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INCOME GROUP – WISE USE OF DOMESTIC WATER SOURCES IN AIZAWL CITY, MIZORAM

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*Abstract: The water needs of the hilly people for generations have been met by natural sources of water. Traditionally, **Tuikhur** (i.e., water seepages accumulated in artificially fabricated reservoirs and springs water collected in artificial tanks) on the hill slopes and collection of rainwater is used as the main source of drinking water in Aizawl. The affordability of water has a significant influence on the use of water and selection of water sources. The high cost of water may force households to use alternative sources of water of poorer quality that may present a greater risk to health. Furthermore, high costs of water may reduce the volumes of water used by households, which in turn may influence hygiene practices and increase risks of disease transmission.*

Key Words: Income group, water sources, principal source of water

Introduction: Many claim that the poor cannot pay for water and use this argument to imply that water need not be priced. However, this argument is not based on reality. India's relatively poorer population does pay for water, both in a monetary sense and in terms of the effort required to obtain clean water (Bajpai and Bhandari, 2001). Water is under-supplied in the study area. The fact that water supply is almost wholly in the realm of the public sector verifies that governments are unable to provide adequate water supplies. It is characterised by poor water supply infrastructure. Services are generally poor for all sectors of society, but for poorer sector, conditions are worst because of their perceived inability to pay house connection fees. Problems in water supply are especially severe. The level of service provided by a water supply system is a function of the price, quantity, quality, reliability, and convenience that it provides to the user. As a result, poor and rich are dissatisfied with their current water supply situation. However, it was observed that the rich are better off than the poor but not dramatically so as far as their satisfactory level is concerned.

Literature Survey: The World Bank (2001) reports stated that 25 per cent of the urban population of Latin America and 60 per cent of the urban population of Africa are not connected to official utility networks and rely on alternative sources for their water supply. Low-income families that construct dwellings at the urban fringe far removed from main trunk lines, providing adequate supplies of safe water will remain one of the biggest urban challenges in coming decades (Howard and Bartram, 2005).

In 2004, about 3.5 billion people worldwide (54 per cent of the global population) had access to piped water supply through house connections. Another 1.3 billion (20 per cent) had access to an improved water source through other means than house connections, including standpipes, water kiosks, protected springs and protected wells. Finally, more than 1 billion people (16 per cent) did not have access to an improved water source, meaning that they have to revert to unprotected wells or springs, canals, lakes or rivers to fetch water (World Bank, 2004).

STUDY AREA: Aizawl, the capital of Mizoram state, is situated in on the hillcrests, steep slopes and small valleys. It is located on a north-south elongated ridge, which acts as the main hill from which many small ridges and valleys are extending towards the east and west directions. The topography is highly undulating and rugged. The altitude varies from 120 m to 1400 m above mean sea level. It falls between 23° 40' N to 23° 50' N latitudes and 92° 40' E to 92° 49' E longitudes (Fig. 1). It covers an area of about 128.98 sq km, and as per 2011 Census, the population is 293,416 persons.

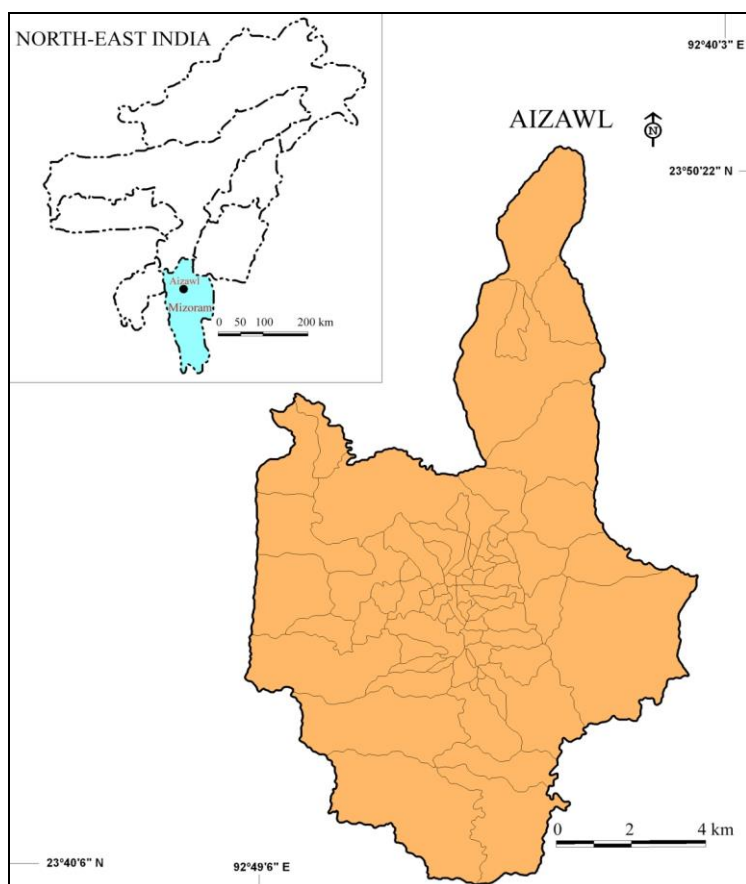


Fig. 1: Study Area (Aizawl City)

DATA BASE AND METHODOLOGY: The present study is based on the information obtained from primary and secondary sources.

- (i) Survey of India toposheets No. 84 A/9, 84 A/10, 84 A/13, 84 A/14 (scale 1:50,000), is used to develop base map of the study area.
- (ii) Households' survey was carried out in 15 local councils out of 72 local councils of the study area (Fig. 2). This amounted to coverage of 20.83 per cent of the total local councils. The number of sample households selected from each of the sample local councils are 50 households, thus data was collected from 750 households.
- (iii) The scheduled for household survey was designed to elicit information of households' income-wise use of domestic water sources. A simple index is created to represent the economic status of the households. Self-reported total monthly income is used as the measure of households' economic status. Hence, households were categorised into three different groups such as, high-income group (HIG), middle income group (MIG), and low-income group (LIG). A total monthly income less than the threshold level of Rs.8,000 are designated as LIG, between Rs.8,000 to Rs.20,000 are designated as MIG and more than Rs.20,000 are considered as HIG.
- (iv) Households' water sources have been classified into principal/main source of water and supplementary sources of water. Principal/main source of water refers to the water source that the households' has been obtaining the largest amount of water and the other sources is considered as supplementary sources of water supply. To conduct households' survey, few households have been identified because studying all the households in the sample local councils is usually impracticable in view of time, money involved, and other considerations. A stratified random sampling procedure was used to select local councils for the survey, i.e. number of population, percentage of individual piped water connections, and geographical location were taken into considerations to give an overall view

of each corner of the study area. Households to be surveyed were selected based on random sampling method and it is believed that they are reasonably representative households in the study area.

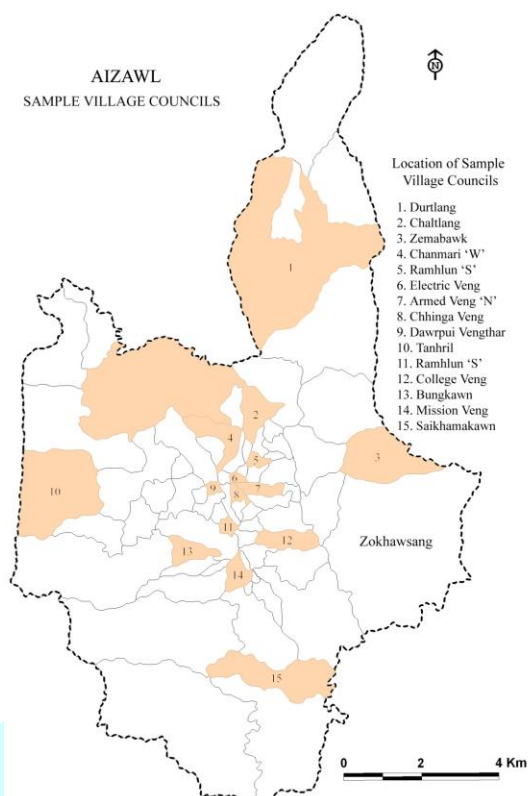


Fig. 2: Location of Sample Local Councils in Aizawl

Discussion: Most households are not using water from only one source but from multiple sources. The pattern of dependence on water sources varies with monthly income (Table 1). It has been observed that among the low-income group (LIG) no household gets house connection, whereas 81.09 per cent of middle-income group (MIG) and 93.52 per cent of high-income group (HIG) have access to house connections. It is important to note that households belonging to MIG and HIG without house connection are beyond reach of the network.

All LIG families use *tuikhur* as their principal source of water supply, whereas 12.71 per cent of MIG and 1.30 per cent of HIG use *tuikhur* as their principal source of water supply. About 6.19 per cent of MIG and 5.18 per cent of HIG use rainwater harvesting as their principal source of water supply (Fig. 3). Absence of LIG using rainwater harvesting as principal source of water reflect the limitation of physical and economical feasibility to make rainwater harvesting as their main source of domestic water supply.

Table 1: Income Group-Wise Use of Water Sources (% of households)

Name of Water Sources	Low	Middle	High
<i>Tuikhur</i> , Rainwater	21.96		
<i>Tuikhur</i> , Rainwater, Public tap	20.32	04.12	
<i>Tuikhur</i> , Hand pump, Rainwater	24.30		
<i>Tuikhur</i> , Rainwater, Tanker	10.50	05.50	01.30
<i>Tuikhur</i> , Hand pump, Public tap	08.52		
<i>Tuikhur</i> , Hand pump, Public tap, Rainwater	10.80		
<i>Tuikhur</i> , Rainwater, Public tap, Tanker	02.62	01.03	
<i>Tuikhur</i> , Rainwater, Hand pump, Tanker	00.98	02.06	
Rainwater, Public tap, Tanker		04.12	01.94
Rainwater, <i>Tuikhur</i> , Tanker		01.37	03.24
Rainwater, <i>Tuikhur</i> , Public tap		00.70	
House connection		07.21	24.02
House connection, Tanker		13.05	31.20
House connection, Rainwater		13.40	09.74
House connection, Rainwater, Tanker		30.60	26.62
House connection, Rainwater, <i>Tuikhur</i>		09.96	00.64
House connection, <i>Tuikhur</i> , Hand pump		03.10	
House connection, <i>Tuikhur</i> , Tanker		02.74	
House connection, Rainwater, Dug Well		01.03	01.30

Source: Sample Households Survey, 2018.

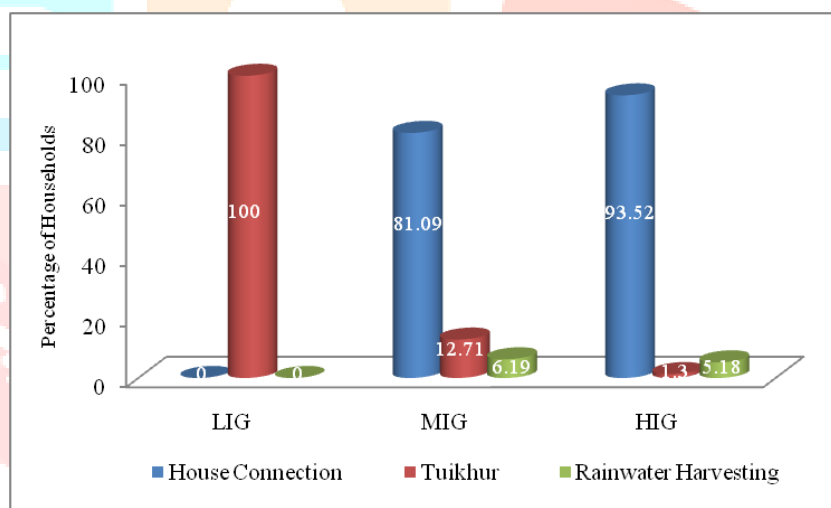
**Fig. 3: Income Group-Wise Use of Principal Source of Water**

Figure 4 gives an overview of the types of water sources used by different income groups of households. Among the LIG, cent percent have access to *Tuikhur*; 42.26 per cent have access to public taps; 91.48 per cent collect rainwater; 44.6 per cent use hand pumps and 14.1 per cent purchase water from tankers. Among the MIG, 81.07 per cent have house connections; 9.97 per cent have access to public taps; 73.89 per cent collect rainwater; 30.58 per cent use *tuikhur*; 5.16 per cent use hand pumps; 60.47 per cent buy water from tankers and 1.03 per cent have private dug wells. Among the HIG, 93.52 per cent have house connections; 1.94 per cent have access to public taps; 44.78 per cent collect rainwater; 5.18 per cent use *tuikhur*; 64.3 per cent purchase water from tankers and 1.3 per cent possess dug wells. It is important to note that no household from LIG has access to house connection and dug well, at the same time no household from HIG uses hand pump.

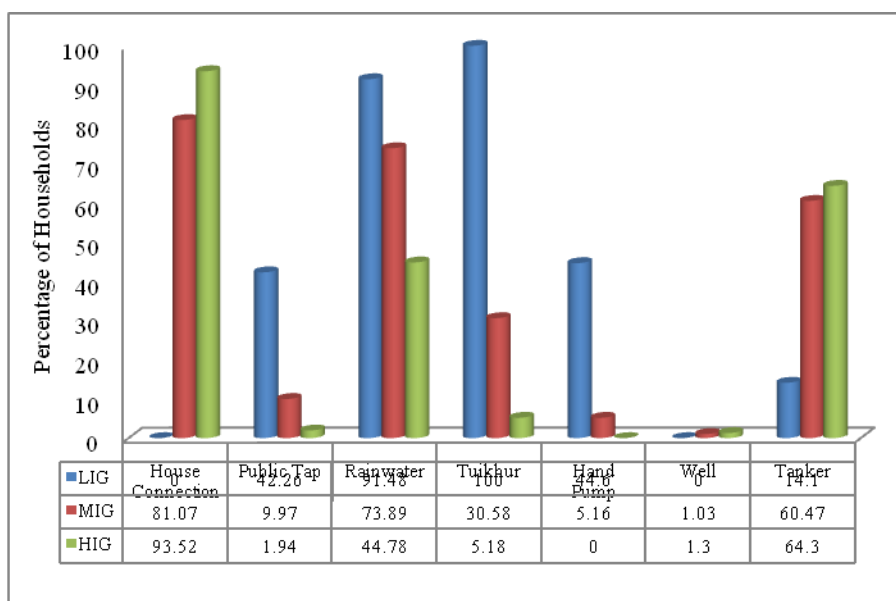


Fig. 4: Income Group-Wise Use of Water Sources

Among the users of only one source of water, 36.21 per cent belong to MIG and 63.79 per cent belong to HIG. In fact, the number of water sources access reflects the amount of water obtained from principal source of water. Of the users of two water sources, 32.37 per cent are from LIG, 37.19 per cent are from MIG and 30.43 per cent are from HIG. Subsequently, among the users of four water sources, the largest users 83.02 per cent are LIG, 16.98 per cent belong to MIG and no household from the HIG uses four sources of water. It means that lower the income, higher the number of water sources on which households depend.

As regards to the barriers of LIG from having piped supply connection, the survey revealed three major reasons. Firstly, most of the LIG families live in the village councils where the piped water facilities have not yet reached. Secondly, in areas where pipes have been laid and house connection facilities are readily available, utilities connection charges hinder the LIG from getting house connection. Thirdly, despite high connection fees water supply through house service connection is unreliable so that LIG families opt for other water sources. Fourthly, for new piped water connection, proof of land ownership is required but most of the LIG live in rented houses, hence they cannot produce the land ownership certificate resulting to disqualification from getting house connection.

Conclusion: All the families in the study area are not being serviced efficiently, the worst affected are those of fewer economic means. Many justifications for the prevalence of public provision of water are given, such as the idea that privatising an 'essential good' like water leads to high price that would prevent the poor from having access to water. However, the existing public sector system imposes an additional burden on taxpayers, while the poor still do not have good access to tap water. The public sector has not even managed to provide good water supply to relatively wealthier households, which do possess the ability to pay for piped water.

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