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Urban Water Supply in Hosanna Town of Hadiya Zone, SNNPR, Ethiopia

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Abstract
The objective of this study was to assess the household water supply problems in the Hosanna town. Descriptive survey research design was employed to find the crux of the problem and get scientific solution for water supply problems in Hosanna town. Primary data are collected from 133 Households selected randomly and 12 respondents purposively selected from four offices concerned with the urban water supply. The 12 respondents were interviewed to get in-depth information related to the problem. Descriptive statistics were employed as techniques of data analysis to assess the problems of water supply. The results showed that the major factors attributed to lower supply of water are shortage of water provision, high cost of piped water connection, poor coordination and participation of stakeholders, inadequate water supply, unfair distribution of water, lack of capacity, limited budget/fund, limited forecasting strategies of the HWSSS, limits of water consumption, rapid population growth, frequent interruption and lack of narrowing gap between communities particularly makes the provision services difficult in the area. As a result nearly half of the dwellers prefer to use alternative sources, which have seriously contributed to water supply problems. Community participation in water supply and sanitation is inadequate due to the limitation of offices or authorities particularly municipality in coordinating and supporting active community participation in the area. So, the lack of the water supply could affect the health condition and every economic activity of the dwellers in the study area. The provisions of water supply were not adequate for urban dweller that means there is a perpetual unmet demand of water in this town, which need to be satisfied. The equitable distribution and regular water supply in the town should be ensured.
Keywords: urban water supply, demand for water supply, sources of water, and challenges of water supply

1. INTRODUCTION

Water is the very basis for sustenance of life. It is the most essential necessity of life after oxygen. The importance of water is not only attached to the drinking but also to cooking, bathing, washing and other activities. Anything that disturbs the provision and supply of water, therefore, tends to disturb the very survival of humanity. Where provisions for water and sanitation are inadequate, the diseases that arise from contaminated water, food and hands are among the world's leading causes of premature death and serious illness (Yewondossen, 2012). There are serious constraints to meeting the challenge to provide adequate water for all urban dwellers. Water supply shortage is one of the problems which require greater attention and action. Various strategies are always being developed to make water accessible to all inhabitants. However, due to insufficient infrastructures coupled with rapid population growth and urbanization, the gap between demand and supply of water continues to widen.

Provision of urban water supply system has been a major concern in many of developed and developing countries. Conflicting to this, the aspect of providing water was downplayed by the focus on the access provision to water supply. This is mostly the case of water supply provision. Hence, the understanding of this integration and interrelation provides a better consideration on the importance of universal provision of providing water supply (Salendu, 2010).

Sufficient potable water supply is one of the basic urban services, which highly affects the economic progress of towns and the health of people. However, many urban centers around the world are facing serious problem of water supply (Assefa, 2006). Ethiopia is one of the member countries that adopted the millennium development declaration with its main objective of water supply (UNDP, 2008). This resulted in prioritizing accessibility to improved water supply. 2

Another key issue, water is crucial for sustainable development. However, limited access to clean and safe water, associated with poor water supply, hygiene and sanitation at household level is widening the poverty gap, gender inequalities and the prevalence of water borne diseases (GWA, 2006). And also, the Millennium Development goals (MDGs) target 7(c) seeks to "halve by 2015 the proportion of people without access to safe drinking water and sanitation" (UNDP, 2005), It is anticipated that Sub-Saharan Africa will only reach the MDGs water target by 2040 (Sutton, 2008).

Hosanna town is the administrative and commercial centers of the Hadiya Zone. The town of Hosanna was declared a model town in 2004 by the regional states. Since, then the town has been getting in emphasis for growth and development of urban infrastructure like water supply. In the last ten years the population of the town has been increasing at exponential rate and there has not been much capital investment on urban infrastructure

like water supply. So, there has been a general shortfall to accessibility to water supply. Some `dwellers of this town face water supply shortages and part of these dwellers gets water from the better households. This rapid growth of the town has brought about a tremendous increase in the demand for urban water supply.

1.2. Statement of the Problem

The availability of water sources throughout the world is becoming depleted by the rate at which populations are increasing, especially in developing countries. This has brought into focus the urgent need for planned action to manage water resources effectively for sustainable development (Khatri and Vairavamoorthy, 2007).

According to Brocklehurst (2004), in the last 50 years, the world"s urban population has increased fourfold, and now around 50% of the world"s population lives in urban centers. While, urban populations grew rapidly, expansion of water supply services did not. As a result, it is estimated that between 30% and 60% of the urban population in most nations is not being adequately served. By 2025, urbanization in Africa is projected to progress from about 32 to 50 % with the urban population increasing from 300 million to 700 million (WUP, 2003).

If current trend prevails, majority of urban dwellers would be living in unplanned or informal settlements without access to basic services such as water affecting public health adversely (Nyarko *"et al",* 2006). According to Getachew (2002) water supply situation in Ethiopia is very poor, as most of the population does not have access to safe and adequate water supply facilities. As a result, three-fourth of the health problems in Ethiopia is due to communicable diseases attributable to unsafe or inadequate water supply and improper waste management particularly excreta.

Earlier studies like Chala (2011) conducted on water supply at national levels focused mainly on large urban settlements. But in small and medium towns like Hosanna, not adequate researches have been yet carried out. Furthermore, Hossana was one of the towns in the SNNPR with rapid urbanization, high population growth; high investment flow due to its investment potential as the capital city of the Hadiya zone. It was also serving as an administrative, commercial and transport center of the Hadiya Zone. There are a number of researches that have been conducted on the state of water supply in different towns and how the country have been trying to address the requirements of the MDGs water targets. The major household water supply problems are shortage of water provision, high cost of piped water connection, poor coordination and participation of stakeholders, inadequate water supply, unfair distribution of water, lack of capacity, limited budget/fund, limited forecasting strategies of the HWSSS, limits of water consumption, rapid population growth, frequent interruption and lack of narrowing gap between communities particularly makes the provision services difficult in the town. Moreover, other towns but as per the researchers knowledge and also information collected from the office of the water supply and sewerage service and municipal offices indicated there was that majority of the households in shortage of water supply provision. Although, its cost and the investigator had gave emphasis to solve the poor quantity of production and quality of distribution of water supply in the town to the dwellers (elders and municipality head communication). Therefore, by assessing the extent of water supply and its sources as well as the challenges with possible recommendation that the community of the town and service providers in Hosanna town face, the study could bridge the existing research gap and helped to plan or replicate the findings for sustainable development of urban water supply in other parts of the town.

This study was undertaken with the main objective of assessing and evaluating the problems of household water supply in Hosanna town.

2. Materials and Method

2.1. Study Area and Study Period

Hosanna town is the administrative and commercial center of the Hadiya zone. The town of Hosanna has been declared a model town by the regional state government. The town has got its new administration structure in 2004 consisting of three sub-towns and eight kebeles. Hossana town is located south west of Addis Ababa at a distance of 232 km via Alemgena-Butajira route, 280 km from via Wolkite route, and 305 km via Ziway. Hossana is located in south-east of Hawassa (the capital of SNNPR) at approximately 168 km via Halaba-Angeca and 203 km via Halaba. The absolute geographic location of Hossana is from 70 30′ 00′ to 70 35′ 00″ North latitude and from 370 491′ 00″ to 370 53′ 00″ East longitudes. The administrative area of Hossana town is 10,414.3 hectares, out of this 4,585.48 hectares of the town has been master planned *(*Hossana Town Finance and Economic Development Office, 2018)

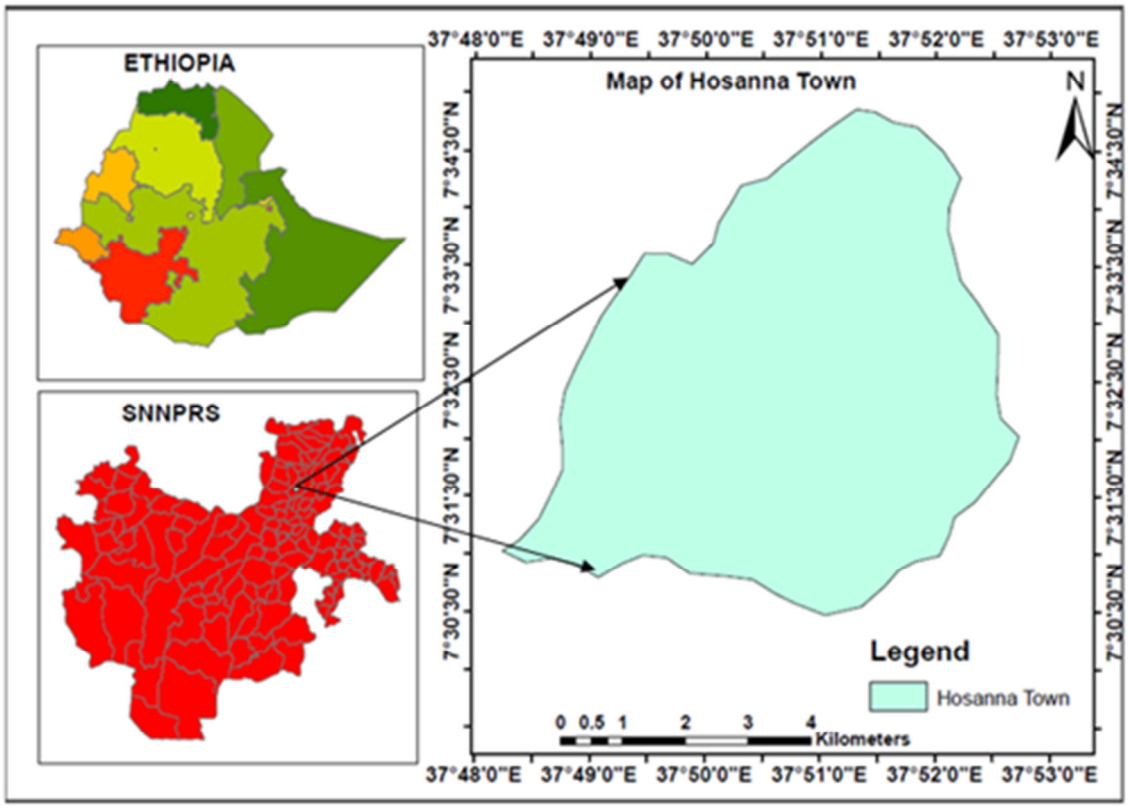

Figure 1: Location map of the study area
Source: Own Survey, 2018

2.2. Research Design

The proposed research was carried out by employing descriptive survey research design. In this study, descriptive survey with both qualitative and quantitative research design was used. Quantitative research design is highly structures and produced data that are amenable to statistical analysis. It presents findings in numeral form. Qualitative research design studies about experiences, behaviors and attitudes from the respondents. Thus, for the quantitative method, semi-structured questionnaires are used whereas for the qualitative data collection methods such as filed observation and document analysis are used.

2.3. Source of Data

Both primary and secondary sources of data were used to generate appropriate information for this investigation. Primary data were collected from the study area using questionnaire, organizing interview and conducting field observations. The secondary data was collected from published and unpublished sources viz. publications, proceedings, reports, academic dissertations etc. Secondary data were collected from different sources e.g. government organizations, non-governmental organizations (NGOs), community based organizations (CBO) and university, etc.

2.4. Sample Size and Sampling Procedure

It was beyond the scope of the study to gather data from the entire populations. Hence, sampling techniques was used; both systematic random sampling and purposive sampling have been employed. In Hosanna town, there are three sub-towns i.e. Gofer-meda, Sech-duna and Addis-ketema. Out of these three sub-towns only one sub-town was selected. Gofer-meda sub-town was purposively selected for this study. This sub-town is one of the newly developed parts of the town. It is located on the North, North-east and South-east fringe of the town. In Gofer-meda sub-town there are four kebeles. The four kebeles are Bobicho, Jalo-naramo, Heto and Gofar-meda. Data has been collected from all there four kebeles by employing systematic random sampling. The total population of the four kebeles is 9,183 29 and there are 1,321 total households (CSA, 2014). Out of these, 133 households were used for the collection of sample data. Therefore, for this study the sample size is 10% of the total households (with the following formula as given on page number 29). In order to determine sample households the investigator selected every item on the list of households.

The sample size taken from each sample kebeles is proportional to their total number of households. The total households selected for this study was 133 households residing in the town. There were 330, 345, 326 and

320 total households in kebelesBobicho, Jalo-naramo, Heto and Gofar-meda respectively. From these 33, 35, 33 and 32 households were respectively selected. In order to determine the sample size for this study, the formula suggested by Burt *et al,* (2003), has been applied.The details of the formula was as follows-

$\mu=n/N \times \mu_i$

Where, μ = sampled sizes of each kebeles

n = sample size

N = total household size of sampled kebeles

μ_i = number of households in each sampled kebeles

Table 1: Distribution of sample households by kebeles

S/N	Sub-town	Kebeles	Total households	Sample size	Percentage (%)
1	Gofer-meda	Bobicho	330	33	2.5
2		Jalo-naramo	345	35	2.6
3		Heto	326	33	2.5
4		Gofar-meda	320	32	2.4
	Total		1,321	133	10

Source: Gofer-meda sub-town Offices, 2018 Households annual report to Hosanna Town Administration.Further, twelve respondents were selected purposively from different sectors such as, Hosanna Town Water supply and sewerage services, municipal offices, health sector for gathering in-depth information through interviews

Table 2: Details of purposive sampling (key informants)

Nº	Offices from where the key informants are selected	Sample selected for interview	Sampling techniques
1	Zone water Development sector	3	purposive sampling
2	Hossana town water supply and sewerage services	3	
3	Hossana town Health Sector	3	
4	Hossana town Municipal Offices	3	
	Total	12	

Source: Proposed by the Investigator

2.5. Methods of Data Analysis

After the completion of data collection process, the data was coded (tallied), tabulated, analyzed, described, interpreted, and Descriptive statistical technique (percentages, ratio, average, using table, frequency distribution charts etc.) were employed as methods of data presentation. The data was analyzed both qualitatively and quantitatively. The Statistical Package for Social Science (SPSS), v.20 software and MS-EXCEL was used to process the data. Moreover, qualitative data collected through close-ended and open-ended items of questionnaires, interview, and observation was logically interpreted and analyzed to strengthen and support the quantitative data.

2.6. Ethical Consideration

The proposal of this study was approved by Ethical Review Committee of Mettu University, College of Social Sciences and Humanities. Verbal consent was obtained from each study participants before interview. Moreover, no personal identifiers were used on data collection questionnaire and the data obtained from the study participants were kept confidentially.

3. Results and Discussions

3.1. Socio Demographic Data

As shown in Table 4, of the total sampled respondents about 62 (46.6%) and 71 (53.4%) are males and females respectively. The greater number of female is among the total respondents only. It is, however, beneficial for the study as most of the household chores are performed by females. They are in a better position to provide household water supply and water consumption related information. Like for frequent usage of water for washing clothes, bathing and personal hygiene.

With regard to the age structure of the respondents 18 (13.5%), 45 (33.8%), 50 (37.6%), and 20 (15.1%) were in age between 20 to 30, 31 to 40, 41 to 50 and 51 and above year respectively. The majority of the respondents‟ age is between 41 and 50. This indicates that they are mature to provide well contemplated response concerning the current provision of water supply.

Table 3: Sex and age structure of the respondents

S/N	Variable	Categories	Number of respondents	Percentage of respondents
1	Sex of the respondents	Male	62	46.6
		Female	71	53.4
		Total	**133**	**100.0**
2	Age structure of the respondent	20-30	18	13.5
		31-40	45	33.8
		41-50	50	37.6
		51 and above	20	15.1
		Total	**133**	**100.0**

Source: Field survey, 2018

3.1.2. Social profile of households

As indicated in Item of, marital status of respondents, out of 133 respondents 18 (13.5%) are single, 93 (69.9%) are married, 9 (6.8%) are divorced and 13 (9.8%) are widowed. Therefore, the majority of respondents are married and family responsibility takers.

Item 2 of Table 5, indicates the education background of the respondents. Accordingly, 9 (6.8%), 15 (11.3%), 21 (15.8%), 23 (17.3%), 30 (22.5%), and 35 (26.3%) the education level of respondents are illiterate, able to read and write, grade 1-4, grade 5-8, grade 9-10 and grade 11-12 and above respectively.

3.1.3. Employment profile of households

The sampled households have diverse employment backgrounds. These include government employees, merchant, daily laborers, farmers and others (seniors and households that depend on other people for their survival). Accordingly, 33 (24.8%) were merchants, 46 (34.6%) are government employees which found the dominant section in the town, 15 (11.3%) are daily laborers, 19 (14.3%) are farmers and 20 (15%) others. Additionally, the income sources are both agriculture and trading this varieties the supply situation inferior and these condition improve problem for the water supply bodies, this situation contributes for the growth of the town as additional suggestion collected by author from sampled households.

In the Table 6 the income of the sample households shows that 17 (12.8%), 27 (20.3%), 47 (35.3%), 18 (13.5%), 13 (9.8%) and 11 (8.3%) have received less than 800 birr, between 801 to 1600 birr, 1601 to 2200 birr, 2201 to 3000 birr, 3001 to 3800 birr and greater than 3801 Ethiopian birr per month respectively. For the majority of respondents the income level has its contribution for water supply. Later, having private connection and being available to water supply service is directly related to income as observed in the field.

3.1.4. Duration of residence of Household Heads

Duration of residence of respondents in the town shows that 13 (9.8%), 36 (27.1%), 58 (43.6%), 10 (7.5%), 9 (6.8%) and 7 (5.2%) of them has lived for less than one year, 1 to 5 year, 6 to 10 year, 11 to 15 year, 16 to 20 year, and greater than 20 years in the town respectively (Table 7). The majority of the respondents have lived in Hosanna town for 6 to 10 years. Hence, they provided necessary information to the investigator about the condition of the town provision of water supply

Table 4: Duration of residence of the respondents

S/N	Variable	Years	Number of respondents	Percentages of respondents
1	Duration of residence in the town	<1	13	9.8
		1-5	36	27.1
		6-10	58	43.6
		11-15	10	7.5
		16-20	9	6.8
		>20	7	5.2
		Total	**133**	**100.0**

Source: Field survey, 2018

3.2. Source and Spatial Coverage of Household Water Supply in Hosanna Town

In line with, the interview made with the key informants of HWSSSE shown that, the source of water supply has its own problems to overcome high amount of inhabitants. As a result, the households‟ demand for private connection is very high. Still, the water supply to handle with inhabitants demand as a result its shortage at water production, technical problem, lack of awareness of people as vendor of property, high population growth, old water supply system and inadequate water supply of pipeline in some part of the town makes challenging the provision of water supply. As the results of the study shown African Development Fund (ADF, 2005), access to water is a condition for health and livelihood, which is why the MDG target was expressed in terms of sustainable access to water supply.

The demand for water in the urban center of developing countries has been increasing over time, as a result of the rising standard of living and population increase resulting from natural growth, as well as from rural-urban migration. In such situations, planning for resourceful and rightful water provision systems in both the short run and long run was critical to confirm that the population gets sufficient water supplies (Alebel, 2002).

3.2.1. Sources of water supply

According to HWSSSE report, the modern water supply system for Hosanna town was established in 1972 by UNICEF (United Nations Children‟s Emergency Fund) for the first time. The population of Hosanna town has increased at an exponential rate since; then it has put a huge pressure on municipal water supply system in particular and sources of domestic water for the town in general. The government added some additional strength on water supply service in 1999 but this relaxed provision could not handle with the rapid growth of the town.

The source and coverage of water supply for Hosanna town is four pipelines that provide water for consumption. Additionally, Dajasmje dam and Batena, Shilalansha and Gombora Rivers as well as spring along the two rivers the pipeline was the main water supply source of the town. The pipeline water was treated at the source and then directed to reservoir from the reservoir; clean water was distributed to users by distribution networks. There were four water treatment plants in the study area but among these one was not effective due to long year services (Hosanna Town WSSS, 2018).

3.2.2 Sources of water for households

Residents of the town collect water from two main sources these are piped system and/or non-piped systems. Pipeline water supply is the safest and reliable sources of water. That means non-piped systems is unguarded and unsafe which included groundwater, springs and other unprotected source. The dwellers are supplied with piped water. The water source is not continuous and dependable for all water users. Hence, the households used water from taps private and public, spring, water vendors and their collective supply. For fright of shortage of water supply provision and other sources of water were used to meet their needs through different supply of water system as shown in the following Figure 2.

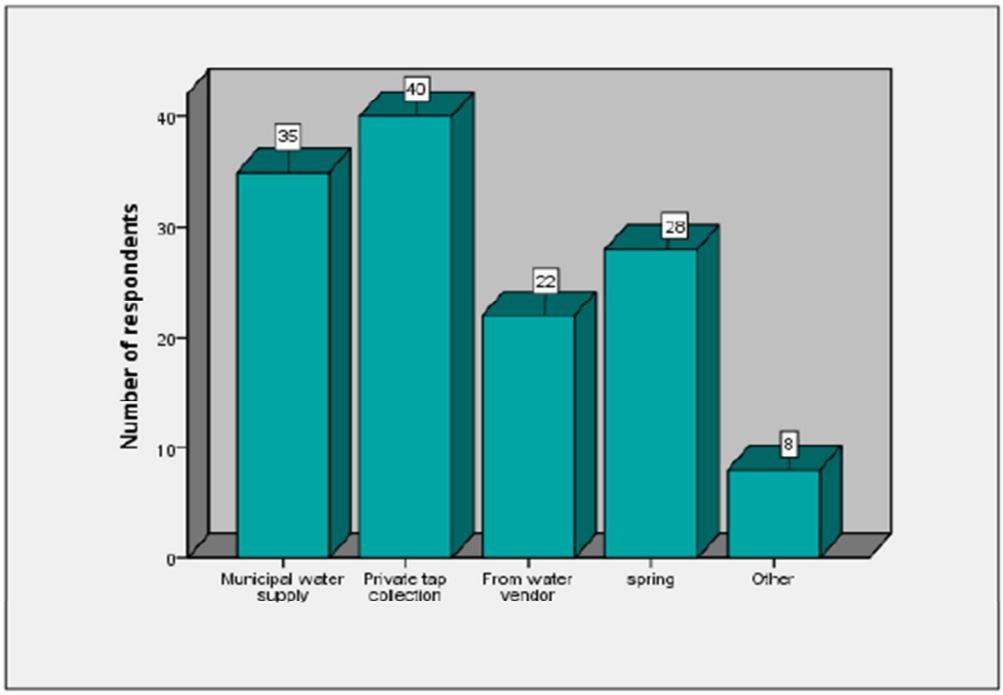

Figure 2: Sources of water for households
Source: Field Survey, 2018

Regarding the survey result as shown in Figure 2, 35 (26.3%) households have access to water through municipal water supply, 40 (30.1%) have source water through private tap connection, 22 (16.5%) have source to from water vendors, 28 (21.1%) of the respondents have source to consumption water from spring and 8 (6%) have other source of water for households in the town.

Approximately, half of the respondents have no source to water through private tap or public tap. From sampled households, who used municipal water supply supposed that they used this source because it is challenging to have private tap connection. As a result of the cost of the connection and administration problems of the HWSSS and the system of the pipeline is old access to water for domestic chores. Thus, the residents choose or prefer to use different source.

The water supply and sewerage service (HWSSS) officers have given detailed information that the water supply problems in the town is due to different reasons. These are lack of financial capacity of WSSS office, inefficient support of other concerned bodies like municipality, water and mines energy office and the other administration body.Furthermore, the awareness of problems by the people living in and around the town, rapid urban growth as a result of rural to urban migration, lack of prediction or forecast demand of water to reduce the water supply problems in the office.

3.2.3. Access to potable water

The universal access to potable water is one of the primary concerns of welfare states. It is a basic necessity for healthy living. According to the universal statement of human rights, the access to potable water is an integral part of right to health. It has quantified that 25 litters clean water per day per person is required for healthy living. However, for many households of urban settlements of developing countries including Ethiopia, it is a distant dream. In many such towns and cities, children and women devote significant amount of time every day in fetching clean water for human consumption and domestic chores. Moreover, women and children devote hours every day collecting water with high operational cost of time that may be otherwise consumed in employment (Mengesha*et al*., 2003; UNDP, 2006). This has led to water supply uncertainty especially for those households with higher demand due to large family size (Collick, 2008).

Described as the water post of East Africa, Ethiopia has abundant water resources, including 12 river basins and 22 natural and artificial lakes. It is expected that per capita renewable fresh water resources total 1,924 m3 per year. The exact groundwater potential of the country is unknown, but it has been expected to be nearly 2.6 billion m3 (ADF, 2005). Even though, many Ethiopian have been suffering from lack of access to safe water supply in the centuries. The town of Hosanna, too, is facing similar problem of poor and uncertain water supply condition.

Table 5: Households" access to potable water

S/N	Variable	Categories	Number of households	Percentage of households
1.	Do you have access to potable water source?	Yes	98	73.7
		No	35	26.3
		Total	**133**	**100.0**
2.	Where from you collect domestic water?	Tap inside house	34	25.6
		Tap inside the private compound	27	20.3
		Tap outside compound	21	15.8
		Youth association water vendor	14	10.5
		Highland water	2	1.5
		Total	**98**	**73.7**

Source: Field survey, 2017/18

Table 8 shows the accessibility to water supply service and indicates that almost half of the respondents do collect water from the main source in the town. As Item 1 indicates, out of 133 households 98 (73.7%) of the respondents had access to the potable water source and 35 (26.3%) of the respondents have no access supply of water their home. This nearly large number of people indicated that the provision of water supply did not cover the demands of the residents. Moreover, which reveal there was problems in the study area. As a result, the concerned body attention is low to improve or solve the water supply problems in the area as similar suggestion raised by sampled households. Moreover, additional information is collected from respondents who have low access of the water as a result of the different problems, they supposed that the main reason of water cost is high, source of the water system is challenges due to the line old, low power of water, frequent breakdown of pipeline and lack of durable Master plan of the town.

As Item 2 of Table 8, revealed that the accessibility of water as concerned by 34 (25.6%) have accessed to tap inside house, 27 (20.3%) have tap inside the private compound, 21 (15.8%) have tap outside compound, 14 (10.5%), have youth association water vendor, 2 (1.5%) have highland accessed water supply in the study area. In this case, the respondents said that they used alternative water supply source for the sake of satisfying their need. Butthere low supply of water and per unit cost of water supply is high and frequent breakdown pipeline in the study area. Moreover, in order to narrow the gap between supply and demand that is caused by water supply linked problem. They used other source, as an alternative of using individual vendors, public taps and neighbor"s house pipeline due to its efficiency for time, money and labor as observed by researcher. Others used river water because their shortage of income.

Table 6: Households" accessibility to pipeline water supply

S/N	Variable	Description	Freq	Per (%)
1	Do you have pipeline water connection in the house?	Yes	34	25.6
		No	99	74.4
		Total	**133**	**100.0**
2	How many days in a week doo you collect tap water?	1 day in a week	35	26.3
		2-3 day in a week	42	31.6
		4-5 day in a week	12	9.0
		Every day	10	7.5
		Total	**99**	**74.4**

Source: Field Survey, 2018

Concerning pipeline water connection of the households, 34 (25.6%) of the respondents are households

using pipeline water connection, 99 (74.4%) of the respondents have not pipeline water connection in the house. This who has not households using pipeline water connection indicated their problems of the water supply services like administration condition, landscape of the town, inefficient man power, and lack of response from the office.

In regard to how often they collect taped water within a week, 35 (26.3%) of the respondents remained collected to taped water once in a week, 42 (31.6%) of the respondents are collected taped water 1 or 2 days in a week, 12 (9%) of the respondents supposed that collected taped water for their need 3 or 4 days in a week, 10 (7.5%) of the respondents remained that collected every day in a week. Moreover, in order to narrow the gap between supply and demand that is made by water supply linked problem respondents use other water supply source like individual vendors, public taps and neighbor's house pipeline because of its efficiency for time, money and labor as observed by investigator. Others use river water because of shortage of money or income. It is clear from the above data that the households‟ accessibility to potable water is from satisfactory households in the town have no access to safe sources of potable water. It may have adverse effect on the general health of residents of the town.

3.2.4. Status of provision of water supply

As stated by WHO, basic access can be defined as the availability of water at least 25 liters per day per person, a distance of not more than 1 km from the source to the house and the maximum time taken to complete round trip should not be more than 30 minutes. The UNDP (2008) stated the minimum absolute daily water need per person per day is 50 liters (13.2 gallons) which include: 5 liters for drinking, 20 for sanitation and hygiene, 15 for bathing and 10 for preparing food. However, because of lack of water supply, millions of people try to exist on 10 liters (2.6 gallons) a day (ADF, 2005). In densely populated areas, a water transportation trip of 30 minutes or less, including get in line time was a more appropriate indicator of access. So, inadequate access of water in the study area related with different type of problems that again influence demand of water as shown the next table.

Table 7: Status of municipal water supply

S/N	Variable	Categories	Number of respondents	Percentage of respondents
1	Satisfied with existing condition of municipal water supply in the town	Yes	55	41.4
		No	78	58.6
		Total	**133**	**100.0**
2	The cause of dissatisfaction	Quality of water supplied is inadequate	25	18.8
		Water is not clean for household chores	16	12
		Water is unsafe human consumption	17	12.8
		The per unit cost of water supply is high	15	11.3
		Other reasons	5	3.8
		Total	**78**	**58.6**

Source: Field Survey, 2018

According to item 1 of Table 10, out of the total respondents 55 (41.4%) stated „satisfaction with the condition‟ and 78 (58.6%) stated „No‟ concerning whether there have not been satisfied with the condition of municipal water supply.

As item 2 of Table 10, reveals out of 133 households 25 (18.8%) indicated quality of water supplied is inadequate, 16 (12%) described water is not clean for household chores, 17 (12.8%) stated water is unsafe for human consumption, 15 (11.3%) showed per unit cost of water supply is high and 5 (3.8%) stated the other

reasons. Regarding above mentioned of the respondents 55 (41.4) stated their not satisfied with the condition municipal water supply.

3.3. Challenges of Water Supply in Hosanna Town

As clearly said by Rose (2009, there is lack of access to safe and clean water supply in the developing countries. Even though the issue of water was observed as a general problem for both the urban and the rural population, women tolerate the greatest burden because of their social gender roles including collecting water for their households Because of their chore of water provision at the households, women and children suffer from disease, had limited participation in education, and both income generating activities and engagement in cultural and political issues are often cooperated. Mostly, poor people exist in urban slums and rural areas, to achieve a better economic growth rate and higher productivity, priority have to be given to the health of the people, for which provision of public utilities like water supply and sanitation was necessary. Provision of safe and adequate water supply with sufficient sanitation service in urban areas were an important investment protections health and safety of the people living in urban areas, and safety, management and promotion of the environment, particularly in developing countries this was like with study area.

3.3.1 Challenges of distribution of water supply in Hosanna town

According to Item 1 of Table 11, 98 (73.7%) explained that there are agreed on the problems of water supply and delivery services in the town, and 35 (26.3%) shows that there is no problem of water supply and delivery services in the town. The majority of the respondents provided evidence reveals that the town is serious shortage of water supply. According to HWSSS technician stated that shortages of water supply are faced in short time in the town. This condition is understood especially, in the town since last eleven years and open the way for rural people to enter into the urban to get relatively good infrastructures like electricity, portable water supply, road, health center and others in the town. Similarly, the capacity of supplying water added to this service and became beyond the ability office. This again leads shortage of water supply service.

As illustrated by Item 2 of Table 11, 23 (17.3%) of the respondents identified the water supply problems are technical, 38 (28.6%) of the respondents revealed the water supply problems are financial, 20 (15%) of the respondents supposed facilitation related problems and 17 (12.8%) of the respondents said other problem as obstacle for water supply. The majority of respondents‟ response shows financially constraint is a limitation to supply of water in the town. With this, interview made the head municipality revealed technical problem as the main problem to supply water effectively to all residents as well as the man powers or technicians have not practiced to overcome the problems and to give them training. Furthermore, the topographic nature of the town made it difficult to improve the water supply service, distribute of water just as in all direction and this condition influenced power of pipeline water relating with the long-standing system.

According to Item 3 of Table 11, 36 (27.1%) of the respondents stated that the concerned bodies have able to entertain to water supply connection and 97 (72.9%) of the respondents showed that the concerned bodies have not able to engaging water supply connection for all residents in the town. As clearly observed, the great majority of the respondents indicated the concerned bodies did not entertain their request for water supply connection.

Item 4 of Table 11, shows that 34 (25.6%) respondents opined that the problem of water supply as an outcome of bureaucratic system, 20 (15%) respondents of the indicate that the problem of water supply due to lack of skilled worker, 18 (13.5%) respondents of the have water supply problem because of distance of the office, 25 (18.8%) of the respondents said due to shortage of materials and 36 (27.1%) of the respondents supposed that the concerned bodies were able to entertain to water supply connection.

This mostly indicated that, the nature problems related with bureaucratic system affects the distribution system of water in the town. For instance, the additional information from field observation showed which makes the residents of the gap at least more than two months after request for new connection, to update and to restoration the old line. People contribute their money to repair the system without the line remains closed services a long time. Therefore, this condition of work system directly or indirectly affects the entire services in the town. In the same way, the interview made with governmental officials indicated they were agreeing on the issue of the connection problem. For instance, they put the maintenance; connecting the new line and informing the existing line were related with inefficient master plan of the town. This was also related with the problem of municipality, the power limitation of HWSSS and low coordination and participation of stakeholders affected the service.

Table 8: Nature of shortage of supply of water in Hosanna town

S/N	Variable	Description	Frequency	Percentages %
1	Cause of not having household tap water supply connection	Distance from line	26	19.5
		Unable to meet the cost	51	38.4
		Inefficiency of municipality	41	30.8
		House related factors	15	11.3
		Total	**133**	**100.0**
2	Nature of the shortage of municipal water supply for household	Extremely serious	33	24.8
		Very serious	26	19.5
		Serious	59	44.4
		Not serious	15	11.3
		Total	**133**	**100.0**
3	For what purpose shortage of water?	Drinking	56	42.1
		Domestic chores	29	21.8
		Both	40	30.1
		Other	8	6
		Total	**133**	**100.0**

Source: Field survey, 2018

As per Item 1 of Table 12, 26 (19.5%) of the respondents are not having tap water connection because of distance from line related water distribution problem among those, 51 (38.3%) of the respondents did not developed tap water connection on account of unable to meet the cost, 41 (30.8%) of the respondents have not developed the tap water connection as a result of inefficiency of municipality to improve the problems of water supply, 15 (11.3%) of the respondents is not developed the pipeline connection.

In addition, nearly two-third of the respondents have not got pipeline connection as a result of inability to meet the cost and inefficiency of municipality. Hence, the Hossana water provision problems are mostly related with inefficient of municipality of the town. To solve this lack of water, many households‟ used spring and river water as alternative sources observed by author during extensive field survey.

According to Item 2 of Table 12, 33 (24.8%) of the total respondents opined that the current provision of water supply is an extremely serious issue for discussion, 26 (19.5%) of the respondents indicated that the current provision of water supply as very serious issue of discussion, 59 (44.4%) of the respondents said the current Provision of water supply as serious issue of discussion, and 15 (11.3%) of the respondents showed the current provision of water supply as not serious issue of discussion. This clearly indicated that the majority of respondents‟ the current provision of the municipal water in the town was a serious issue of discussion. However, the current provision of the pipeline water is low for the household demand in the town.

Regarding Item 3 of Table 12, 56 (42.1%) of the total respondents faced a shortage of water for drinking purposes, 29 (21.8%) of the respondents are faced a shortage of water for domestic chores purposes, 40 (30.1%) of the respondents remained faced a shortage of water for both, 8 (6%) of the respondents are faced a shortage of water for other purposed. This clearly showed that the majority of respondents‟ encountered shortage of water for drinking and domestic chores purposes in the town. The field observation result indicated that the current provision of water has been key discussion issues. As a result of the fetch water from using spring, namely Batena, Gombora and Shilansha spring for drinking, domestic chores and other purposes.

Table 9: Measures to solve current water supply problem

No	Variable	Description	Freq	Per (%)
1	Level of stakeholders' participation	Adequate	29	21.8
		Inadequate	104	78.2
		Total	**133**	**100.0**
2	To improve supply of water administrative bodies should pay	a lot of attention	61	45.9
		some attention	47	35.3
		less attention	14	10.5
		no attention at all	11	8.3
		Total	**133**	**100.0**
3	Solving water supply problems for the development of the town is	Nothing	10	7.5
		To some extent	23	17.3
		Necessary	30	22.6
		Very necessary	70	52.6
		Total	**133**	**100.0**

Source: Field survey, 2018

As per the Item 1 of Table 13--about stakeholders‟ level like NGOs, CBOs of participation --29 (21.8%) of the respondents showed that there is adequate participation of stakeholders, and 104 (78.2%) have shown inadequate participation of stakeholders. The majority of the respondents‟ chose the coordination and participation of the stakeholders is inadequate to solve the service. Therefore, which showed there are limited stakeholders and this again information to the delivery inefficient of services.

According to Item 2 of Table 13, 61 (45.9%) of the respondents indicated a lot of attention is given to the issues, 47 (35.3%) were some attention is given to the issues, 14 (10.5%) supposed that less attention is given to the issues and 11 (8.3%) stated that no attention at all is needed. Moreover, comparatively the large number of the respondents as revealed that a lot of attention is given followed by some attention, less attention and no attention at all needed. This expression the problem of attention to solve the water supply service information is lack service in the area.

Regarding to item thee of Table 13, 10 (7.5%) of the respondents indicated that nothing, 23 (17.3%) supposed that to some extent, 30 (22.6%) shows that necessary and 70 (52.6%) stated very necessary. Relatively large numbers of the respondents are very necessary followed by necessary for the developments. Therefore, solving the water supply service is central which expressions adequately water supply services are critical, most necessary and makes sustained the town at entire. The reason given main concern of the water is the life for all which lived in the town. Thus, it is very necessary for all and solving water supply in the town in other word was maintaining all living thing that lived in the area. Specifically, why it is emphasize that every economic activities, health and good looks of the town directly or indirectly related with water (HWSSSE, 2018).

3.3.1. The causes for water shortage

According to interview result, the factors responsible for water shortage in the study area encompass topography of the town, population growth, urban growth and economic development, behavior of the community in using water. For the most part, population growth in urban areas makes conservation of the existing level of water supply a massive job. Water supply per capita declines as population increase beyond the planned facility. This forces either expansion of the existing water supply provision system or upward new water supply sources which necessary long term investments.

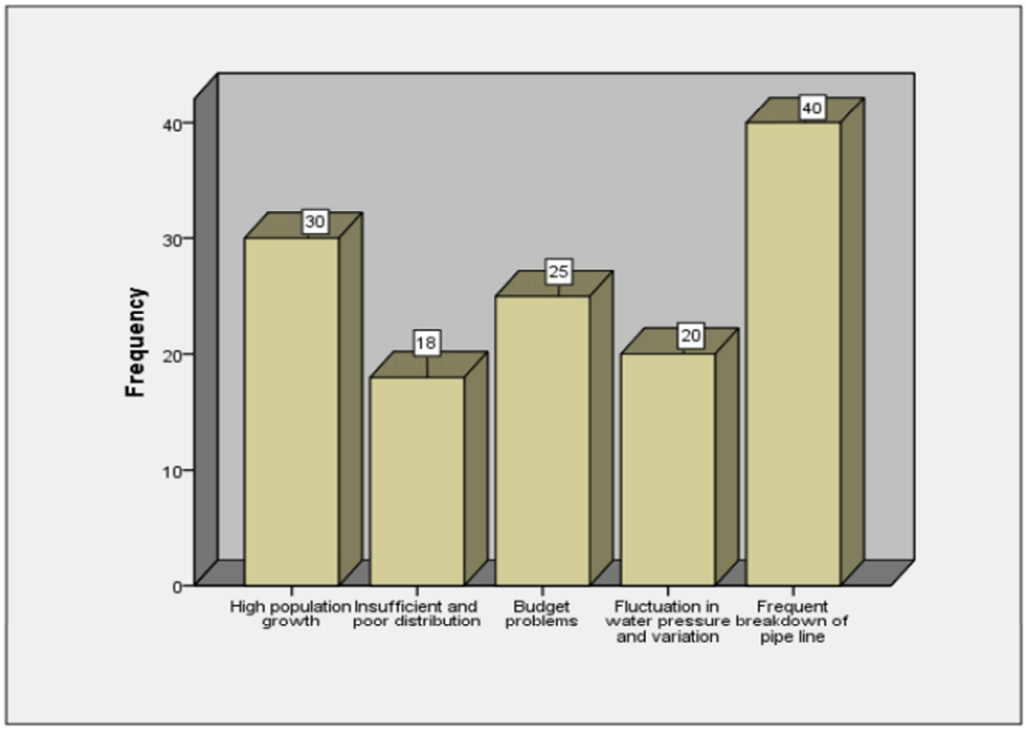

Figure 3: The causes of water shortage for households
Source: Field Survey, 2018

The above Figure 3 indicates that 30 (22.6%) of the respondents expressed that population growth leads to high demand of water, 18 (13.5%) said that the scarcity of water is due to insufficient and poor distribution of water infrastructure, 25 (18.8%) of the respondents remained that budget problems, 20 (15%) of the respondents have fluctuation in water distribution and 40 (30.1%) of the respondents explained the shortages of water as a result of frequent breakdown of pipeline. As the majority of respondents expressed that frequent breakdown of pipeline, population size and budget problems were the main causes for shortages of water supply services. In line with this, many issues are raised during field observation from inhabitants of the town among this; mostly lack of water supply, unawareness by government agencies and municipality problem were causes for shortage of water in the town.

3.3.2. Causes of interruption in water supply

According to World Health Organization (WHO, 2010), interruptions to water supply either through frequent sources or resulting from engineering inefficiencies is a major factor of the access to water. Daily or weekly interruption results in low water supply pressure and a risk of in-pipe contamination. Additional consequences include reduced availability and lower volume of water supply, which poorly affect hygiene. Therefore, water storage required for respondents and this lead to an increase in the risk of infection during such storage and related handling. Seasonal gap often forces users to obtain water from lower and reserved sources. Further, in addition to the clear reduction in quality and quantity of water supply, time is wasted in water collection. Water interruption in town is becoming a great challenge for the last six years and affecting the life of the dwellers in many ways.

Table 10: Causes of interruption in water supply

No	Variable	Description	Freq	(%)
1	Causes of interruption	Scarcity of water source	30	22.6
		technical problem	46	34.6
		power problem	40	30.1
		I don"t know	17	12.7
		Total	**133**	**100.0**
2	Duration of interruption in water supply	2 to 3 days	24	18
		4 to 5 days	44	33.1
		6 to 7 days	35	26.3
		>a week	30	22.6
		Total	**133**	**100.0**
3	The reason why Hossana water supply office was unable to overcome the problem	Newly recognized as office	22	16.5
		Less attention of sub-town"s concerned bodies	14	10.5
		Inefficiency of municipality office support	18	13.6
		Low participation level of NGOs and CBOs	50	37.6
		I do not know	29	21.8
		Total	**133**	**100**

Source: Field survey, 2018

According to Item 1 of Table 14, cause of interruption in water supply condition is serious, 30 (22.6%) indicated that water supply causes of interruption water supply arisen because of scarcity of water source, 46 (34.6%) revealed that water supply interruption occurred as a result of technical problem, 40 (30.1%) described that the causes of interruption reason have the power problem, and 17 (12.7%) of the respondents showed that they didn"t know the cause of interruption of water supply like municipality related problems. The majority of the respondents described the causes of water supply interruption mostly as a result of technical, and power problem, scarcity of water at source for water supply.

In consonance with this, interview made with head of water and mines, energy office suggests that the frequent interruptions in power supply affect water supply in the town. In the same way, lack of awareness of people about treatment of water supply in the town and planting trees around the spring create other problem at the sources. In addition, technical problems influenced the supply systems through unfair distribution of water for some part. However, the area first time established offices located part of the town have collect water continuously. Therefore, which indicated that there are shortages of water supply service in the area with inefficient of the HWSSS to monitor the systems.

Regarding to Item 2 of Table 14, out of the total respondents 24 (18%) revealed that duration of interruption in water supply generally lasts for 2 to 3 days, 44 (33.1%) supposed that the water interruption lasted for 4 to 5 days, 35 (26.3%) indicated that the interruption of water lasted for 6 to 7 days and 30 (22.6%) showed that the interruption of water lasted greater than a week. As a result, the majority of the respondents" water interruption lasted 4 to 5 days, 6 to 7 days, greater than week and 2 to 3 days, respectively. As observed in the field lack of skilled technical mechanism of the water supply problem mostly unfair the service because of this situation the water supply service is not handling with population growth. Similarly, water supply service shows inadequacy and system challenging to easily minimize the problem of time to time.

According to Item 3 of Table 14, the respondents of 22 (16.5%) indicated that inefficient power to overcome the water supply problems are newly recognized as office, 14 (10.5%) exposed that inefficient power to overcome the water supply problems are less attention of sub-town"s concerned bodies, 18 (13.5%) shows that inefficient power to overcome the water supply problems of the municipality office support, 50 (37.6%) indicated as a result of inefficient power to overcome the water supply problems are low participation level of NGOs and CBOs and 29 (21.8%) revealed that inefficient power to overcome the water supply problems they did not know why the office is inefficient. Therefore, the above result shows the majority of the respondents exposed that the office of inefficient power to overcome the water supply problems were low participation level of NGOs and CBOs as well as some respondents are no information about water supply problems. Along the lines of this, interview made with the key informants of the HWSSS supposed that the problems are the result of the weak coordination of concerned body, shortage of financial capacity, lack of support from government offices and inefficient sectors strategies regard of manpower. As a result of such causes the condition difficult to easily solve the problem.

3.3.3. Impact of environmental condition on urban water supply

The total sampled households have given different factors that hinder the provision of water supply in accordance with their priority of problem. This shows that knowing factors that hinder the service are essential for the town people and revealed that their consistent ranking for the obstacles given as options. If we see which factors have given priority in each group responses revealed that condition.

Table 11: The environmental causes of poor water supply

S/N	Variable	Description	Number of household	Percentage of household
1	Role of environmental factors in poor water supply	Urban growth	40	30.1
		Planting of trees along spring	32	24.1
		The climatic condition of the town	38	28.6
		The low level of awareness of the people	23	17.3
		Total	**133**	**100.0**

Source: Field Survey, 2018

According to Table 15, 40 (30.1%) of the respondents said that urban growth, 32 (24.1%) supposed the respondents indicated the planting of trees along spring as the second factors affecting the provision, 38 (28.6%) of the respondents are weather condition of the environment as the third factor that could affect the supply the inadequacy of water is as a result of insufficient and poor water supply and 23 (17.3%) of the respondents are the low level awareness problem of the people as the fourth factor that could delay the provision in the area.

The result stated that how much this kind of factor affects the service in the study area. An urban growth because of remittance indicates a change within short period of time, but highly facilitates the growth of town. As a result, this rapid urban growth without adequate water supply made the problem worst, mostly the provision of the potable water. Moreover, this situation face without to strength the service by the concerned bodies‟ to sustained the provision and provided effectively the service for newly becomes made the condition is difficult. For this service needs fast response from HWSSS and municipality office as well as community at large as “water is life” as supposed by many scholars. Consequently, minimizing this problem means that solving economic, health and environmental problems in the study area as observed by author in the field survey.

3.4. The Coordination and Participation of Stakeholders to Improve Water Supply

According to Wallace *et al* (2008), integration was the basis for multi sector approaches to ensure that planned goals are achieved and actions converge to solve environmental, water supply and health problems. The Memorandum of Understanding (MOU) signed by the Ministries of Health, Water, and Education in 2005 has provided the foundation for implementation of the National WASH Program in an integrated and coordinated way. Nevertheless, the author observed that integration, participation and coordination among concerned bodies, community based organization, NGOs and other stockholders are limited and at a low level.

Table 12: The role and assessment of water supply personnel

No	Variable	Description	Freq	(%)
1	The responsible bodies to supply drinking water	Government	41	30.8
		community based organization	3	2.3
		NGOs	35	26.3
		both government and NGOs	10	7.5
		Other	44	33.1
		Total	**133**	**100.0**
2	Is there adequate water supply distribution for all dwellers in the town	Yes	37	27.8
		No	96	72.2
		Total	**133**	**100.0**
3	The gap in demand and supply of drinking is because of	Low participation of stake holders	39	29.3
		Lack of coordination among concerned bodies	31	23.3
		Lack of attention to this service	26	19.5
		Total	**96**	**72.2**
4	The causes for low participation of stakeholders in drinking water supply system	Lack of encouragement from concerned bodies	60	44.1
		Shortages of plan for this service	43	31.6
		location of the town or remoteness"	30	22.1
		Total	**133**	**100.0**

Source: Field Survey, 2018

In line with Item 1 of Table 16, as regarding the responsible bodies for providing drinking water supply services, 41 (30.8%) of the respondents supposed agreed on government, 3 (2.3%) shows that community based organization participation, 35 (26.3%) of the respondents supposed NGOs, 10 (7.5%) indicated that both government and NGOs, 44 (33.1%) indicates that other responsible body to provide water supply in the study area. The majority of the respondents" indicated other responsible bodies to provide water followed by government and NGOs. This informed to both the government and NGO"s contributions supposed low to sustain water supply service problem for town's population growing or demand for supply service. Regarding this, the Hosanna's water and mines energy office, HWSSS and municipal interview result showed that currently a day no NGOs and community based organization in the area. Moreover, the government support is weak as well as inefficient coordination of the concerning sectors to provide the services sufficiently for residents made the services difficult.

Field observation suggests some amount contributions from both the government and NGOs it is not adequate to sustain the service. As a result, the community participation is vital part in the provision of urban water supply. Mostly, the community participation is supporting to the creation activities from start to end provision labor and material, cash and contributing any means of supports until conserving the properties. Moreover, community participation is not being limited to resource contribution. Similarly, the contribution of all persons in the management and decision making like planning, selecting the location of water points observing, like later, the community improves a sense of post-employment ownership which is considered by all concerned bodies to maintain the service.

Concerning Item 2 of Table 16, 37 (27.8%) of the respondents picked "Yes" and 96 (72.2%) are picked "No" concerning adequate water supply distribution to households. Along the lines of above result, HWSSS technician interview supposed the water supply problem mostly related inefficient coordination, participation, and discussion on the issues with stakeholders in order to narrow the gap between supply and demand to improve the water supply.

As per Item 3 of Table 16, 39 (29.3%) of the responded low participation of stakeholders affect the service, 31 (23.3%) lack of coordination among the concerned bodies influenced the provision and 26 (19.5%) remained that lack of attention affect the service. The majority of respondents showed that low participation of stakeholders is impact on the provision followed by lack of coordination among concerned bodies. Above the perfect condition exposed that low coordination, attention and participation of the concerned sectors directly and indirectly limited the effort to improve water supply services for all dwellers of the town.

As result as to Item 4 of Table 16, 60 (44.1%) of the respondents stated that lack of encouragement from concerned bodies, 43 (31.6%) indicated that shortage of plan for this service and 30 (22.1%) showed that location of the area concerning the causes for low participation of stakeholders in water supply system. The majority of the households stated that stakeholders" participation and coordination limited because of lack of

encouragement from the concerned bodies and shortages of plan remained the factors to without problems improve and this condition makes difficult for this service. In line with this, the interview made with municipality shown that limited budget/fund, lack of discussion with concerned bodies, lack of communication with community and lack of custom for facilitating NGOs and CBOs hold back the service.

The shortages of the different infrastructures in the town; the respondents concerned to their shortage and in unity with their main concern of need. They stated there as the follows in Figure

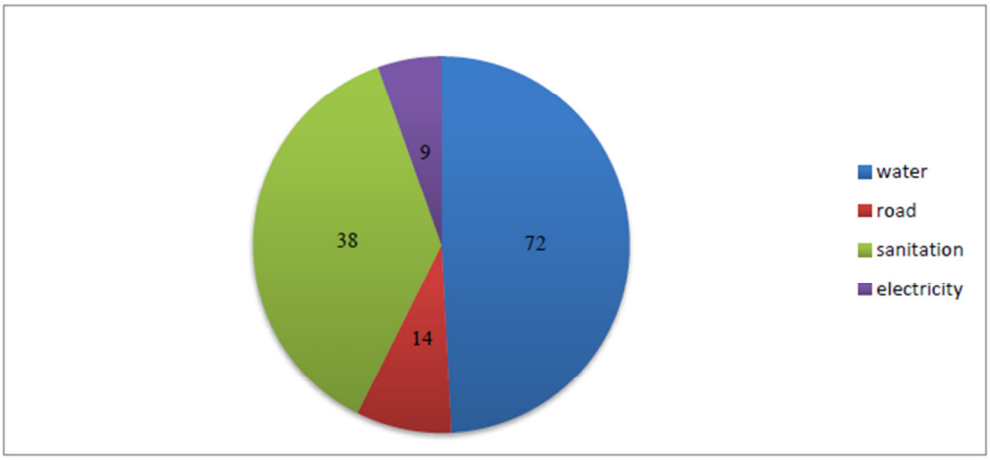

Figure 4: Infrastructures shortage in Hosanna town
Source: Field survey, 2018

According to Figure 4, out of the total sampled respondents 72 (54.1%) reveals that provision of water service is the greatest infrastructure shortage, 14 (10.5%) stated shortage of road, 38 (28.6%) indicate shortage of sanitation and 9 (6.8%) shows shortage of electricity. The comparatively large numbers of the respondents respond exposed that shortage of provision of water followed sanitation service. Moreover, sanitation is very critical for the town inhabitants; water and sanitation remained dependable with supply service shortage. Thus, in the study area the problem of the water is the serious inadequacy followed sanitation. This indicated some problem of the water is directly or indirectly related with health, economic, and every community activities. As a result, provision of water supply service needs a lot of attention to reach targeted goals.

3.5. Spatio-Temporal Variation in Demand and Supply of Water in Hossana Town

3.5.1. Spatial-temporal variation in demand for water supply

As per the interview made with different officials, such as the head of the sector, human resource management and each offices expert from HWSSS, some improvements is made in the provision of water supply in the town from time to time. Urban water supply service is the most important infrastructure and this necessary high investment to meet the demand of rapid urban growth. The households‟ demand for service is very high and indicated increasing through time in the town. However, the water supply is not fulfilling the residents demand due to, its shortage of power, old supply system and lack of financial management in the town. In addition, lack of trained employees who entirely understood how to function the system. This indicates that the technicians lack responsibility and accountability which have leads to inefficient service delivery in order to provide full water supply service for the households.

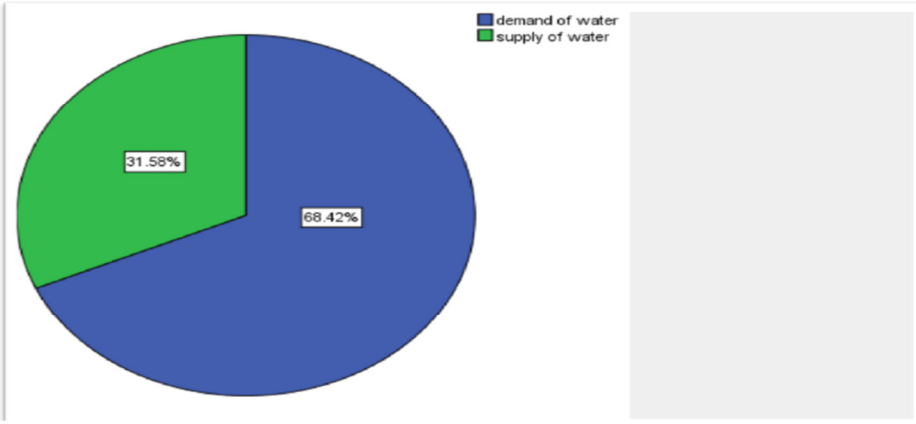

Figure 5: The demand and supply of water for households
Source: Field Survey, 2018

According to Figure 5, the average water demand of respondents have 91 (68.4%) per day of households and the average supply of water have 42 (31.6%) per day of households. This indicated that the demand for water provision is greater than the supply of water, which needs attention of the concerned bodies to reduce this problem. Instead, as interview conducted with selected office heads response shows that there is still a challenge between the supplies and demands of this service. Among the challenges inadequate finance, inadequate man power, weak coordination among the offices, and failure to implementing the policies as it was written on the paper, lack of other institutions like community based organization; rapid population growth in the area.

Table 13: Spatial-temporal variation in demand for water supply services

S/N	Variable	Description	Freq	Per (%)
1	Households consumption of water per day (in liters)	20-50 liters	43	32.3
		51-80 liters	55	41.4
		above 81 liters	35	26.3
		Total	**133**	**100.0**
2	Is supply of water proportional with households daily demand	Yes	40	30.1
		No	93	69.9
		Total	**133**	**100.0**
3	Alternatives source of water for domestic chores	by using river water	25	18.8
		by using spring water	35	26.3
		by using from water vendor	16	12
		Others	17	12.8
		Total	**93**	**69.9**
4	Distance of water point/sources from residence	10-50m	4	3.0
		51-100m	8	6.0
		101-200m	10	7.5
		201-300m	17	12.8
		300-400m	24	18.0
		> 400m	70	52.6
		Total	**133**	**100.0**

Source: field survey, 2018

According to Table 17, spatio-temporal variations of water demands of the sampled household are variable from one water consumers to other water user or place to place in the town. Thus, the average litters per day per household consumption from private tap connection and municipal water supply vary in the area.

Regarding Item 1 of Table 17, daily water consumption is between 20 to 50 liters for 43 (32.3%) of the respondent, 51 to 80 liters for 55 (41.4%) of the respondents and abovelitters for 35 (26.3%) of the respondents. The majority of the respondents‟ daily consumption is between 51 to 80 liters water per day. The amount of household water consumption is low when the supply capacity of water related with not much demand of water supply in the town (HWSSS, 2014). This indicated that low amount of the water consumption as well as high demands for the water supply service.

In the Item 2 of Table 17, 40 (30.1%) of the respondents are accessed supply of water proportional with daily demands and 93 (69.9%) of the respondents accessed water not proportional with their daily demands. This exposed that large number of the respondents have not daily demands of water proportional. In line with this, the interview made with head of HWSSS showed that, the households‟ demand for water supply or private pipeline connection is increasing through time in the town. But it couldn't fulfill the demands of the residents and the provision capacity of an office is low improve the services.

Besides, in line with above, the interview made with key informants water supply falls short of the community demand due to its shortage at production, lack of governmental support financially, high rural to urban migration, unavailability of distribution lines in the town. The existing water distribution line is not having enough power for the previously connected households to benefit from full water supply service. As a result, this inequitable distribution of water and awareness problem of the people was also exasperating the water supply problem.

Regarding to Item 3 of Table 17, 25 (18.8%) are satisfied their needs by using river water as alternative source of water, 35 (26.3%) are satisfied their daily demands by using spring water as alternative sources and 16 (12%) are satisfied their daily demands by using water from vendor as alternative sources of water. Though, 17 (12.8%) are satisfied their daily demands using water from others source as alternative source of water, in order to reduce the problem related with supply of water in the area.

According to the field observation result, the situation of water supply for the household consumption activities is limited to satisfy their demands of water from private taps and municipal water supply due to lack of consistency of water supply service in the town lead the dwellers to the different water source. Moreover, consumption of water supply activities is used involving for washing clothes, drinking and cooking, washing, bathing, house cleaning, gardening, toilet and others. However, the different water source needed to overcome this shortage. Yet lack of extra water supply; distance from source of water, topographical constraints attributed to variation over space**.**

4.5.2. Spatio-temporal variation in supply of water

According to interview result, water supply is mostly affected by seasonal variations especially during the dry season. However, during dry season the residents who has no access to the supply of water for cleaning purpose used the around rivers like Batena and Gombora rivers and unprotected spring for drinking as well as cleaning from that remain mostly found both rivers. The long-standing system also is its problem when flood happened during summer; due to this quality of water is affected.

Table 14: Temporal variation in water supply

No	Variable	Description	Freq	Per (%)
1	In summer Season variation of water supply	High	78	58.6
		Medium	35	26.3
		Low	20	15
		Total	**133**	**100.0**
2	The reliability of water supply during winter season	not reliable at all	46	34.6
		slightly reliable	54	40.6
		quite reliable	19	14.3
		very reliable	14	10.5
		Total	**133**	**100.0**
3	The highest supply of water during in month in the town	Sept-December	13	9.8
		January-April	3	2.3
		May-August	113	85.0
		Other	4	3.0
		Total	**133**	**100.0**

Source: field survey, 2018

According to Item 1 of Table 18, 78 (58.6%) of respondents shown that in summer season of the high variation of water supply in the town, 35 (26.3%) of the respondents indicated medium variation of water supply and 20 (15%) of the respondents remain that low variation of water supply. These aggregate effects made the provision of water supply service inefficient. Therefore, these shown that lack of awareness creation of communityand lowly cooperation of HWSSS with concerned government agent in order to control provision problem.

Regarding to Item 2 of Table 18, the result showed that 46 (34.6%) of the respondents indicate that not reliable at all, 54 (40.6%) of the respondents revealed slightly reliable, 19 (14.3%) of the respondents exposed quite reliable and 14 (10.5%) of the respondents indicated very reliable of water supply in winter (dry) season. Hence, the majority of the respondents stated slightly reliable and followed not reliable. This result showed that serious water supply problem in the town as well as how much seasonal changeableness affects the use of water for residents.

In line with Item 3 of Table 18, 13 (9.8%) of respondents supply of water during in month indicated that September-December month, 3 (2.3%) of the respondents shows January- April month, 113 (85%) of respondents remained May-August month and 4 (3%) of the respondents are other of the highest water supply of during in month of the area. The respondents indicated that the highest water supply in May-August month of the town.

4. Conclusions

This study is aimed at assessing and evaluating the problems of household water supply in Hosanna town. It proposed to assess the source and spatial coverage of water supply services of the town, the challenges to water supply service of the town, the coordination and participation of stakeholders in water supply services in the town and the spatio-temporal variation in demand and supply service of the town. Moreover, the current provision of the pipeline water in the town is a serious issue, lack of the accessed water for the household consumption in the town. Therefore, connecting the new line and updating the existing line are related with inefficient master planning of the town, which is related with the problem of municipality, urban growth, limited budget/funds, lack of capacity, rapid growth of population and low community participation in decision making in the town.

Thus, in the study area the water supply from particular water source is not continuous and unfailing for all water users. The main obstacles for water supply in the town such as high cost for connection pipeline, old of the previous pipeline, lack power of water, and the frequent break down of the pipeline as a result of lack of durable master plan of the town. But this statistics presents an overly optimistic representation for "improved" supply of water did not always good or safe, sufficient and easily accessible by customers. However, given this fast growth of town with weak participation of stakeholder to improve the water supply service, the situation seems to be difficult for the town to provided water supply services in the town.

Then the investigator as observed that the price of water varies from place to place, which means mostly related with interruption of pipeline, unfair distribution of water supply, distance from the springs, rapid population growth, water vendors and lack of water sources like private pipeline providers who want to enhance the price of water. The load to collect water taken by both children and women this is directly or indirectly affecting them their health or education, the shortage of the water supply was affect the life or health condition and each economic activity of the residents in the study area.

The provisions of the water supply is not enough for urban dwellers because of inadequate finance, low participation of the concerned bodies, inadequate man power, lack of budgets/funds problem, weak coordination among the offices, lack of other institutions concerned bodies, rapid population growth and failure to mobilize the community are the major constraints in the study area.

4.1. Recommendations

- The result of the study indicates that the current water supply provision, demand and accessibility are low standards in the town. Therefore, HWSSSE should increase the distribution line to bring the system near to the residents in order to facilitate the people to get pipeline at close to their surroundings.
- HWSSS should establish additional public taps and follow up the maintenance and operation of the tap in the areas the problem is mostly seen. The community should also care for the tap and arrange the service time agreement to their interest to avoid a problem. The old system should be improved by replacing it by a new system to manage the wastages of scarce water.
- Municipality should support the establishment and expansion of water services by accessing the capacity of the HWSSSE and the Hosanna water and mines energy office should provide the necessary supports (financial, materials and technical) to the activity to serve the people and alleviate the present and long term water shortages in the town. So, the municipality has to design strategies for a coordinated and organized intervention between different stakeholders such as the government, NGOs, community based organizations, charity and religious organizations, and sanitation and hygiene problems and their consequences.
- The HWSSSE was better work with community. The community should get awareness regarding protect the sources of water or spring and closely follows up and encouraging them to make active participant on the issues, protecting environment and planting trees around the spring. Additionally, preparing proposals to search NGOs and mobilized community to solve the issues rather than supposing everything from the government.
- CBOs and Community participation are very low in the study area. So, these stakeholders should be encouraged in all parts like resource contribution; decision making and support implementation management. Therefore, this HWSSSE and municipality should encourage and conduct different investigation on urban infrastructures to identify the problems and improve plan which support to solve the problems.
- The HWSSSE has to design strategies to bring together and involve different stakeholders such as the government, NGOs, community based organizations and community at large to reduce of the poor water provision. The helps of mechanism for water supply facilitate some budget/fund getting means and inviting different concerned bodies, businessman, community at large, NGOs and other stakeholders and in the town to improve the services

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