



## TYPES AND SOURCES OF DRINKING WATER: A CASE STUDY OF LUNGLENG VILLAGE, MIZORAM

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### ABSTRACT

*Water supply is one of the most important problem faced by the rural people in Mizoram. Lungleng village is also no exception in this regard. Everyday water is needed for drinking, cooking and other domestic purpose is used to collect from the nearby streams and other water sources. Sources of water supply in Lungleng village can be broadly classified into three types, namely; public-piped water points, village spring sources and rain water harvesting. Among the water sources as mentioned above; public-piped water points and village spring sources constitute major sources of water supply in rural areas. In spite of several efforts done by the Government for providing adequate water supply like construction of impounding reservoir and pumping of water from nearby streams and rivers till today Lungleng village faces acute and perpetual water supply. Especially during summer months when the water sources become dry men and women would queue for several hours to collect a few buckets water. The present paper is an attempt to study the details of water sources and associate problems in Lungleng village.*

**Keywords:** *Piped Water Point, Spring Water, Water Reservoir.*

### Introduction

Provision of drinking water in the rural areas is the responsibility of the state government and funds have been provided in the state budget right from the commencement of the First Five Year Plan in 1951. Taking into account the magnitude of the problem and in order to accelerate the pace of coverage of villages without water

supply, Government of India introduced the Accelerated Rural Water Supply Programme (ARWSP) in 1972-73. The states and Union Territories were assisted with cent per cent grants-in-aid to implement the schemes in villages without water supply.

In 1974-75 with the introduction of Minimum Needs Programme, ARWSP was withdrawn. However, it was reintroduced in

1977-78 when it was found that the progress of safe drinking water to the villages was not as per expectation. In August 1985, the subject of Rural Water Supply was transferred from the Ministry of Urban Development to the Department of Rural Development with the objective of securing quick implementation and better integration with other rural development Programmes. The National Drinking Water Mission was launched as one of the five societal missions in 1986. The Mission was renamed as Rajiv Gandhi National Drinking Water Mission.

From 1990 onwards, a minimum of 25 per cent ARWSP funds have been earmarked for provision of water supply for SC's and 10 per cent for drinking water supply for ST's. Such funds cannot be diverted for any other purpose. As a part of Dr. Baba Saheb Ambedker Centenary programme, Government of India allocated further special assistance of Rs. 60 crore in 1991-92 to 24 states for the coverage of 30,000 SC/ST habitations with safe drinking water facilities (Census, 2001).

The Government of India also provides assistance to the state under the programme of Accelerated Rural Water Supply Programmes while insisting upon State Government to provide equally matching share under Minimum Needs Programme. Under this programme, water supply to the rural habitation is provided based upon locally resource available through piped water supply scheme, installation of hand pump, tube wells, construction of rainwater harvesting tanks, improvement of village spring sources and construction of impounding reservoirs.

Besides, rural schools are also to be covered with drinking water facilities under this programme (Ray, 1993). Provisions of drinking water in rural areas are the responsibility of the State Government and funds have been provided in the State budget right from the commencement of the First Five Year Plan.

### **The Study Area**

Lungleng village is located in the south western part of Aizawl district, about 18 km from Aizawl city and it comprises one of the villages under Tlangnuam R.D Block. The location of this village falls within 23°39'49'' N Latitude and 92°39'57' E Longitude. The area has a hilly landscape and the average altitude of the village is about 1011.21 meters (3317.62 feet) above sea level, the highest point of the area is 1057m from sea level and the lowest point is 960m. The study area has a pre-dominance of sedimentary rocks. The highest point of the area is 1057m from sea level and the lowest point is 960m. The size of the village can be described as small medium village having a total population of 777 with 152 household (as per survey by Geography Department of Pachhunga University College). The village became an 'adopted village' of Pachhunga University College from 2016 onwards. The village is best known for its 'Lal-In' which was the resident of the village chief still standing after many decades apart from this village is famous for its sugarcane production in the state of Mizoram (Gopalakrishnan, 1991).

### **Origin of the Research Problem**

Traditional systems of collecting water and using it optimally have been practiced in Mizoram for so many generations. Water supply has always been a special problem because the Mizos build their villages on top of the hills and ridges. Traditionally the villages were located strategically on the hill tops mainly on consideration of the defense. The other consideration was health as hill tops have a healthy and bracing climate and hence were chosen as habitation sites.

Water for drinking, cooking and other domestic purpose had to be collected daily from the nearby streams and other water sources. Since the economic life of the Mizos has always centered around jhum or shifting cultivation, every member of male in the family were engaged in the jhum fields for the whole day. Thus women and young girls took the responsibility of collecting water and other household duties. Everyday women and young girls would trudge up and down along the hill slope carrying a number of big hollow bamboo pipes on their back which were used for carrying and storing water. The sight of village women and girls traveling to and from the water points was very common even a few years back.

Later on a few initiatives were taken to make the task of water collection in the village easier. One initiative was getting water to the village by gravity from the water source above the village through a sort of open pipe line made by slit bamboos joined together. Another system was the use of plain steel sheet, villagers having corrugated iron sheet roofs over their houses

would put gutter all around the roof so that water during rains would flow from the roof to one point and from there water would be collected and stored in a tank made of C.I. or plain sheet.

In the initial period before the commencement of First Five Year Plan, lack of resources such as water tank, reservoir, drilling machine, G.I. pipes, lots of energy and time had been spent in collecting water from the nearest water sources. Therefore, lack of facilities and resources was one of the main reasons which had caused water problem in the rural areas.

With the onset of planned development, an integrated approach for health and sanitation of the rural areas was launched to suit the specific requirement and considerable amount of money had been spend for rural water supply. Keeping in view the availability of water resources a part from adequate amount of rainfall, the region is endowed with numerous rivers, streams and their tributaries. Notwithstanding the available water resources several rural areas face acute and perpetual water supply. Especially during summer months when the water sources become dry men and women would queue for several hours to collect a few buckets water.

In the light of the above statement it is a motivating and challenging task to investigate the reason by conducting research and in-depth study, research with a broader perspective is essential to understand the reality of water problem at different micro and spatial level which deserved a special attention.

### **Significance of the Study**

Provision of drinking water in the rural areas is the responsibility of the state government and funds have been provided in the state budget right from the commencement of the First Five Year Plan in 1951. Taking into account the magnitude of the problem and in order to accelerate the pace of coverage of villages without water supply. Government of India introduced the Accelerated Rural Water Supply Programme in 1972-73. The states and Union Territories were assisted with cent per cent grants-in-aid to implement the schemes in villages without water supply.

In 1974-75 with the introduction of Minimum Needs Programme, ARWSP was withdrawn. However, it was reintroduced in 1977-78 when it was found that the progress of safe drinking water to the villages was not as per expectation. In August 1985, the subject of Rural Water Supply was transferred from the Ministry of Urban Development to the Department of Rural Development with the objective of securing quick implementation and better integration with other rural development Programmes. The National Drinking Water Mission was launched as one of the five societal missions in 1986. The Mission was renamed as Rajiv Gandhi National Drinking Water Mission.

In Mizoram the State Public Health Engineering Department is the sole agency of the State Government in water supply and Sanitation (GoM, 2005). The main objective is to provide safe water supply and sanitation facilities to all citizens in the State of Mizoram. A proper survey and investigation, planning and design,

construction and quality control, operation and maintenance are the sole responsibilities of this Department to achieve its specific objectives.

The Government of India also provides assistance to the state under the programme of Accelerated Rural Water Supply Programmes while insisting upon State Government to provide equally matching share under Minimum Needs Programme. Under this programme, water supply to the rural habitation is provided based upon locally resource available through piped water supply scheme, installation of hand pump, tube wells, construction of rainwater harvesting tanks, improvement of village spring sources and construction of impounding reservoirs. Besides, rural schools are also to be covered with drinking water facilities under this programme.

The system of water supply can be divided into four categories such as Ground Water, Rain Water Harvesting, Piped Water Supply (gravity feed and pumping system) and Improvement of Village Spring Source.

### **Objectives of the study**

The objectives of the present study are as follows:

- a) To study the types and sources of water supply,
- b) To examine the extent of availability and accessibility of water in Lungleng village.

## **Methodology**

Firstly, the problem of water supply will be examined by investigating the existing water sources, number of available public water points, total number of households depending on the public water points, per capita daily consumption and materials used for carrying and storing water will be analyzed.

Secondly, a close in-depth study will be done to what extent that several schemes under Rajiv Gandhi National Drinking Water Mission, ARWSP and Swajaldhara such as piped water supply, installation of hand pump, tube wells, construction of rainwater harvesting tanks and impounding reservoirs, improvement of village spring sources a part from management, maintenance, water quality monitoring and surveillance had been implemented and benefited the people living in Lungleng village.

Thirdly, in order to assess the spatial variations of water supply in the study area, the extent of availability and accessibility of water such as hand pump, tube wells, rainwater harvesting tanks, reservoirs and IVSS in Lungleng village will be examined.

Finally, statistical methods, maps and diagrams will be prepared by using different and suitable cartographic methods whenever it was found necessary and applicable which would serve the purpose of this study.

## **Data Base**

The database of the present study consists of both primary and secondary sources. Primary data was collected from the

study area through direct field work, interview and with the help of questionnaires. Besides, secondary data such as Reports of Block Statistics, District Statistical Handbook of Mizoram, Village Level Statistics, Journals, Published Articles etc. were used extensively for this study. Relevant information for this study was also obtained from different government offices, libraries and other recognized sources.

## **Types of Rural Water Supply**

Public-piped water point, natural spring source and drilled water point are the three main types of water supply in the village. These are the sources of water in Lungleng village from where the villagers collect their water for domestic uses. Notably, among the three sources, spring water and public-piped water point are commonly used by the villagers, while drilled water point also used by a few villagers. Rain water harvesting is used as an alternative water supply for domestic uses during the months of monsoon. Thus, the water supply in Lungleng village can be discuss as follows:

### ***Public-piped water Point***

There are two types of public-piped water points such as gravity feed system and pumping system. Gravity feed public-piped water point is a simple method in which water is obtained from the nearby perennial stream or spring which are located at a higher elevation. Several G.I. pipes or polythene pipes are joined at each ends and a small dam is made across the stream or spring where water would accumulate and by connecting the required number of pipes

between the small dam and the main storage reservoir, water began to flow from the dam and accumulates into the reservoir.

This system comprises of conveyance main storage reservoir, distribution network and several taps stands to the consumer's end. In pumping system, water from river and stream through high lift pump is used to transport water to the reservoir. The location of reservoir is selected at the higher elevation and distribution point is also selected at convenient places from where water is distributed to the villagers.

### ***Spring Water***

By far the most important source of water supply in rural areas of Mizoram is spring water. Lungleng village is also not an exception. Spring water comprises as the main source of water supply in the village. It is largely used for drinking; cooking, cleaning and washing. Water is collected manually from the spring by using bucket or by any other convenient materials readily available. Generally, adults and teenagers are used to collect water frequently from spring sources. It varies 3-5 times a day. The dependence on spring water is high especially during summer. The number of spring water varies according to the size of the village and population.

With the onset of planned development and the introduction of several programmes towards rural area development, improvement and construction of spring water source (**Fig. 1**) nearby or within village has been undertaken by the State Government under National Rural Water Drinking Programme. It is named as

Improvement of Village Spring Source (IVSS). The system of construction consists of Reinforced Cement Concrete (**Fig. 2**) or stone masonry structure in rectangular shape with tin roofing.

### ***Drilled Water Point***

The ground water exploration and extraction is being conducted by Public Health Engineering Department (PHED) for the entire Mizoram since 1987 by using drilling rig mounted on a truck. Bores are drilled upto an average of 50 meters depth and Indian Mark-III is installed for lifting ground water from the bore hole. The record shows that 2,889 numbers of bore holes were drilled. Out of these 1806 numbers of bore holes are successfully fitted with hand pump (GoM, 2010). With 60% achievement level Mizoram is placed significantly in drilled water supply system.

From the field study and observation it can be assume that bore holes, wells and construction of hand pumps in the village are shallow tube well that controlled by localized potential with secondary structure possessing of independent parameters. Therefore, it is difficult to arrive at a conclusion regarding the nature and thickness of aquifers, depth of the ground water table, yield etc. So it can be understood that any information that can be tapped in hilly region like Lungleng is bound to produce limited yields. But luckily the village get sufficient water for domestic uses.



Figure 1: Village Spring Water in Lungleng Village



Figure 2: Impounding Reservoir in Lungleng (NRDWP)

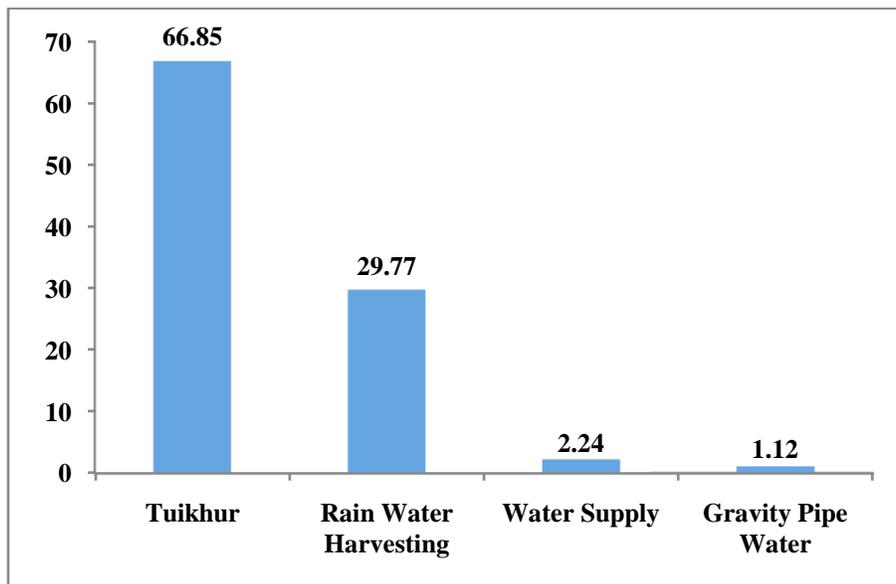


Figure 3: Share of Water Sources in Lungleng Village

### Share of Water Sources in Lungleng Village

The main sources of water supply in Lungleng village are of *tuikhur*, rain water harvesting, piped water supply and gravity pipe water. Among these, *tuikhur* is the most important sources of water supply with 119 families (66.85%) are using for their daily

consumption. It is followed by rain water harvesting with 53 families (29.77%), piped water supply with 4 families (2.24%) and 2 families (1.12%) are benefited from gravity pipe water. **Fig. 3** is showing the share of water sources that used the villagers for their daily consumption.

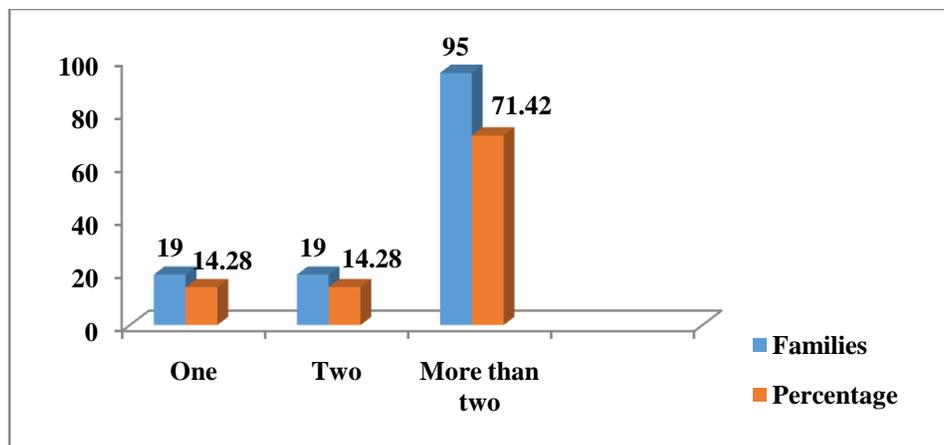


Figure 4: Frequency of Water Collection

### Frequency of Water Collection

Fig. 4 is depicting the details of the water collection frequency of the villagers. From the figure it can be interpreted that 19 families in Lungleng village fetched water once a day which comprises 14.28% of the total family. Another 19 families fetched water twice a day this account for 14.28% of the total family. The remaining 95 families fetched water more than twice a day which comprises 71.42% of the total family.

### Average Consumption of Water per Day (in buckets)

On an average 50 families used 5 buckets of water per day while 51 families used 10 buckets, 23 families used 15 buckets and 22 families use 20 buckets of water per day. In the present study 15 liters of water is considered as one bucket. Fig. 5 is showing the details of average water consumption per day by the villagers.

### Conclusion

Lungleng is one of the few villages located near the capital city of the state. It is 17 kms away from Aizawl. It has a total household of about 150-180. In Lungleng village various water schemes have been introduced by the Government such as Accelerated Rural Water Programme (ARWP), Swajaldhara, National Rural Water Monitoring & Surveillance, Rajiv Gandhi National Drinking Water Mission (RGNDWM), but these schemes had not been properly implemented. Of all the rural water supply schemes and programmes, only Rural Drinking Water Programme

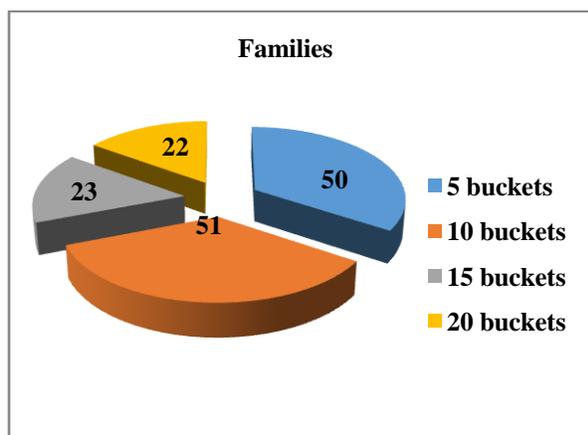


Figure 5: Average Water Consumption per Day (in Buckets)

(NRDWP) has been one of the most important programmes for providing rural water supply in the study area. Due to the above mentioned problems or reasons spring water and Rainwater Harvesting became the main source of water supply in Lungleng village. The people mainly depend on a low level of water sources. *tuikhur* is their main source of water supply; more than half of the population (66.85%) depends on it. Therefore, water is the main problem in Lungleng Village although they get water from rainwater harvesting, gravity pipe water, etc. it barely satisfied their daily needs.

### **Suggestions**

Since the main source of water is *tuikhur* and more than half the population depends on it, it barely provides their daily needs which become a serious problem for the people. The village representatives like the Village Council in particular and the Govt' official in general must give their utmost attention to make improvement on this matter. Though water pipelines had been set up, till now, no water supply has been given to the village. This is the main reason for the scarcity of water in the village. This matter must be brought forward to the concerned department of the State Government and must be settled as soon as possible. This will bring an easier living for the people since water is the basic needs of life.

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