plans and their strict enforcement through the multi- institutional collaboration can contribute to improved water governance and socio ecological restoration for sustainable water resource management.

Keywords: Namchi, Water, Sanitation, Rural.

Introduction

Sikkim is a state in north-eastern India and is a landlocked Indian state located in the Himalayan Mountains. The state borders Nepal to the west, China's Tibet Autonomous Region to the north and east, and Bhutan to the southeast. The Indian state of West Bengal lies to the south. The state is situated between 27°04' 46" and 28°07' 48" north latitudes and 88°00'58" and 88°55'25" east longitudes. The state is extending approximately 114 km from north to south and 64 km from east to west having total geographical area of 7,096 sq km. Administratively, Sikkim is divided into four district – north, South, east, west. This state is known for its substantial water resources and the role of water resources is paramount. It is recognized that water is scarce and precious natural resources to be planned, developed in an integrated and environmentally sound basis. The water supply in Sikkim is not same in all the parts, usually hilly areas have less amount of water. As population is growing and all the main towns of Sikkim are situated in hilly region like Namchi, Gangtok, Mangan; depends on rivers and springs that are fed by numerous local aquifers, it is a natural underground water systems and form the primary means of water supply. In hilly areas a separate planning and management should be made for the withdrawal of groundwater and for water conservation.

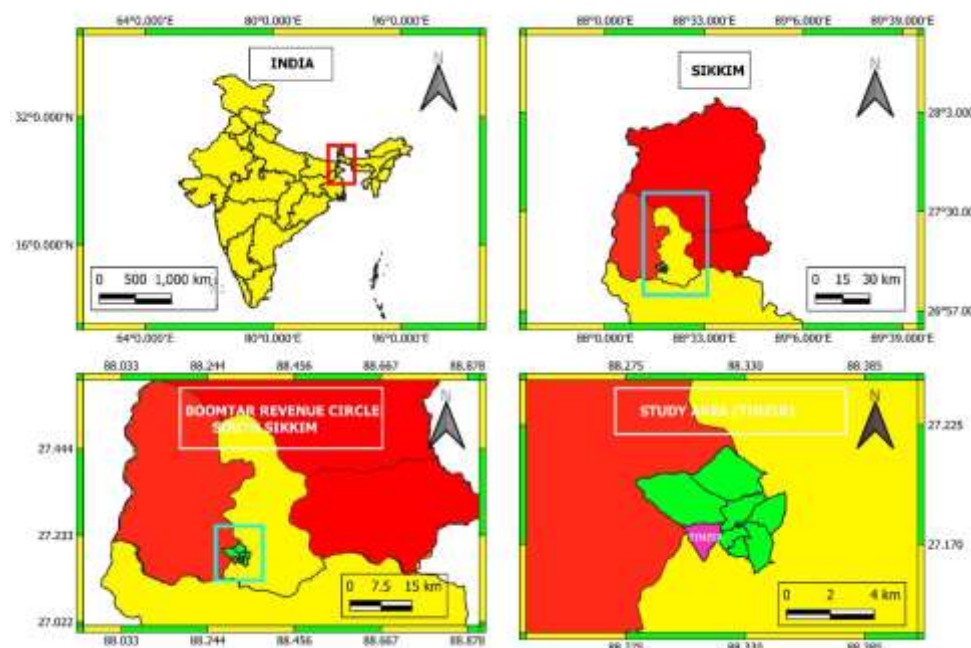
Some of the schemes and planning for water supply in Sikkim is initiated like Jal Jeevan Mission by the Central Government assistance to States for rural water supply. Its aim is to provide functional household tap connection to every household i.e., Har Ghar Nal Se Jal(HGNSJ) by 2024. Innovative Programmes like Dhara Vikas (spring shed development) was

adopted in 2008 for drought prone area to revive and maintain drying springs, which helps to alleviate the problem of rural water scarcity by reducing surface runoff of rainwater and allowing more water to percolate down to recharge underground aquifers, which in turns ensures increased discharge from springs.

Hygiene is a set of practices performed to preserve health. According to World Health Organisation (WHO), "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of disease. Hygiene is the concept related to cleanliness and health.

Sanitation refers to the provision of facilities and services for the safe disposal of human waste. Basically, we're talking about toilets, or versions of toilets such as latrines. Most developed countries are well equipped with flush toilets, however in developing countries; sanitation is based around much more basic facilities that are often little more than a hole in the ground.

Location of the Stud Area



Problem statement of the study areas

Focusing on the South District of Sikkim. It is the smallest district in terms of area i.e., 750squarekm. Lies at an altitude of 400m to 2000m. Namchi is the headquarters of South Sikkim. Namchi being the hilly region, the water scarcity is very high. Water here is not so sufficient for the people living in this area. The people of the villages situated on the hills Slopes depend mainly on the springs and or nearly perennial kholas for their drinking water supply. The rural works department of the State Government has implemented schemes for water supply. The spring water collected in storage tank from where it is supplied to various villages situated at the same or lower altitudes by gravity.

Tinzir extends from 88.3554495 E longitude and 27.1694029 N latitude and its elevation is 1327m/4354 feet. The problem faced by this area is that: -

1. During rainy season (June to July) most of the people from Tinzir faces water shortage as in these seasons there is a water interruption by landslides and due to which they need to fetch water through spring from a long way
2. Water quantity is not in a sufficient amount in this area
3. The water pipes laid in 1987 and 2017 for Namchi area was frequently damaged and repaired in past and now because of back cutting, massive boulders slipping down the hillside, sometimes water pipes are buried 15ft deep under the mud which makes water supply irregular.
4. They are not able to use sufficient water due to shortage as the water provided from PHE is for 1 or 2 hours for their daily purposes.
5. All the dispose water from household should be treated before releasing it in a open space because due to untreated and unhygienic way of disposing it causes pungent smell and breeding of germs which can be a reason for ill health.

Objectives of the study

1. To identify the problems and challenges related to safe water and sanitation.
2. To show the status of water and sanitation in Tinzir Namchi and mechanism of participation of different communities in water resources management.
3. To study the water scarcity faced by the Tinzir Namchi South Sikkim.

Literature Survey

Rural water system means a water system designed to provide domestic water service to an area having its major part outside of an incorporated community. Sanitation is used to define a package of health-related measures. The planning for rural water supply is made at the Central and State levels and responsibilities for proper implementation must be borne at the local level.

The Central Rural Sanitation Programme was started in 1986 in India. The efforts were to provide safe sanitation in rural areas. Rural Drinking Water and Sanitation Department (RDWSD) works towards ensuring sanitation and providing clean drinking water. According to the a NITI Aayog in 2019, 75%of households do not have drinking water on premise. Many programmers and schemes are implemented by Government of India for water sanitation which includes the National Rural Drinking Water Programme (NRDWP), Water, Sanitation, and hygiene (WASH) in Schools, WASH in health facilities, and district-wide WASH interventions supporting planning and implementation.

The study area of this project is Boomtar Revenue Circle of Namchi South Sikkim focusing on Tinzir. People of Tinzir fetch water directly from PHE Namchi and some of the household uses protected water spring (Tinzir Dhara) the connections from the source to each household is properly maintained by using GI (Galvanized iron) pipe.

It is the place where the water scarcity is high and 24/7 water facilities is not available. Taking about the water sanitation, the water quality is clean and people too living in Tinzir try to manage and makes the water clean by filtering, adding alum and boiling it. But sometimes due to the seasonal variation (rainy season) the quality as well as quantity of water decreases.

Water quality and quantity analysis in Sikkim, North Eastern Himalaya (2012) by Archana Tiwari (article) reveals water shortages and crisis in the South district of Sikkim, one of the most populated districts after East Sikkim. The paper also discusses that in order to improve the quality and quantity of water in the region there is a need for an integrated approach, planning of research into water resources and their management and educational outreach.

Methodology

Primarily in the month of December an extensive field survey was carried out to monitor the Water and Sanitation of Rural Households of Boomtar Revenue Circle of Namchi, South Sikkim. The study mainly covers the Tinzir village of South Sikkim.

Each people were allowed to pick a particular lottery, survey groups were formed based on lottery method and similarly survey area were also selected on the basis of lottery method.

In the field random households were selected for the collection of data.

Structured questionnaire was provided with multiple option related to the water supply, seasonal variation, sanitation, and hygiene related issues in rural household.

Result and discussion

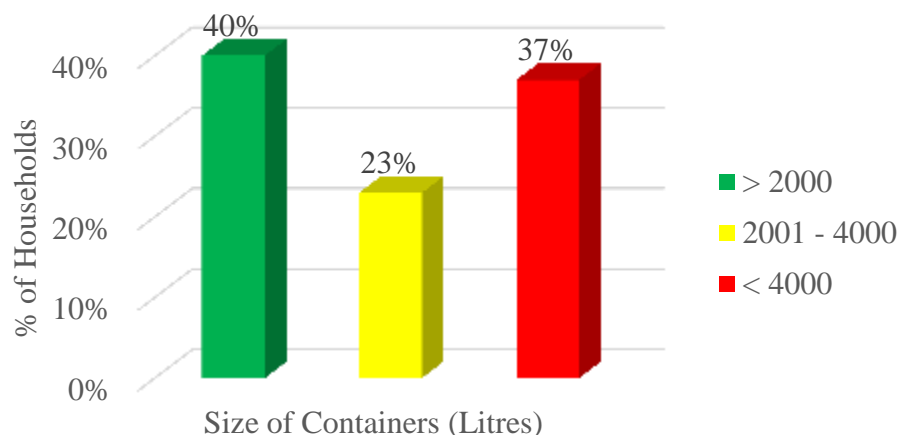
Water supply

Table 1: The size of the container used to fetch the water

Size of the containers(litres)	> 2000	2001 - 4000	< 4000
Percentage of household	40%	23%	37%

Source: Feld Survey Tinzir Namchi

Figure 1: Bar diagrams showing the size of the container used to fetch the water



Source: Feld Survey Tinzir Namchi

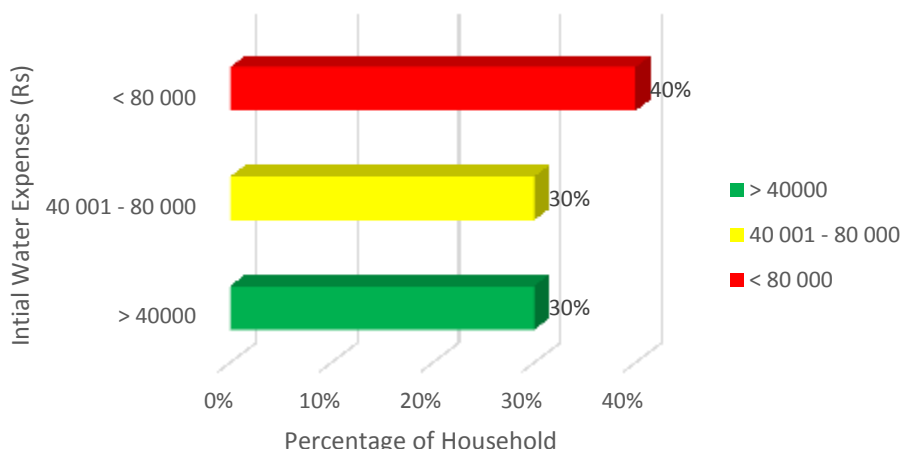
The total initial water related expenses for households, which include connection fee, initial contribution and own expenditure for materials etc.

Table: 2 Initial water related expenses for household

Initial water expenses (Rs)	> 40000	40 001 - 80 000	< 80 000
Percentage of households	30%	30%	40%

Source: Feld Survey Tinzir Namchi

Figure: 2 Bar graph showing the total water expenses of households



Source: Feld Survey Tinzir Namchi

Water plays a vital role in day-to-day life of each and every individual to sustain. This study examines the main source of drinking water of Tinzir village south Sikkim. Majority of the household uses PHE (Public Health Engineering Department) for water supply only some of the household uses spring water as their main source of drinking water. PHE controls the water supply and sanitation budget of the state government and provides water supply and sanitation services mainly through Public Engineering under its administrative control.

The above Figure: 1 Bar graph showing the size of container used to fetch the water in Tinzir. The size of the container used for fetching the water varies from 1000 to 10000 litres. Kamna Ghimeray has the largest container and house no. 35(Nanda Maya Darnal) has the smallest container. There is a disparity in size of the container used by households due to economic differences and also the no. of people living in a house (permanent and rented). Among all the houses only house no. 35 (Nanda Maya Darnal) fetches water from protected spring of Tinzir (Tinzir Dhara).

The total initial water related expenses for household, which include connection fee, initial contribution and own expenditure for materials is shown in the Figure no.2. Bar graph showing the total water expenses of household. House no. 170 (Kumar Chettri) has the highest expenses and most of the Household has the lowest expenses of Rs 10000.

Continuity of water supply

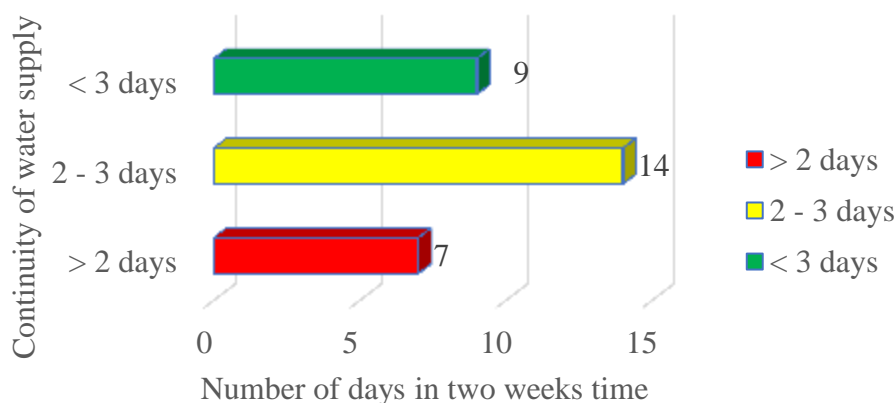
Frequency of the drinking water from the main source available to the household during the last two weeks

Table: 3 Continuity of Water supply

Continuity of water supply for last two weeks	> 2 days	2 - 3 days	< 3 days
No. of households (water supply in days)	7	14	9

Source: Feld Survey Tinzir Namchi

Figure 3: Continuity of water supply (last two weeks)



Source: Feld Survey Tinzir Namchi

Interpretation: The main source of water supply to Tinzir is from Ravangla, Borong South Sikkim. As majority of the people from Tinzir fetch water from PHE Namchi so the water from main source available to the household during last two weeks was one to two days a week. But some of the house hold who fetch from protected spring was daily 24 hours a day.

Storage

Household’s expenses for the drinking water storage container

Table 4: Expenses for the drinking water storage container

Expenses for the drinking water storage container (Rs)	> 10 000	10 000 - 20 000	< 20 000
Percentage of house holds	53	37	10

Source: Feld Survey Tinzir Namchi

Figure 4: Bar graph showing the expenses of the drinking water storage container (Rs.)



Source: Feld Survey Tinzir Namchi

Interpretation: Above bar graph shows the expenses of the drinking water storage container (Rs.) of Tinzir. There is fluctuation in prices regarding the water storage container due to size variation, quality of storage container and the influence of time on the prices of container which keeps on increasing.

Attitude towards the water quality

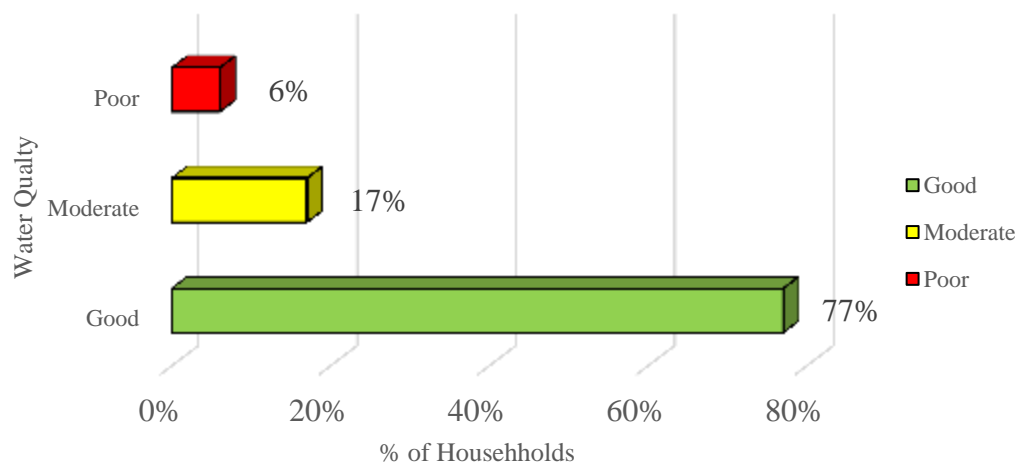
The quality of drinking water service now (coming from the primary source) on a scale from 1=good to 3=poor.

Table 5: Water quality

Water quality	Good	Moderate	Poor
Percentage of households	77%	17%	6%

Source: Feld Survey Tinzir Namchi

Figure 5: Bar graph showing drinking water quality of Tinzir



Source: Feld Survey Tinzir Namchi

Interpretation: Drinking water quality varies from place to place, depending on the condition of the source of water from which it is drawn and the treatment it receives. As seen in the above bar graph, people of Tinzir rated their water quality as 77% of households are receiving good quality of water followed by 17% of households with moderate quality but unfortunately 6% of households are having poor quality of water leading to many health issues and problems. Overall, we can state here that the quality of water supplied to Tinzir is good.

Sanitation

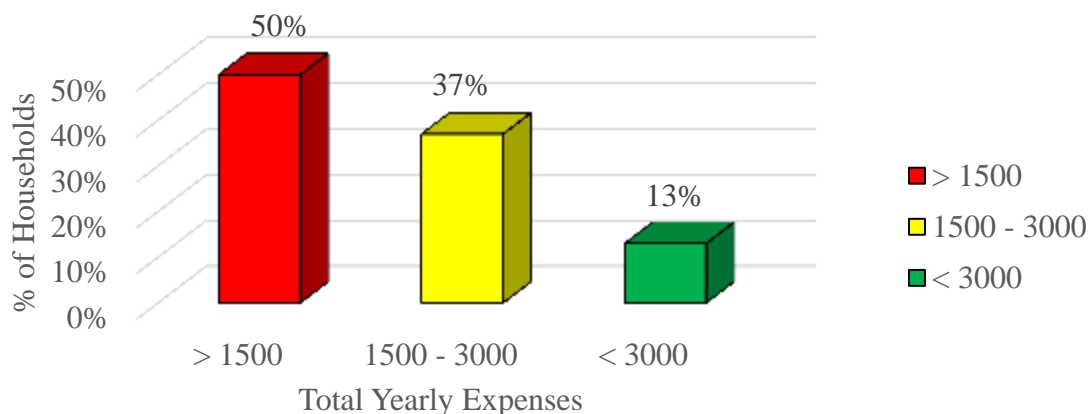
Maintenance - household approximately spend per year for repair and cleaning of the toilet

Table 6: Total yearly expenses for cleaning and repair of toilet

Total yearly expenses (Rs)	> 1500	1500 - 3000	< 3000
No. of House holds	50%	37%	13%

Source: Feld Survey Tinzir Namchi

Figure 6: Bar graph showing the yearly expenses for repair and cleaning of the toilet (Rs)



Source: Feld Survey Tinzir Namchi

Interpretation: Sanitation refers to public health conditions related to clean drinking water and treatment and disposal of human excreta and sewage. The overall purpose of sanitation is to provide a healthy living environment for everyone, to protect the natural resources, and to provide safety security and dignity for people when they urinate.

Above figure 6, shows the yearly expenditure for repair and cleaning of toilet. The sanitation facilities observed on each household were good. The yearly expenses on cleaning and repairing of the toilet ranges from Rs. 500 – 5000. The cleaning items purchased by the households were harpic, Lysol, phenol, Dettol bottle, toilet brush, air freshener, soap, towel, toilet paper, mop, and trashcan.

Findings and Conclusion

The study area Tinzir, Boomtar Revenue Circle Namchi South Sikkim has moderate water supply, sanitation, hygiene facilities according to the surveyed observation. Majority of people fetch water directly from PHE Namchi and some of the household uses protected water spring (Tinzir Dhara) the connections from the source to each household is properly maintained by using GI (Galvanized iron) pipe. The availability of water is not so good but people however manage by storing it in large tanks conserving it for later use.

The container used for storing the water was clean, off the floor and out of reach of children. The drinking water storage container had narrow neck and was well covered. For the treatment of water some people use alum, bleaching water, neem leaves and common method i.e., boiled water. During the survey the household of Tinzir appear to follow the hygienic way of disposing the used water through piped sewer, open channel. People of Tinzir are aware of the health and hygiene, their toilets were well maintained with proper toiletries and proper connection of sewage.

According to the surveys examination there is vast difference in their average monthly income because most of the people have regular skilled employee. In respect to monthly income of each household their expenditure in water sanitation and hygiene also varies. Even though the area has water scarcity people uses water in a rational way.

In order to cope with the water scarce situation, water local people have initiated various water management techniques and practices.

Future scope of the work

The Future scope of this work is to identify the households water sanitation and supply in Tinzir, Namchi South Sikkim which mainly shows the drinking water treatment, hygiene, sanitation, and household characteristics in the area of Tinzir. This paper may help NGOs, DoNER , District collector to fix the problem and work to the targeted areas. The scheme and programmes should be implemented by the government to fulfil the requirement this area and in addition to ensure the sanitation facilities in a proper manner.

The future work which should be done in Tinzir village should be:

1. There is no perennial water sources available in an around Tinzir, Namchi town and also in rural area therefore implementation of extensive rain water harvesting scheme is very essential to cope up with the growing water shortage problem in Namchi.
2. There should be a proper monitoring of leakages of pipeline between zone distribution tank to households.

3. Timely monitoring and maintained of installed infrastructure like tank, pipeline is needed in rural areas since many water storage tank and pipeline are not in use due to lack of maintenance. Subsequently government should frame policy for the maintenance of water.

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