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IDENTIFICATION, ASSESSMENT, AND MANAGEMENT OF THE NON-FUNCTIONAL WATER SUPPLY AND SANITATION SCHEMES AND THEIR IMPACT ON HUMAN LIVES AND LIVELIHOODS AS WELL AS ON THE LOCAL ECONOMY IN RURAL PARTS OF NEPAL

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ABSTRACT

The non-functional water supply and sanitation systems are not the only major barriers to accessing safe drinking water and sanitation services these are the major sources of the huge waste of investment from the perspective of value for money. Numerous water schemes were constructed with huge investments from the government and other organizations but after 1-2 years of construction, some schemes became partial functionals and a higher number of schemes became fully non-functional as a result people are non-benefitting from these schemes so huge of invested amount wastage if the system could not have to revive instantly.

This research mainly focused on the topic of identifying, assessing, and managing non-functional water supply and sanitation systems in two selected areas of the hilly and Terai regions of Nepal and their impacts in human lives and livelihoods triggering the local economy in inferiorly. that means water scarcity adversely impacts all aspects of human lives, livelihoods, and the environment aspect as well.

The research dissertation not only seeks the identify and assess the non-functional water supply system even research has been able to manage the systems in social, technical, financial, and managerially perspectives to revive the system and ensure access to safe drinking water and sanitation services for the people who are still left behind from the WASH services.

The researcher was also able to explore potential donors during the time of research to revive the system for access to safe and sustainable water and sanitation services for the communities of Khabri, Dang district, and Gothiban community in Rolpa district. At the time, Engineer Without Boarder USA (EWB-USA) was on the ground for the technical assessment of these schemes for revival instantly because EWB-USA had agreed to revive these schemes to ensure safe, equitable and sustainable WASH services for all. Therefore, the research dissertation is a fully holistic approach to creating an enabling environment for water and sanitation access for all toward achieving SDG6 by breaking various barriers and obstacles.

Readers will feel something different when reading this research because this research dissertation does not describe the strategy and narrative it also started the immediate action in partnership with potential donors for sustainable solutions for sustainable development. This is something different than other research documents.

Keywords: Non-functional, sustainable, access, barrier, lives.

list of Abbreviation

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Identification, Assessment, and Management of the Non-Functional Water Supply & Sanitation Schemes and their Impacts on Human Lives and Livelihoods as well as on the Local Economy in Rural parts of Nepal:

Chapter 1: Background

Access to safe drinking water and sanitation facilities are every person's primary and basic needs. The government of Nepal has also prioritized water supply and sanitation. The constitution of Nepal has defined accessibility to safe drinking water and sanitation as basic human rights. Although the government of Nepal had set a goal to provide basic drinking water and sanitation facilities to every citizen by 2017 AD, the developments did not go as per the aim, and the goal was amended to meet within 2019 AD. But, still, in 2022, many people from different parts of the country do not have easy access to safe drinking water. For the classification of drinking water facilities, four indices are used by the Nepal government: quantity, accessibility, continuity, and quality. As per the Department of Water Supply and Sanitation data, every province lacks proper water supply facilities. The data from 2018 by the DWSS shows that only 87.88% (Managment, 2018) of households have access to at least the basic water supply. However, it is an improvement from 2010, when the accessibility was only 80.37%. As of 2018, households in Gandaki province have the highest accessibility to drinking water which is 89.92%. Meanwhile, the least number of households are getting drinking water in Karnali province, with only 84.18% of households having the facility. The percentage of households with drinking water facilities in provinces 1, 2, 3, 5, and Sudur Paschim province is at 85.28%, 87.85%, 89.89%, 88.57%, and 86.53% respectively. Although 87.88% of households have access to drinking water facilities in Nepal, it doesn't mean all the households having access are supplied with piped drinking water. Only 51.69% of households are getting water from pipe systems. Also, the difference is huge among provinces regarding the piped water supply. Province 2 has the least number of households with access to piped water systems, with only 10.46% of the total households with water access; meanwhile, in Province 4, the percentage is huge, with around 84.23% of all water supply provided through pipe systems.

Due to the lack of water supply to every household, people are experiencing great difficulty in day-to-day activities. Mostly people from vulnerable and marginalized communities are heavily affected. Those groups of people rely on water for agricultural purposes, animal husbandry, poultry farming, and many more. Due to the lack of water supply, those activities are limited, resulting in poor income and economic growth. Although the water supply projects are developed and constructed in the area of need, only the construction and running during the period of project handover is not enough. Without proper training of the users about the operation and maintenance and the formation of a systematic and capable user committee, those projects would certainly fail within a short period of time. This problem is seen widely in Nepal, where the projects have stopped functioning even due to small technical problems. Due to this, the government and different non-governmental organizations' funds have been wasted, which could have been used for other developmental works. So, the projects should focus on the post-handover activities and provide enough knowledge to the user group on operation and maintenance for the project's longevity, as well as inform them on where to contact when the scheme is not repairable to the users themselves.

As per the data from DWSS 2018, around 42000 big and small piped water supply schemes are constructed, and 1200000 shallow tube-well schemes are connected all over Nepal. These schemes were constructed in different periods and mostly have a design period of around 20-25 years. Although this number seems huge in data, in reality, some schemes have already been phased out, and most schemes are non-functional. More precisely, out of all the schemes, only 28.13% are functioning properly. Only 11828 water supply schemes are functioning as per their full capacity. Also, 38.07% of the schemes can be made functional with minor repairs and maintenance. Moreover, around 4200 schemes, or 10% of the schemes require major repair and maintenance. However, the percentage of schemes that require a complete replacement is around 15.85%. Furthermore, some of the schemes are damaged by different disasters and accidents as well as due to aging and need to be destroyed and reconstructed. These types of schemes are around 7.93%.

There are several factors that determine whether the water supply project of the scheme will be successful or not. Some of the key factors that determine the sustainability of the project include proper design and proper construction strategy, strong organizational structure or strong user committee, availability of technical manpower, availability of repair and maintenance equipment, and finally the budget for the functioning of the scheme. As per the data from DWSS, 2018, out of around 42000 water supply schemes, only 16399 schemes are registered systematically, however many registered schemes do not conduct meetings and discussions as per the necessity. Also, only 13526 schemes have the necessary technicians, and only 14533 schemes have the necessary equipment for repair and maintenance. The number of schemes having the funds for repair and maintenance is extremely low with only around 2378 schemes having such funds available. ((DWSS, 2018)).

Every type of developmental activity requires proper planning and a systematic approach to be successful and sustainable. Also, accurate data reflecting the problems are crucial to formulate a plan and program and hence amend the policies that would certainly help in the effective and smooth implementation of any project or scheme. The non-functional water supply schemes thus have to be accessed regarding their data such as number, type of maintenance and repair required, an estimate of budget necessary, an estimate of human power necessary, and the feasibility of the project for its effective running in the long run. With a detailed study of such non-functional projects, the projects that require less budget to repair and can be run for a long period of time can be revived through effective plans and programs. Repair and maintenance of such schemes would save the money that would be otherwise required to develop new schemes. Also, wherever possible, increasing the capacity of the scheme with some modifications could be a better approach as the demand for water per capita is increasing day by day and the excess water can be utilized for livelihood activities as well. Also, during the repair and maintenance of such non-functional schemes, a program incorporating other aspects such as hygiene, sanitation, agriculture, kitchen gardening, poultry farming and many more can be done which on the one hand solves the problem of drinking water and on the other hand helps in the economic and overall development of the vulnerable and

marginalized community as well as add the responsibility for timely repair and maintenance or promotes better engagement of the people with the schemes or, in the other words, helps in developing the feeling of ownership to the project.

According to JMP updated 2023, 97.10% of the population have access to improved water similarly, 93.8% of the population have access to improved sanitation, and 98.5% of the population have access to handwashing facilities (2023, March 2023).

The post-ODF and sanitation and hygiene master plan intention is also highly hampered due to the lack of water access in many parts of the country in this context total sanitized slogan is only limited to the document it is not practiced on the ground (Government of Nepal STEERING COMMITTEE FOR NATIONAL SANITATION ACTION , 2011).

CHAPTER 2: Research Aim and Objectives

2.1 Research aim: The research aims to better understand the impacts of non-functional water supply schemes in rural Nepal and develop sustainable and effective strategies to solve problems that have prevailed in the economy, health, livelihood, and many other sectors.

2.2 **Goal:** Analyze the non-functional water supply schemes in the rural parts of Nepal and their impact on the local economy, livelihood, and health and provide a way forward for the solution to the existing problems.

2.3 Objectives:

2.3.1 Broad objectives:

The major objectives of this research are to assess and manage the existing non-functional water supply schemes in rural parts of Nepal and measure the extent of their impacts on human life and day-to-day activities.

2.3.2 Specific objectives:

1. To identify the non-functional water supply schemes in the rural parts of Nepal.
2. To analyze the impacts of the non-functional water supply schemes.
3. To promote the build-up of interrelation among the WASH sectorial stakeholders.

4. Revive the non-functional water supply schemes by raising funds from national and international donor agencies.

2.4 Research questions:

2.5 In response to sub-objective 1:

1. What is the current status of the water supply system in your community? (how many existing schemes are non-functional in your community?)
2. Is the existing system functional for the whole year? (if not, is it seasonal?)
3. Is the available water supply sufficient to meet the daily needs of every people?
4. Is the available water fully safe and meets the quality parameters set by the government of Nepal?
5. How does the community operate and maintain the existing water supply system?

2.6 In response to sub-objective 2:

1. Are you fully satisfied with the existing water supply system?
2. How often has the community encountered waterborne diseases?
3. What is the status of kitchen gardening practice in the community?
4. What is the current status of personal hygiene, domestic sanitation, and environmental sanitation in the community?
5. How much time and resources are wasted while fetching water while the schemes run dry?

2.7 In response to sub-objective 3:

1. What is the status of the interrelationship between wash sectorial stakeholders engaged in the community?
2. Are there any projects involving the cooperation between stakeholders at a local and regional level?
3. Is the local government capable for promoting wash activity in term of finance, economy and technology transfer?
4. Are you familiar about resource duplication from national and international aid organizations working in the wash sector?
5. How often do you participate and get to provide your views at different stages of the project design and implementation phase by different organizations?

2.8 In response to sub-objective 4:

1. What is the current trend of renovating and repairing as well as operation and maintenance of water supply schemes as well as other infrastructures in the area?
2. What kind of national and international non-governmental organizations are active in the operation and maintenance as well as the development of water supply and other infrastructural projects?
3. Are there any projects run jointly by governmental and non-governmental sectors for the development of water supply schemes?
4. How aware are the community members and user groups of the significance of operation and maintenance as well as the revival of non-functional projects?
5. What is the perception of the local community about the sustainability of the existing water supply and other infrastructural projects?

Chapter 3: Problem Statement

In the context of Nepal, most particularly in the hilly areas as well as many rural areas, there has been a significant growth in the development of schemes related to water supply. So, there can be seen an overall growth in the number of schemes targeted toward making water resources accessible to a large number of population groups. In the contrary, however, the schemes that used to be functional previously are non-functional as well. Thus, despite having a large number of water supply schemes scattered throughout the country, only 28.13% of the schemes are functioning properly as per the data from DWSS 2018. Thus there are various reasons that have led to less than one-third of schemes being functional at the current period. The trend of building new projects instead of proper care and maintenance as well as repair of existing projects has become a major problem. This trend, on the one hand, leads to the waste of time and resources which could have been saved if the resources were directed towards the revival of non-functional schemes, and on the other hand, the time and resources that are spent due to lack of water resources as well as the associated risk such as disease outbreak in the communities due to consumption of polluted water and lack of economic activities to support the livelihood is also significant. Moreover, there has also been a lack of proper

coordination between different organizations working in the same sector. Thus, there often can be problems of project duplication resulting in more than enough schemes in some areas while a lack of schemes in other areas. Also, very little attention is given to the post-implementation phase of the water supply schemes. Lack of skills in minor maintenance and repair, weak user committee in terms of economy and skills, and various other factors have played a significant role in rendering those schemes non-functional soon after they were handed over to the users by the organization. So, broadly, the whole economy of the country is impacted by the trend as a lot of budget is required every year in the development of new schemes. Also, the income generation activities that are supported by the water supply such as kitchen gardening, livestock and poultry are greatly affected, pushing back people below the poverty line. The government of Nepal has set a sustainable development goal 6 which covers safe, equitable, and affordable drinking water and sanitation services for all, which, regarding the current trend of overlooking the importance of repair and maintenance, and renovation of non-functional water supply schemes seems very difficult to achieve by 2030. Furthermore, the achieved goals such as open defecation free are also at risk. Water and sanitation are highly interrelated. Although the government declared the country ODF in 2019, (DWSSM, 30 September 2019) people are often seen defecating in the open mostly in the areas where water supply is scarce. Thus, it is crucial to prioritize the renovation of non-functional schemes rather than developing new projects.

The higher number of water supply and sanitation schemes were dysfunctional which not only impacted human health causing the use of pollutant water and poor sanitation practices. The impact on many other areas of human such as household level and local economy, develop civilized and healthy society in terms of sanitizing the community, the daily life of school children, local people, livelihoods and many other areas which are very interrelated to water and sanitation access in the community which is guaranteed by the constituent of the government of Nepal and human right organizations but still has not been practiced properly.

Nepal's government is in the race to develop and implement water supply and sanitation schemes rapidly. Still, on the other hand, a huge number of the schemes will be dysfunctional, so in int his situation not easy for the Nepal government to achieve SDG6. Gadhawa is a rural municipality, which is located in Dang district, likewise, Runtigadhi is a rural municipality, which is located in Rolpa district, Province No. 5 of Nepal respecively. In these two rural municipalities studies will be conducted.

In rural municipalities, about 98, 78,950 people live in 19, 34,985 households. Out of 460 rural municipalities, around 86.83% (16,880,096 households) have basic water supply. Of these, 56.9% use piped water, 28.21% use hand pumps, 1.43% rely on protected sources, and 13.17% use unsafe sources ((Managment, 2021/2022).

In **Dang district**, only 75.56% have basic water supply. Over 11.43% lack organized supply, relying on unsafe sources ((DWSS, 2019)).

In **Rolpa district**, insufficient maintenance of water projects has led to water shortages. Budget constraints have prevented upkeep, forcing people to search for water for hours. Climate change has dried up natural sources, requiring residents to walk up to 1.5 hours for water. Daily life is greatly affected. Lack of project maintenance hampers water supply. Aging projects need repairs but lack funding ((2023, p. 2023)).

In rural municipalities, Water scarcity is a pressing issue that demands immediate attention. It threatens every aspect of their lives, from food security to public health, economic stability, and political power. Achieving the government's Sustainable Development Goal 6, which aims to provide safe, equitable, and affordable drinking water and sanitation services for all by 2030, seems challenging given the current trend of neglecting the importance of repairing and maintaining non-functional water supply schemes.

Furthermore, even achieved goals like becoming open defecation-free are at risk. Water and sanitation are closely interconnected, and despite Nepal being declared open defecation-free in 2019, people are still seen defecating in the open, especially in areas where water supply is scarce.

Given these circumstances, it is crucial to prioritize the renovation of non-functional schemes over developing new projects. By focusing on repairing and maintaining existing infrastructure, Nepal can ensure sustainable access to clean water and sanitation services, protect public health, and alleviate the adverse effects on the economy and livelihoods of its people.

Chapter 4: Scope of the Study & Research Methodology :

The study will cover the analysis of the existing non-functional water supply schemes and identify the impacts of those schemes on the economy, livelihood, and health of the community's people. Initially, the study will compare the status of two regions with non-functional water supply schemes. It will focus on identifying various problems faced by the people residing in the community and the reason for the presence of such schemes. Moreover, the initial study will prioritize identifying the root causes of the problems and what can be done to solve those problems such that the problems of non-functional water supply schemes can be sustainably uprooted from the areas.

This research dissertation will explore and identify the status of the local community's economies and development by measuring the key parameters: lives, livelihoods, education, and health associated with lack of access to safe drinking water and sanitation services due to the non-functional water supply systems. In addition, research will be set up on the way forward, and recommendations to address these genuine issues by reviving the water supply systems and ensuring safe drinking water and sanitation services as per the desires of the local people. The scope of the study is associated with the following root causes the system going on non-functional promptly.

The Research methodology- This entails the research design, strategy, techniques, data collection methods, and data analysis and presentation including ethical considerations.

The research structure primarily includes observation of the area of study for the aspects associated with water supply. More importantly, the research structures focuses on the eagle-eye view of the study area for the identification of the problems of wash and wash-related aspects and the interconnected between them as well. Also, there will be focus group discussions among the affected people due to the lack of WASH facilities. The focus group discussion will be held with a maximum of five people based on the selection

criteria. The discussion will include each and every individual interested in participating in the discussion with ensuring the voice of all genders equally along with social inclusion. Also, key informant interviews will be held with service providers working in the sector of water supply and sanitation. The research structure will also include detailed consultation with experts in the wash sector. The consultation will also be held with local leaders, representatives of water user committees, Chairman and mayors, Water Experts, Academia, Researchers, community-based organizations, governmental and non-governmental organizations, and groups involved in the wash sector. Also, social media will be used as a tool for public survey.

The required data will be collected from different sources: field observation, secondary data resources, reports, publications, journals, consultation meeting reviews, keynotes, and suggestions as well as can be noted of the voices of the grassroots people. The collected data will be assessed and analyzed in mixed methods so that qualitative and quantitative data will be analyzed and presented to meet the research objectives of fulfilling the water circumstances of the deprived people.

4.1 Major root causes for the presence of non-functional water supply schemes:

1. **Lack of proper knowledge of operation and maintenance:**

   There is always a probability of minor failures in the system and those failures can occur frequently. Although the faults and damage in the system may seem very insignificant, those problems in the long run can grow into bigger problems that would require more capital and resources. For instance, a simple error or malfunctioning of a faucet of tap would result in loss of water, which in turn force people to cut pipes in different places to secure water. This situation in turn results in less water flow in pipes, thus people will be crowded in tanks to fetch water. It will ultimately result in pollution and damage in the whole system which will render the system non-functional. Thus, a better training and awareness program on operation and maintenance and strengthening the user committees with proper knowledge and resources is very important.

2. **Major design faults in the water supply scheme:**

Sometimes, even simple miscalculations and errors in the system design phase would result in a great disparity in demand and supply. Thus the system might get overexploited and the conflicts between people to secure the supply would cause a collapse of the system. Thus, close attention to the technical aspect is crucial in water supply projects.

3. **Lack of proper monitoring after the project completion and handover:**
   Mostly, the water supply projects are handed over after completion and not monitored by the respective organization. So there exists no data on where the projects are running and where the projects have stopped working. With a lack of proper monitoring of the projects, it is not easy to allocate the resources so that the projects that are in need of repair and maintenance would further degrade and become non-functional in the long run. Thus the involved projects, whether it is governmental or non-governmental as well as the local organizations should consider scheduled monitoring of the projects.
4. **Less priority towards repair and maintenance and more priority towards development of new projects:**
   Although it is the better approach to repair and renovate projects that are non-functional, people in the economically poor regions of Nepal favor the development of new projects with the hope to get employment opportunities. Also, the local government prioritizes the development of new projects as well to get more budget.
5. **Less involvement of women in the project development phase:**
   In the context of Nepal, primarily, women are involved in kitchen household work such as fetching water. However, women are rarely involved during the project design phase. Thus the projects have a great chance to not be very friendly to women. Also, lack of knowledge on handling the water supply system and lack of knowledge on maintenance of the system would result in non-functioning of the projects.
6. **Lack of ownership of the scheme**: Many water supply and sanitation scheme in Nepal has been running and going on dysfunctional due to the lack of ownership from the side of anyone like children without parents, banks without a security guard, and livestock firm without caretaker so lack of ownership on schemes as a result such kinds of the scheme going on non-functional rapidly in the rural parts of Nepal.

Chapter 5: Study of Locations

The study's location has been selected in two different places in Nepal's Terai and Hilly areas. One place is located in the Gadhawa rural municipality ward no 6 in the Khabari community of Dang district, and another in Runtigadhi rural municipality ward no 6 in the Gothiban community of Rolpa district. Both sites are isolated from the district headquarters, and the majority of people are from indigenous/ Janajati in both locations. More information about these study areas is as follows:

5.1 Description of the study area:

The study area is described at the country level, province level, district level, and municipality and ward level in the communities.

Nepal, situated in South Asia, is a compact landlocked nation nestled between India and China. It has an estimated population of 28.4 million and covers an area of 147,181 square kilometers ((CBS, 2017)). Geographically, Nepal can be categorized into the Terai plains, Hills, and the Mountain/Himalayan region. The country adopted a new federal constitution in 2015, dividing it into seven provinces with 77 districts and 753 municipalities and rural municipalities for political and administrative purposes. Nepal is socially and culturally diverse, with 125 caste/ethnic groups coexisting and 123 distinct dialects spoken (Yadav, 2014). Despite its rich natural resources, Nepal faces underdevelopment and persistent poverty due to limited capacity for effective development initiatives. It holds the 149th position in the United Nations Development Programme's Human Development Index ((UNDP, 2018)). Roughly 25.16% of the population still resides below the poverty line, reflecting Nepal's economic growth and development challenges ((CBS, 2011).

There are 12 districts in Lumbini Province. Dang and Rolpa districts are under the remaining Lumbini Province so both studies area will be conducted in this province.

Ward No. 6 of Gadhawa Rural Municipality, which is located in Dang district, was selected for the study. Gadhawa has a total of 8 wards, which are scattered across 359 square kilometers of geographical area. According to the preliminary report of the population census 2078, Gadhawa Rural Municipality has 46275 population where male and female

comprises 22650 (48.95%) and 23625 (51.05%) population respectively. With respect to the number of households, Gadhawa Rural Municipality had a total of 7,267 households. Ward number 6 had the most households with a total of 1,260, while ward number 8 had the least number of households with a total 187 number of households. In ward No. 6 research will be conducted.

Ward no. 2 of Runtigadhi Rural Municipality of Rolpa district of mid-west Nepal is Selected for the study. The Wada has been existed 933 households and a 4,470 total populations (Village Profile, 2073). It is bordered by Ghodagaun in the east, Masina in the west, Ward No. 1 of Lapal in the North and Pyuthan Nayagaun in the south. It is the mountain slope area of Rolpa district.

5.2 Khabari Community Ward no 6 of Gadhawa Rural Municipality.

Ward no 6 has 1345 households with a 2345 population (Dang, 2023). The Khabri community is located in Gadhawa rural municipality-6 in the Dang district of Lumbini province of Nepal. There are many communities in Ward Number 6 with different names. The Khabari community has 106 HHS having 530 population according to the last time census in 2021. Some community institutions and groups are situated, one of the primary level community schools, one primary clinic center, and one church are over there, but WASH services are very limited in there. All of those suffer from safe drinking water and sanitation facilities, even primary health centers. This community lies on the border of the neighboring country of India, just 32 km far from the Khabari community of Banbasa border.

The existing Khabari water supply and sanitation scheme was constructed in 2056 with NPR 925,000 support from the parliament development fund. The scheme went to partial function 6 months later of construction. Similarly, the scheme was fully dysfunctional due to various reasons within a year of construction. There are people who have zero

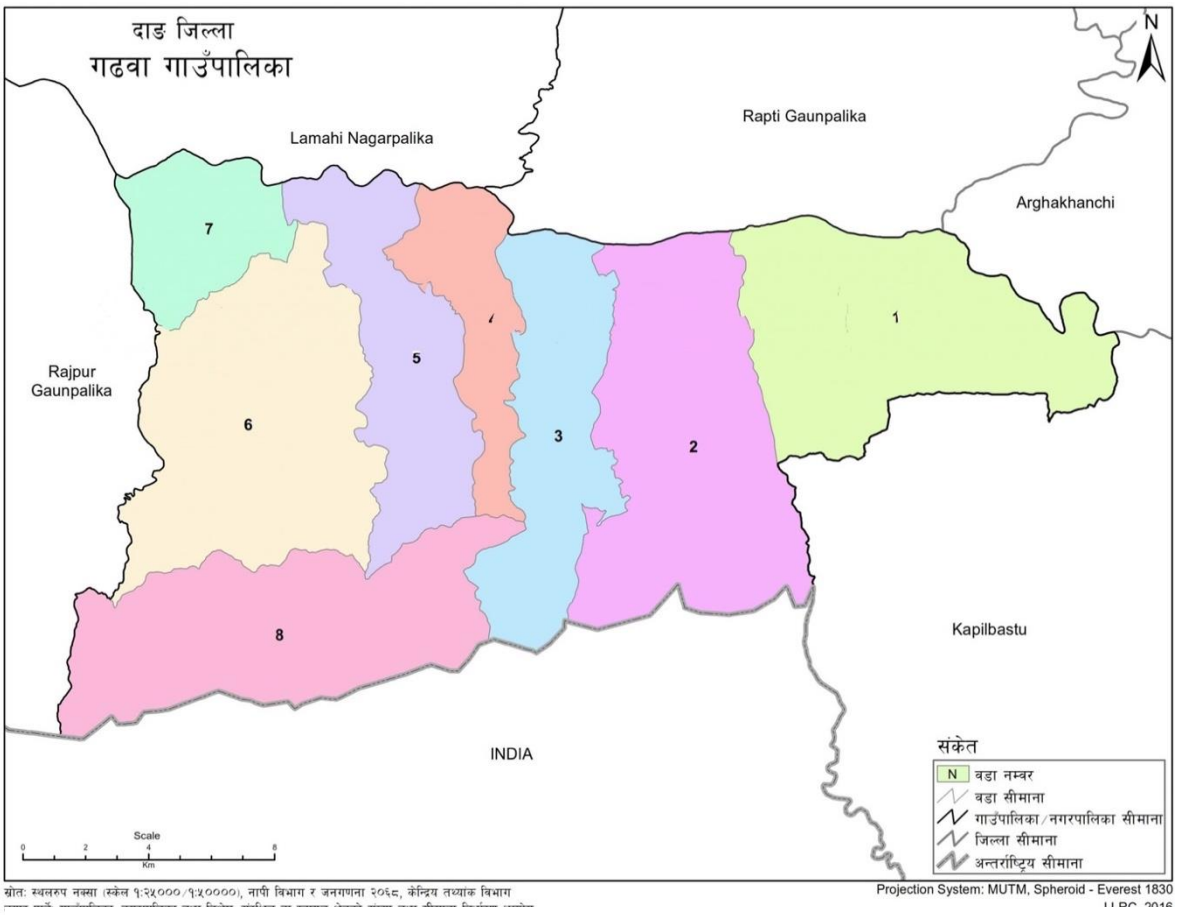


Figure 1Geography Map of Gadhawa Rural Municipality, Dang District

knowledge and skill on the operation and maintenance of the water supply system also sanitation and hygiene conditions are the very worst lack of water supply access. Water purification and treatment are very far from the minds of villagers because people are suffering from basic drinking water so they don't have to imagine safe drinking water and its parameters as identified by WHO and the Government of Nepal. In this community, there are higher numbers of households that have toilets despite being unable to use

toilets and they have no choice open defecation (OD) near the jungle and safe areas where people cannot see them easily.

Figure 2 Non-Functional Water Structure

Figure 3 Non-Functional Public Tap Stand

Figure 4 Depletion of Underground Water of Shallow Well

Figure 5 Dysfunctional Household Toilet

Figure 6 Focus Group Discussion with Water User Committee, Municipal Officer, etc.

Figure 7 Prefeasibility Survey to revive the water system

5.3 Gothiban Community ward no 6 of Runtigadhi Rural municipality in Rolpa District

This community is located in Runatigadhi rural municipality -6 in Rolpa district of Lumbini province Nepal (Rolpa, 2023). This community is located just 7 KM away from the nearest local market of Holeri. This community also majority of Janajati communities especially from Magar (Janajati). This scheme was also constructed with support from the parliament development fund during the tenure of Mrs. OM Shari Gharti in 2063 BS with NPR 280,000. Now existing water supply scheme is functional partially. As a result, 41 tap stands are partially functioning out of 45 similarly 4 tap stands are fully dysfunctional due to the decreasing water yield as well as other physical structures were already

nonfunctional due to the proper operation and maintenance as well as associated with other technical reasons. The community people have been receiving drinking water only 2 times early in the morning and evening for 30 minutes so people's basic water demand

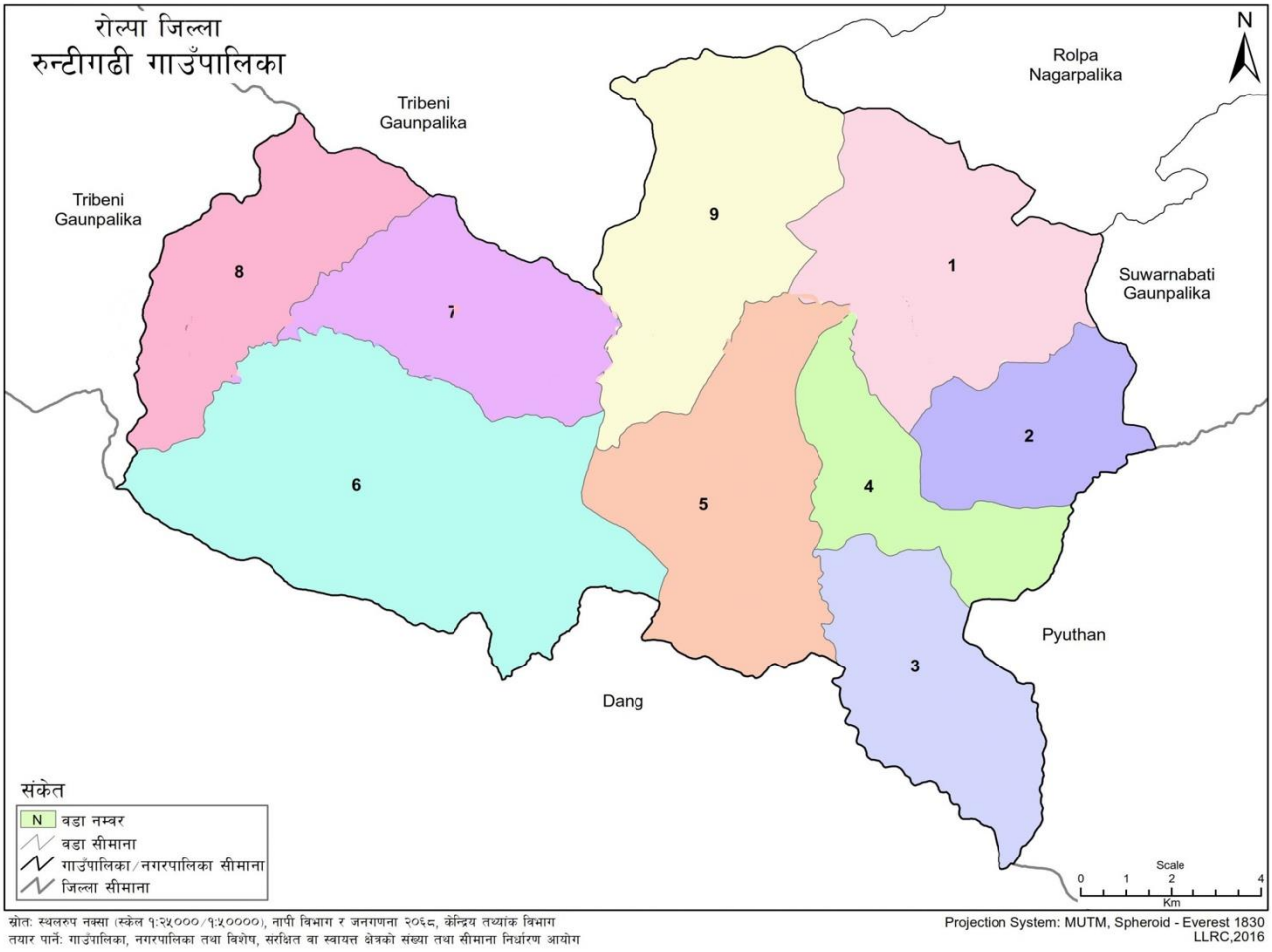


Figure 8 Geography Map of Runtigadhi Rural Municipality, Rolpa District

also could not be fulfilled in 30 minutes causing the inappropriate size of the existing storage tank. The size of the storage tank was much smaller than the demand so we needed to construct an appropriate-size reservoir tank with management for an additional water source to meet the water demand of the beneficiaries. Hence, experts need to redesign the water system considering all aspects in technical, social, financial, and sustainability perspectives as well.

This community has been practicing Operation and maintenance procedures (O&M) itself so that still scheme has been operating partially and serving water services to villagers except for some excluded groups due to the design and technical problems during the phase of design as well as construction. This community people at some level of awareness of O&M and the importance of drinking water and its interrelation to improving the livelihoods of people comparatively than Khabri community of Dang district.

Figure 9 Dam/ Intake ready for improvement

Figure 10 Useless of Reservoir Tank (RVT)

Figure 11 Queuing the beneficiaries to fetch water at the pick hour of the day

Figure 12 Accumulated rainwater in Pit for drinking purposes

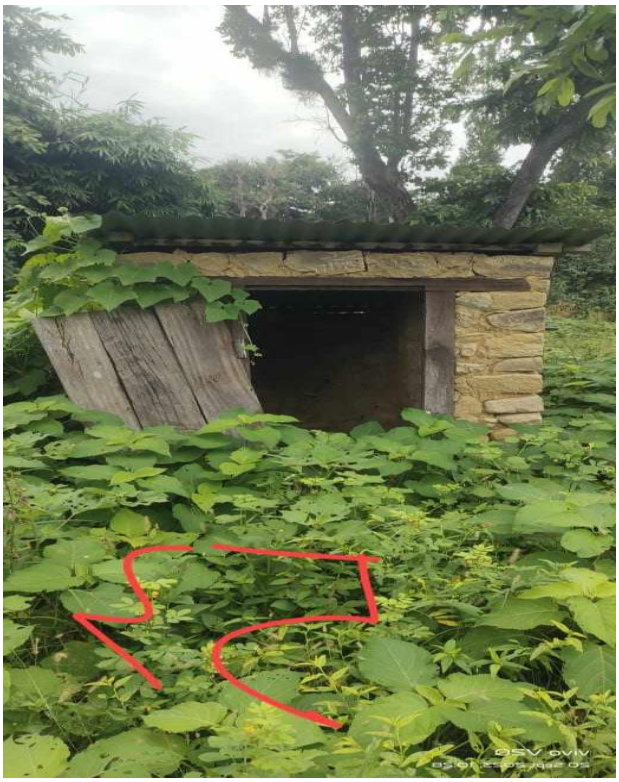


Figure 13 Toilets were useless lack of water access

Figure 14 Children collecting drinking water from the pit of acclimated rainwater

Figure 15 Toilet constructed but out of use due to water scarcity

Figure 16 Collecting water from distant rainwater accumulated pit

Figure 17 Pottering Drinking water from distinct water sources

Chapter 6: The structure of research:

This proposal falls into three main chapters; the introduction, the literature review, and the methodology.

Chapter 1: Background-

This includes a brief problem background, including the statement of the problem, aims and objectives and the scope of work, rationale for the choice of the study area, and the water supply overview in the country of the study.

Chapter 2: Research Aim and Objectives:

This chapter incorporates the research aim and objectives in more detail.

Chapter 3: Problem Statement:

This chapter incorporates the national problem statement at the policy level including the study sites where people face numerous problems in their daily lives and livelihoods causing the water crisis.

Chapter 4: Scope of the Study:

This chapter includes the scope and areas of study aligning the research aim and objectives.

Chapter 5: Study of Locations:

This chapter includes the location of this research in two areas of Dang and Rolpa district of Lumbini, Province of Nepal.

Chapter 6: Literature Review:

This chapter covered various literature reviews that were written and published by various institutions and individuals associated with this research topic. This chapter is able to cover some success stories of the water supply scheme in different parts of the country.

Chapter 7 Data Analysis and Presentation of Results:

This chapter defines the process of data collection and analysis from qualitative and quantitative perspectives towards meeting the research objectives of ensuring sustainable WASH services for outreach who are left behind from the safe and sustainable WASH services.

Chapter 8: Impact Chain and Theory of Change:

This chapter clearly defines how non – non-non-functional water systems adversely impact people's daily lives and livelihoods and highly affect all aspects of human life.

Chapter: 9 Way Forward and Recommendations:

This chapter describes in more detail the Way forward and recommendations to mitigate the non-functional water system trend in rural parts of Nepal and revive the non-functional water system by developing innovative and WASH-integrating projects and programs ensuring safe and sustainable drinking water and sanitation services for all.

Chapter 10: Conclusion:

This chapter defines and describes the overall conclusion of this research towards creating an enabling environment to revive the non-functional water systems aiming to ensure WASH services for all to achieve SDG6.

Chapter 11: Appendix

This chapter covers all of the appendices related to this research like KII Questions, Key Statements, Research Articles, Interviews, etc.

Chapter 6 Literature review:

6.1 Introduction

The Literature review- Includes approach used for literature search, keeping in mind various reputable sources, literature findings including gaps identified by the literature and linking it to the research objectives.

Review of literature is a key step in the research process. It refers to a broad, comprehensive, in-depth, systematic, and critical review of published and unpublished data literature and conceptual literature materials. It gives a depth of knowledge in the selected topic. The literature review is continued throughout the research study to learn more regarding the preparation of writing a proposal and developing instrumentation for data collection. A brief description of the literature is sources provided to give a

comprehensive perspective on the study. A review of the literature on the research topic makes the researcher familiar with the existing studies and provides information that helps to focus on particular problems and lays a foundation upon which to base new knowledge. The related literature review will be done by the respective ministry) water supply and sanitation) websites, journals, research articles, books, reports, respective organization's websites, and the internet.

6.2 Review of the Related Literature:

JMP (2021) in 2020, safe drinking water services were used by 74% of the global population, with rural and urban rates at 60% and 86%, respectively. However, 2 billion people lacked safe services, encompassing 1.2 billion with basic access, 282 million with limited access, 367 million using subpar sources, and 122 million relying on surface water. Estimates for safe services were available in 138 countries and five of eight SDG regions, accounting for 45% of the global population. To achieve universal safe service access by 2030, a fourfold increase in current progress rates is needed (10x in least developed countries and 23x in fragile contexts).

Nepal has been divided into 7 provinces as part of its political structure. When examining the reach of water supply services, a similar situation is evident across the 7 provinces. In a national context, the average coverage stands at 87.88%. However, the coverage of basic water supply services varies among the provinces. Provinces 1, 2, 6, and 7 have coverage slightly below the national average, while Provinces 3, 4, and 5 show coverage slightly above the average. Province 6 has the lowest coverage at 84.18%, while Province 4 has the highest coverage at 89.89%. This analysis indicates that there is no distinct pattern of basic water supply service coverage based on provincial divisions (DWSS, 2019).

Based on data collected from 77 districts, as of the end of the fiscal year 2074/75, around 87.88% of Nepalese households have access to basic water supply systems, marking a 4% increase from 2014. However, this growth only reflects a 1% yearly improvement,

suggesting a comparatively slower rate of service enhancement compared to other amenities prioritized by the government. Out of the 87.88% of households with basic water access in Nepal, not all solely use pipe systems. This group includes homes relying on piped distribution, tube wells, protected springs, and rainwater harvesting. Around 51.69% have piped water, 33.38% use surface and tap water, and 2.7% have upgraded springs for safety. Additionally, about 0.11% collect rainwater. Roughly 12.12% lack a basic water supply in Nepal (Managment, 2019).

In Nepal, 87.88% of households have access to basic water supply systems, but only 51.69% actually receive piped water services. Significant regional disparities exist when analyzing households using piped water systems. The province with the least piped water utilization is Province No. 2, with only 10.46% of households accessing this service. Conversely, Province No. 4 has the highest utilization at 84.23%. Beyond piped water services, tube wells are widely used by Nepalese households, accounting for approximately 33.38% of households. This practice is most prevalent in Province No. 4, where around 84.23% of households use piped water. A smaller percentage (2.7%) rely on safe natural springs and ponds. This practice is less common, even in Province No. 3. Despite geographical factors, source availability, etc., significant disparities in utilization of this system are evident across provinces. The least usage of tube wells (0.66%) is in Province No. 6, while the highest (76.91%) is in Province No. 2. The smallest number of households using safe spring and pond water is in Province No. 2 (0.47%), while the most is in Province No. 3 (5.92%) (DWSS, 2019).

Moreover, there can be seen an inequality in the distribution of water supply systems according to the ecological regions despite surpassing the millennium development goals. The data show that only the coverage of the water supply has increased but there is no strict emphasis on quality and resilience. In the hilly region of Nepal, although being most populous, the quality of water supply is poor so many people residing in the region are deprived of safe drinking water. Even in the capital city of Nepal, Kathmandu, the quality of water supplied is inadequate, unreliable, and of low quality (Hari Katuwal, 2011).

Dysfunctional systems undermine reliable, ample, and safe water supply, impacting toilet usage, hand hygiene, and overall sanitation (Budhathoki, September 2019). In Nepal, water supply schemes are struggling, with only 28.13% fully operational against basic targets (DWSSM 2019).

Water supply systems constructed over the period in the country are not well functioning and are not capable of supplying water to all taps throughout the year. NMIP (2014) reported that only 68 percent of water supply stems can supply water to all tap around the year. In terms of functionality, only 25 percent were found functioning well, and 36.1 percent can be promoted to well-functioning status through minor repair. But 9 percent water supply stem is in need of major repair, and 19 percent can function after the rehabilitation work, which is beyond the capacity of water user committees in the rural areas. Surprisingly, only 4.5 percent of the water supply systems have maintenance funds and 38 percent have kept maintenance tools on the sites (Government of Nepal Ministry of Urban Development, p. 2014). Available data indicate that about 25-40 water supply systems are not in good condition to supply water to the community in a reliable and sustainable way. Poorly functioning systems result in unreliable, insufficient, and unsafe water supply, which has a direct impact on the proper use and cleanliness of toilets and the hand-washing behavior of people.

Many reports show that the coverage of water supply has increased substantially with time, however as per the Ministry of urban development report 2014, the poor functionality of the completed schemes is the major problem. The report shows that around half of the schemes are non-functional and hence need repair and maintenance. The report also suggests that major schemes in the rural hilly regions of Nepal are constructed based on small surface and subsurface sources with very marginal dry weather and dry weather discharges which are extremely prone to even a slight change in climate and environmental situation (MOUD, 2014).

As per the data from NAPA-WASH Endline Survey, 2017, out of the total schemes surveyed in Nawalparasi and Palpa district of Nepal, 11.3% of the schemes were found to be unsustainable, 55% of the schemes were found to be partially sustainable, and 33.8% of the schemes were found to be sustainable (PHD, 2017)

Considering the current global scenario, climate change has become one of the major issues that is almost inevitable and has been affecting each and every sector, water supply and sanitation being no exception at all. Furthermore, the development of water supply schemes that are not resilient to climate change has increased the vulnerability of such schemes and has rendered them unsustainable in the long run. Climate change can create a significant alteration in the flow of water in different sources such as rivers and streams (Yogendra Mishra, 18-02-2018). Springs also come as a source of drinking water in different parts of Nepal, mostly in the hilly areas. The drying of such streams due to climate change has also become a major problem. For instance, In Tanahu district, depletion of stream, spring and point source water in 10 years between the period of 2004 to 2014 was observed to be 20, 34 and 50% respectively (RWSSP-WN, 2016). Also, the spring survey done in Nuwakot district of Nepal showed that 73.2% of the springs used as water sources had a decreased flow and 12.2% had dried up over the past 10 or more years, as recognized by local residents. In response to the severe decline of precipitation and the drying up of springs, local communities have implemented some climate change adaptation measures, such as constructing water tanks at water sources, using pipes to transport drinking water, diverting water from other springs, digging deeper wells, and traveling farther to wash clothes and fetch drinking water (Durga D Poudel, February 2017). A similar study in Melamchi showed the volume of water in the springs has decreased by 30% in the last decade (Prem Sagar Chapagani, 03.10-2017). There is no doubt that the climate change impact on water resources has led to a drinking water shortage in the hilly and mountain areas of Nepal (Namrata Chitrakar, December 2019).

Climate-induced hazards have been growing as one of the major problems for the livelihood and agriculture sector of rural parts of Nepal. Drought stress combined with

socio-political issues, gender discrimination, and unequal social structure has further exacerbated the livelihood practices of vulnerable and marginalized communities (Adhikari, 03-09-2018).

According to the recent report released by the National Management Information Project (NMIP) under the Department of Water Supply and Sewerage (DWSS), the functional status of water supply schemes exhibited notable improvement from 2010 to 2014. However, the report also highlights that despite this progress, 38.5% of water schemes remained nonfunctional in 2014 due to a range of issues (Dahal, 23-09-2020).

The community drinking water schemes in Nepal face a multitude of challenges spanning technical issues, gender equity and social inclusion (GESI), cost recovery and affordability, operation and maintenance, and institutional and legal frameworks. These problems have a profound impact on the functionality, service quality, and sustainability of the water schemes if left unaddressed. It is imperative to timely and appropriately tackle these challenges in order to mitigate their detrimental effects and establish resilient and effective community drinking water systems (Gautam & Dahal, 2020).

There are more than 38,000 water supply Schemes completed in the country. Out of that only 18 % of schemes are running smoothly. It clearly shows that more than 80 % of schemes have a problem of operation and maintenance (DWSS, 2010). In this scenario, it is needed to focus on operation and maintenance i.e. sustainability and functionality of the water supply schemes. The water sector in Nepal is currently highly non-functional and obstructs regular access to safe water for the rural communities (Dr. Anup Gurung, April 2019). In this connection, 95 percent of the population has access to basic drinking water (UNICEF, 2019) so far but there are only 28 percent of the existing water supply schemes are functioning well (NIMP, 2019). Likewise, there are 38 percent needed minor repair while about 34 percent of the schemes have been identified as needing major repair, rehabilitation, or complete reconstruction in the country (NMIP, 2019).

According to data from the Department of Water Supply and Sanitation (DWSS) in 2018, every province in Nepal lacks proper water supply facilities. The data shows that only 87.88% of households have access to at least a basic water supply, which is an improvement from 80.37% in 2010. The province with the highest accessibility to drinking water is Gandaki, with 89.92% of households having access, while the province with the lowest accessibility is Karnali, with only 84.18% of households having access. The percentages for provinces 1, 2, 3, 5, and Sudur Paschim are 85.28%, 87.85%, 89.89%, 88.57%, and 86.53% respectively. It's important to note that having access to drinking water facilities doesn't necessarily mean that all households are supplied with piped drinking water. Only 51.69% of households receive water from piped systems. There is a significant disparity among provinces in terms of piped water supply, with Province 2 having the lowest percentage of households (10.46%) accessing piped water, while Province 4 has the highest percentage (84.23%).

According to DWSS data from 2018, Nepal has approximately 42,000 large and small piped water supply schemes and 1,200,000 shallow tube-well schemes. These schemes were constructed at different times and typically have a design period of 20-25 years. However, despite the large number of schemes, many are non-functional or have already been phased out. Only 28.13% of the schemes are functioning properly, with 11,828 water supply schemes operating at full capacity. Additionally, 38.07% of the schemes can be made functional with minor repairs and maintenance, while 10% require major repairs and maintenance. Approximately 15.85% of the schemes need a complete replacement, and 7.93% have been damaged by disasters or accidents or have aged and need reconstruction.

However, according to DWSS data from 2018, out of approximately 42,000 water supply schemes, only 16,399 schemes are systematically registered, and many registered schemes do not hold necessary meetings and discussions. Only 13,526 schemes have the required technicians, and 14,533 schemes have the necessary equipment for repair and maintenance. The number of schemes with funds allocated for repair and

maintenance is alarmingly low, with only around 2,378 schemes having such provisions. (DWSS, 2018).

In rural Nepal, there are challenges with non-functional water supply schemes, including issues related to functionality, quality, and resilience. Factors such as lack of community ownership, insufficient maintenance funds, and inadequate management capacity contribute to the non-functionality of these schemes. Additionally, climate change impacts, such as water source depletion and drying of springs, further exacerbate the situation. Addressing these challenges requires community participation, technical support, improved management practices, and climate change adaptation measures to ensure functional, quality, and resilient water supply systems.

Safe water is one of the most basic human needs. Water is an essential resource for survival and good health. Access to water in the rural community plays a vital role in the overall socio-economic development (Smith et al., 2009).

A reliable water supply plays a crucial role in driving social and economic progress. The presence of accessible and quality water resources is closely tied to advancements in public health, elevated living conditions, and overall economic growth. Regrettably, a significant portion of the global population still grapples with insufficient access to an ample water supply. (UNDP, 2006).

It is estimated that 800 million people do not have access to safe drinking water. The unavailability of safe, adequate, and affordable water accessibility seriously affects the social, economic, and health conditions of a society. More specifically children and women, who are directly involved in water collecting and managing activities at household levels are more vulnerable to problems (Tefesse, 2009)

Numerous research studies have highlighted the considerable developmental challenge posed by sustaining water supply infrastructure in rural areas of developing countries, including Sub-Saharan Africa (Harvey and Reed, 2004; Hoko and Hertle, 2006; Tadesse et al., 2013; Spaling et al., 2014; Alexander et al., 2015). Over the past two decades, reports consistently indicated a prevalence of non-functional water supply points in this

region, ranging from 30% to 70% (Hoko et al., 2009; Mwnagi and Daniel, 2012; Dube, 2012). Within Zimbabwe, Hoko et al. (2009) identified 38% of water supply systems as unsustainable in Mt Darwin District, while Dube (2012) reported figures of 60–70% in Gwanda District. These unsustainable water supply systems typically exhibit prolonged periods of inactivity, frequent breakdowns, inadequate water provision, and unreliability. The prevalence of such non-functional water supply systems significantly undermines access to clean drinking water, a fundamental human right. Furthermore, this situation prompts an investigation into the reasons behind the failure and abandonment of rural water points within the communities that direly need them (Ihuah and Kakulu, 2014). As a result, an urgent need exists to assess and implement strategies aimed at ensuring the sustainability of water supply infrastructure, thus enabling the realization of enduring benefits from these investments.

The majority of Nepalese 26.4 million people are poor and more than 80 % live in rural areas (GoN/CBS 2011). The biggest challenge faced by the Government of Nepal is to provide basic human needs including the provision of a safe water supply and improved sanitation facilities to all citizens. For underdeveloped countries like Nepal, the degree of ease at which the people have access to safe water is then the indicator of the health status of the people.

The Government of Nepal (GoN) pledged to ensure basic water supply and sanitation for all by 2017, with plans to elevate services even further by 2027 (GoN, 2014). However, the national coverage for basic water supply remains at just 87.88% (GoN, 2018), highlighting a significant challenge in meeting their commitments. The challenge doesn't end there; a more concerning issue looms. Despite completing over forty-two thousand water supply projects, only 28.13% are fully operational. 38.07% require minor maintenance, 10.00% need major repairs, 15.85% demand rehabilitation, and 7.93% must be reconstructed to become operational (GoN, 2018). These figures prompt questions about the performance, functionality, and sustainability of water service providers in Nepal.

Non-operational water systems often result from insufficient implementation of water safety principles, neglect, and the users' committee's limitations in institutional, technical,

and financial capacities to handle significant repairs and funding problems (Shahi, 2017). So, for the proper functioning and sustainability of the schemes, a strong and capable UC and its proper management are important. Along with this, proper design and construction, institutional formation of the Water Supply and Sanitation Users Committee (WSSUC), technical human resources, necessary tools and materials, and required operation and maintenance funds are key components to make the scheme functional and sustainable.

The Department of Water Supply and Sewerage in Nepal indicates that 85% of Nepalese have access to drinking water, yet it's unsafe. Those in impoverished and rural areas often lack access. Remote regions rely on mountain streams, causing school delays and impacting education. The coexistence of people and animals around water sources leads to health issues, including diarrhea and typhoid, raising mortality rates and degrading the environment. Water, Sanitation, and Hygiene-related diseases persist as top causes of death in Nepal, with diarrhea being a significant threat to under-fives (Nepal WASH SDP 2015-2030). In 2009, an acute diarrhea outbreak in Jajarkot and Rukum claimed lives and was linked to polluted water due to inadequate sanitation and water scarcity ((IFRC, 2009)). Unfortunately, even supplied water isn't consistently safe, with irregular and unsystematic water quality assessments.

The spread of disease in developing countries could be reduced through better access to safe water supply, adequate sanitation facilities for the safe management of human excreta, and better hygiene practices (Shah 2008). Water-related diseases are among the top ten leading diseases in Nepal (Shah 2008). This is important, as waterborne diseases such as diarrhea, dysentery, cholera, and typhoid caused by the consumption of contaminated water, and water-washed diseases such as worm infestation and skin diseases caused by poor sanitation, account for 18% and 27%, respectively of the total outpatient department visits in Nepal (Shah 2008).

The lack of water supply to every household has resulted in great difficulties in day-to-day activities, particularly for vulnerable and marginalized communities. These communities rely on water for agriculture, animal husbandry, poultry farming, and other activities. The limited water supply hinders their income and economic growth. Merely constructing water supply projects in areas of need is insufficient for long-term success. Without proper

training for users on operation and maintenance, as well as the establishment of capable user committees, these projects are prone to failure. This issue is prevalent in Nepal, where projects often cease functioning due to minor technical problems. As a result, funds from the government and non-governmental organizations are wasted, which could have been utilized for other development initiatives. Therefore, post-handover activities, including adequate user training on operation and maintenance, as well as providing information on whom to contact in case of irreparable schemes, should be the focus of projects.

Successful and sustainable developmental activities require proper planning, a systematic approach, and accurate data to address challenges and formulate effective strategies. Non-functional water supply schemes must be thoroughly assessed based on their data, including the number of schemes, required maintenance and repair types, estimated budget, necessary human resources, and the feasibility of long-term operation. Detailed studies of such non-functional projects can help revive schemes that require less budget for repair and have the potential for long-term operation. Repairing and maintaining existing schemes can save funds that would otherwise be needed for developing new schemes. Additionally, where feasible, modifying schemes to increase their capacity can address the increasing demand for water per capita and support livelihood activities. During the repair and maintenance of non-functional schemes, comprehensive programs addressing aspects such as hygiene, sanitation, agriculture, kitchen gardening, and poultry farming can be implemented. This approach not only solves the drinking water problem but also promotes economic and overall development in vulnerable and marginalized communities, fostering a sense of ownership and responsibility for timely maintenance or engaging the community with the schemes.

The data from 2019 by the Department of Water Supply and Sewerage Management shows that only 51.69% of the total population has piped water system coverage, however, the remaining 48.31% of people are relying on non-piped water systems like tube wells and other sources managed by private and local sectors. Even after achieving the water supply-related millennium development goal, by analyzing the type of facility

provided, non-piped water supply coverage increased from 36% in 2000 to 44% in 2017 as per the report (JMP, 2019).

Also, when analyzed according to the service level, it is found that during the period of 20 years, the percentage of safely managed improved water supply sources has decreased from 24% to 18% (JMP 2021).

Moreover, there can be seen an inequality in the distribution of water supply systems according to the ecological regions despite surpassing the millennium development goals. The data show that only the coverage of the water supply has increased but there is no strict emphasis on quality and resilence. In the hilly region of Nepal, although being most populous, the quality of water supply is poor so many people residing in the region are deprived of safe drinking water. Even in the capital city of Nepal, Kathmandu, the quality of water supplied is inadequate, unreliable, and of low quality. (Katuwal & Bohara 2011).

Several factors can influence the functionality and sustainability of the water supply schemes. Major factors include the ownership of the project by the local people and user groups, the management capacity of such user groups and committees, the availability of operation and maintenance funds for the scheme, the skills of the people involved in the committee, the availability of tools and spare materials necessary for operation and maintenance and repair as well.

As per the data from NMIP (2014), out of the total water supply schemes, only 25.4% of the schemes are well functioning. 36.1% of the schemes need major repair and 9.2% of the schemes need minor repair. Moreover, 8.6% of the schemes need reconstruction and 19.8% of the schemes need rehabilitation. Only 0.9% of the schemes are completely non-functional Also, considering the condition of water tap stands, 78.4% of the schemes are functioning well and hence need no repair, 5.1% of the schemes need minor repair and 16.5% of the schemes need major repair (Government of Nepal, Department of Water Supply and Sewerage , October 2014).

Many reports show that the coverage of water supply has increased substantially with time, however as per Ministry of urban development report 2014, the poor functionality of the completed schemes is the major problem. The report shows that around half of the schemes are non-functional and hence need repair and maintenance. The report also

suggests that major schemes in the rural hilly regions of Nepal are constructed based on small surface and subsurface sources with very marginal dry weather discharges which are extremely prone to even a slight change in climate and environmental situation (Government of Nepal,Ministry of Urban Development, 31-12-2014).

As per the data from the NAPA-WASH Endline Survey (Prasad, 2020), 2017, out of the total schemes surveyed in Nawalparasi and Palpa district of Nepal, 11.3% of the schemes were found to be unsustainable, 55% of the schemes were found to be partially sustainable, and 33.8% of the schemes were found to be sustainable. (NAPA-WASH Endline Survey, 2017).

Considering the current global scenario, climate change has become one of the major issues that is almost inevitable and has been affecting each and every sector, water supply and sanitation being no exception at all. Furthermore, the development of water supply schemes that are not resilient to climate change has increased the vulnerability of such schemes and has rendered them unsustainable in the long run. Climate change can create a significant alteration in the flow of water in different sources such as rivers and streams. (Mishra *et al.* 2018). Springs also come as a source of drinking water in different parts of Nepal, mostly in the hilly areas. The drying of such streams due to climate change has also become a major problem. For instance, In Tanahu district, the depletion of stream, spring, and point source water in 10 years between the period of 2004 to 2014 was observed to be 20, 34 and 50% respectively (RWSSP-WN 2016). Also, the spring survey done in Nuwakot district of Nepal showed that 73.2% of the springs used as water sources had a decreased flow and 12.2% had dried up over the past 10 or more years, as recognized by local residents. In response to the severe decline of precipitation and the drying up of springs, local communities have implemented some climate change adaptation measures, such as constructing water tanks at water sources, using pipes to transport drinking water, diverting water from other springs, digging deeper wells, and traveling farther to wash clothes and fetch drinking water. (Poudel D. & Duex W. T. 2017 Vanishing springs in Nepalese mountains: assessment of water sources, farmers' perceptions, and climate change adaptation. Mountain Research and Development 37 (1), 35. https://doi.org/10.1659/mrd-journal-d-16-00039.1). A similar study in Melamchi

showed the volume of water in the springs has decreased by 30% in the last decade (Chapagain et al. 2017). There is no doubt that the climate change impact on water resources has led to a drinking water shortage in the hilly and mountain areas of Nepal (Gurung et al. 2019).

Climate-induced hazards have been growing as one of the major problems for the livelihood and agriculture sector of rural parts of Nepal. Drought stress combined with socio-political issues, gender discrimination, and unequal social structure has further exacerbated the livelihood practices of vulnerable and marginalized communities. (Adhikari 2018).

6.3 Success stories:

The success stories have been captured from various sources, especially from the internet. Research has been able to include some success schemes in the dissertation. These schemes have been successful in terms of sustainability perspectives because these schemes are still operating in a systemic way and these schemes' user committee has been operating the system institutionally based on the well O&M plan and practice. The Gorkha Integrated Rural Water Supply and Sanitation Project constructed in Gorkha District: The Gorkha Integrated Rural Water Supply and Sanitation Project aimed to address water scarcity and sanitation issues in rural areas of Gorkha district. The project included the revival of non-functional water supply schemes through repair, upgrade, and maintenance activities. The project also emphasized community mobilization, capacity building, and awareness campaigns. By making the non-functional water supply schemes functional, the project provided sustainable access to clean water, improved hygiene practices, and reduced water-related diseases in rural communities.

The Ramechhap Rural Water Supply and Sanitation Project successfully revitalized non-functional water supply schemes in various rural areas of Ramechhap district. The project involved repairing and upgrading the existing infrastructure, including water sources, pipelines, storage tanks, and distribution systems. Through community engagement, technical expertise, and support from local authorities, the project restored the water

supply, ensuring reliable access to clean water for rural communities. This had a significant impact on health, sanitation, and overall quality of life.

The Bajhang Rural Water Supply and Sanitation Project aimed to address water scarcity and improve sanitation facilities in rural areas of Bajhang district. The project involved rehabilitating non-functional water supply schemes, constructing new infrastructure, and promoting hygiene and sanitation practices. Through active community participation and collaboration with local stakeholders, the project successfully revived the non-functional water supply schemes, providing reliable water access to the rural population. This led to improved health, hygiene, and socio-economic development in the region.

The Dailekh Water Supply and Sanitation Project focused on revitalizing non-functional water supply schemes in rural areas of Dailekh district. The project involved repairing and upgrading the water infrastructure, constructing storage tanks, and expanding the distribution network. Through community mobilization and technical support, the project restored the non-functional water supply schemes, ensuring consistent access to clean water for rural communities. This brought about positive changes in health, sanitation, and overall well-being.

These success stories highlight the efforts made to revive non-functional water supply schemes in rural Nepal, emphasizing community involvement, technical expertise, and collaboration with local authorities. By addressing infrastructure challenges and ensuring sustainability, these projects have had a transformative impact on water availability, hygiene, and the overall quality of life for rural populations.

Chapter 7 Data analysis and presentation of results:

The required data will be collected using different sources, such as observations at project sites, key informant interviews, focus group discussions and interviews, and discussions and interviews with key stakeholders (Government entities, NGOs, INGOs, CBOs, Private sectors, etc.), consultants, academia, existing sources, and literature reviews. We will collect both types of data, qualitative and quantitative, using different

techniques and skills so that my thesis can be made more rational and constructive, which can be helpful to policymakers, researchers, development workers, and WASH practitioners who are working in the field of Water, Sanitation, and Hygiene (WASH).

7.1 Collected data from the study location

I have collected the quantitative and quantitative required data using the above-mentioned process and techniques with proactive participation from all segments of the community people, water user committee, key stakeholders in the district and municipality level, WASH experts, government officers, INGOs, NGOs, CBOs, and people from the private sectors. I have noted down the collected data in the table.

Data type, source, and collection tools:

Qualitative and Quantitative will be collected based on the fowling Data Research Questions	**Source of data**	**Data collection and analysis methods**
What are the major root causes of the non-functionality of the water supply and sanitation system? Who are the responsible and accountable persons for the proper operation and maintenance of the existing water system? Is the system fully or partially dysfunctional if fully how long has the system been useless? What and how do you think about reviving the system? Do you have any concerns or suggestions on the government WASH act, policies, and regulation? so that existing system can be run and use long term .	Primary data/Secondary data	KII with an in-depth interview with the water leader, users, water user committee, WASH practitioner, government officials, representatives of INGOs, NGOs, CBOs, private sector, academia, researcher, women leader, youth member,

		child clubs, on-site observation, etc.
What is the drinking water and sanitation service in your schools and other institutions? Are you satisfied with these services? Are all the WASH facilities like toilet, hand washing stations being used and maintain properly with regular access of water and other essentials goods ? Do you use the available water for kitchen gardening, vegetable production, poultry farming and others IGA initiatives ? How water crisis problem affected in your daily lives and livelihoods and how can you relief from these problems ? Are the communities people affected by waterborne diseases like diarrhea, typhoid, cholera etc. and how many children and elderly people have died in last year ? What is your opinion on the misused of huge amounts of money in the context of dozens of drinking water and sanitation projects being completely non-functional and people are suffering from basic drinking water ? What is your suggestion to government and development actors about the problems of non-functional water systems and its revive to access water service for deprived people?	Primary data/Secondary data	Questionnaires, interviews with school children and school management committee, FGD, KII Remote, consultation with experts of concerned stakeholders, analysis of case studies and reports.

Are communities happy with the existing water supply and toilets and other sanitation facilities services in terms of sustainable use?		
What are the existing practices in operation & maintenance (O&M) in water supply and sanitation system ?	Primary data/Secondary data	Questionnaires, KII Remote interview, consultation with respective person.
What are the technical and non-technical issues pertaining to non-functional of the water supply and sanitation systems ? What is your suggestion to sustain the existing water supply and sanitation systems and revive the non-functional water system to ensuring water services for the villagers ? Can you express your opinion that how disaster and climate change affecting water sector in Nepal ?	Primary data/Secondary data/Literature review	Questionnaires, KII Remote interview, content analysis and case study

7.2 Khabri Community of Gadhawa Rural Municipality Ward No 6, Dang District

Explore areas of the existing water supply system	Water Supply	Toilet	Sanitation and Hygiene	Impacted lives and livelihoods	Remarks
Existing water supply conditions	Partially function Only 2 Taps stand operating out of 19 as a result remaining HHs using distant water sources and accumulated rain water in the muddy pit.	50 % toilets were not functioned due to the lack of water 50% Toilet has been operating with limited water access so toilets are very dirty and nasty	Household and village sanitation status is poor. The personal hygiene status of the people is more dangerous level (fewer people have been practicing hand washing with soap in the critical time)	Nobody practices kitchen gardening and vegetable farming Almost people are depending on vegetable market but those huge lands are barren in to converting grazing area	90 % scheme is almost non-functional Child nutrition condition is not satisfactory due to the nutrient vegetables
Lives of people	90% people suffering from safe drinking water and	The nation was declared open defecation free (ODF) state	90% people are suffering from the various water	Almost community people do not practicing	The local people lives and livelihoods is highly

	improved sanitation services in each single day. Especially, women's and children's are spending half of the day for fetching drinking water. They could not have a time to reading and writing as well as go to school for education. Similarly, women could not have a time to do income generation activities and support to theirs children's education.	without complete the minimum requirements consequently people have no option to open defecation lack of water access and improved toilets so reverting back to ODF in this community	borne diseases : Diarrhea, typhoid, cholera etc. using pollutant water and School children and people are aware about the importance of hand washing with soap in critical time but they do not able due to the lack of water access. Many children's are affecting various water born disease and 11	kitchen gardening and vegetable farming so theirs money has been spending vegetable and other food items so that theirs economic status going to down each day as well as they spending huge money for treatment of children's and themselves.	disturbances and hampered by non-function water systems because its impact's on human health, livelihoods means agriculture, livestock, school children education even in the whole society development and prosperous due to the lack of water access. One of the interesting thing is domestic cattle: Cow, buffalo and goats also

			children were death in last year due to the water born disease.		suffering from drinking water in each single day in this community as a result domestic animal could not thrive according to theirs growth systems so its also affected productivity of all kinds amical productions: Milk, Meat, ghee etc.
Livelihoods of people	Most of the livelihoods options are break causing water scarcity which are associated with water. No water no everything's.	We can't envision a healthy society without healthy people so people could not be healthy without the use of toilets.	People cannot work perfectly without healthy so people could not be healthy without proper	If people are healthy can do everything. without healthy people, we can't imagine sustainable livelihoods in the community	Water impacts every area of living beings directly and indirectly including humans. So, should ensure water accessibility for the well-being

			sanitation and hygiene.		of the people and other living beings.
Health of people	Every living being can’t survive without water so water access is a fundamental right of the people which is guaranteed by a constituent of the Nepal government and human rights.	A toilet is a place where disposal human waste A toilet is one of the most important factors to measure the house's value and dignity. we can’ imagine a civilized house without provisions for toilets.	Sanitation and hygiene are the behavior of humans that need to practicing right way regularly to maintain the clean me and Mine community principle for a fully sanitized and civilized society.	Water and sanitation are the major elements for healthy and wealthy people so it's important for everything to work something better. If we are not healthy we cannot do anything this is reality.	Water and sanitation is the heart of healthy and wealthy people like the snow of a mountain. without snow mountains transform into hills so water and sanitation is a key element for the better of the people its impact everything in human life in areas of health, education, livelihoods, economics, social culture, value and

					dignity, and overall well-being of the society across the nation.
Value for Money (In terms of investment perspectives)	Invested NPR 925,000 in 2015 Cash From Parliament Development fund and IPAD. The Community Contributed value of the amount NPR 1,050,000	Total invested cost for toilets in the community Households and institution NPR: 5,500,000	No investment separately for sanitation and hygiene promotion in this community		As of now community people only 15% return income have been received from this scheme up to 7 years after construction.
Adverse impact on HHs economy	No water there is fully closed the doors of economic oppournities associated to water access	People have been spending huge money for treatment causing waterborne disease	People do not have healthy lives absence of proper sanitation & hygiene	Every aspects of human lives and livelihoods are highly impacted lack of water access	No water nothing else of human life as a result county could not stand stable and prosperous.

7.3 Gothiban Community Runtigadhi Rural Municipality Ward No 6 Rolpa

Explore areas of the existing water supply system	Water Supply	Toilet	Sanitation and Hygiene	Impacted lives and livelihoods	Remarks
Existing water supply conditions	Partially function Only 20 Taps stand partial operating out of 45 and 4 taps stands are fully non-functional as a result remaining HHs using distant water sources and accumulated rain water in the muddy pit.	35 % of toilets were not functioning due to the lack of water 65% Toilet has been operating with limited water access so toilets are very dirty and nasty	Household and village sanitation status is poor. The personal hygiene status of the people is more dangerous level (fewer people have been practicing hand washing with soap in the critical time)	Nobody practices kitchen gardening and vegetable farming Almost people are depending on vegetable market but those huge lands are barren in to converting grazing area	70 % scheme is almost non-functional Child's nutrition condition is not satisfactory due to the nutrient vegetables because of there are no kitchen gardening and vegetable production practices.
Lives of people	50% people suffering	The nation was declared	65% people are suffering	Almost community	The local people lives and

	from safe drinking water and improved sanitation services in each single day. Especially, women's and children's are spending half of the day for fetching drinking water. They could not have a time to reading and writing as well as go to school for education. Similarly, women	open defecation free (ODF) state without complete the minimum requirements consequently people have no option to open defecation lack of water access and improved toilets so reverting back to ODF in this community	from the various water borne diseases : Diarrhea, typhoid, cholera etc. using pollutant water and School children and people are aware about the importance of hand washing with soap in critical time but they do not able due to the lack of water access. Many children's are affecting various water born disease and 14 children were death in last year due to the water born disease.	people do not practicing kitchen gardening and vegetable farming so theirs money has been spending vegetable and other food items so that theirs economic status going to down each day as well as they spending huge money for treatment of children's	livelihoods is highly disturbances and hampered by partial function water systems because its impact's on human health, livelihoods means agriculture, livestock, school children education even in the whole society development and prosperous due to the lack of water access. One of the interesting thing is domestic cattle: Cow, buffalo and goats also suffering from

	could not have a time to do income generation activities and support to theirs children's education.			and themselves.	drinking water in each single day in this community as a result domestic animal could not thrive according to theirs growth systems so its also affected productivity of all kinds amical productions: Milk, Meat, ghee etc.
Livelihoods of people	Most of the livelihoods options are break causing water scarcity which are associated with water. No water no everything's.	We can't envision a healthy society without healthy people so people could not be healthy without the use of toilets.	People cannot work perfectly without healthy so people could not be healthy without proper sanitation and hygiene.	If people are healthy can do everything. without healthy people, we can't imagine sustainable livelihoods in the community	Water impacts every area of living beings directly and indirectly including humans. So, should ensure water accessibility for the well-being of the people and other living beings.

Health of people	Every living being can’t survive without water so water access is a fundamental right of the people which is guaranteed by a constituent of the Nepal government and human rights.	A toilet is a place where disposal human waste A toilet is one of the most important factors to measure the house's value and dignity. we can’ imagine a civilized house without provisions for toilets.	Sanitation and hygiene are the behavior of humans that need to practicing right way regularly to maintain the clean me and Mine community principle for a fully sanitized and civilized society.	Water and sanitation are the major elements for healthy and wealthy people so it's important for everything to work something better. If we are not healthy we cannot do anything this is reality.	Water and sanitation is the heart of healthy and wealthy people like the snow of a mountain. without snow mountains transform into hills so water and sanitation is a key element for the better of the people its impact everything in human life in areas of health, education, livelihoods, economics, social culture, value and dignity, and overall well-being of the society across the nation.

Value for Money (In terms of investment perspectives)	Invested in 2005 NPR 280000 Community contribute value NPR. 1.500,000	Invested in 2005 NPR 3,500.000	There are no separate investment for sanitation and hygiene promotion so less people aware about the sanitation and hygiene program		55 % investment gained community people span of the 17 years of construction.
Adverse impact on HHs economy	Community people are suffering getting basic needs of drinking water thus they could not been think about other IGA initiatives	65 % households toilets are functioning with poorly managed lack of water and cleanness status is very worst so this is a sources for production of waterborne and sanitation	Sanitation and hygiene status is very poor in this community because 55% people suffering from water born disease like diarrhea, typhoid, cholera etc. in each single year during the time of dry season.	14 children were die in last year causing waterborne disease and higher number of people are suffered as result huge of money and time was spending for the required treatment.	Water scarcity highly impacted every aspects of the people like education, health and nutrition, livelihoods, household/ local economy, develop skill and smart manpower, smart village towards civilized and prosperous country.

		related disease.			

Chapter 8 Impact and Theory of Change :

Water is an essential commodity for all beings not only humans it is also important to maintaining the ecosystem in this fragile condition due to the global warming of climate change. Water impact each and every part of human being including nature. Water access is a fundamental and inevitable part of all kinds of being including human. I have also described the water impact chain below and described in detail the impact chain how water impacted every aspect of human lives and livelihoods. With no water, there is nothing else livelihood opportunities like agriculture and vegetable production, livestock, income generation, and water-associated services such as irrigation, electricity other social and productive infrastructures.

Whereas water access, all doors are open for opportunities there is water good education for children, good human health, promoting livelihood activities, income generation, and improving nutrition of the people by promoting vegetable and fruit production. Therefore water is a prominent part of a smart city for smart people toward a prosperous nation and happiness of people. In this critical situation, proper use of water technology and practices are highly admired and respected for mitigation of flood and landslide disasters and fighting against climate change.

This research document also incorporates the theory of change to achieve this research aim and objectives means of ensuring the revival of functional water systems for secure safe drinking water access for those who are still falling behind in the basic needs of water and all of the aspects are highly hit by the water crisis. The theory of change comprehensively defines and guides appropriate strategy to achieving a meaningful result aligning the aim of this research. The theory of change is one of the guiding tools and pilots of the Aeroplane to land at the right destination. Thus, This research is able to define

the theory of change to fulfill the dream of people who are seeing good dreams of access to water in their home premises.

8.1 Nepal Government Practices Approaches in the WASH Sector

The government of Nepal has recognized the importance of an integrated approach to health in Water, Sanitation, and Hygiene (WASH) and has taken several initiatives to support and promote such integrated programs but current efforts are not sufficient to meet the WASH and health targets. Here are some ways in which the Nepal government supports this approach and has been practicing it.

1. **National WASH Policies and Strategies:** Nepal has developed national policies and strategies related to WASH that emphasize the integration of health components. These policies provide a framework for the implementation of integrated programs that address both water and sanitation issues as well as their direct impact on public health consisting of waterborne diseases.

2. **Sector Coordination Mechanism:** The government has established coordination mechanisms between relevant ministries and departments to ensure a coherent and integrated approach to WASH but this is not enough in this sector because many WASH initiatives are non-progressive causing a gap between sector coordination and communication. Collaboration between the Ministry of Health and Population and the Ministry of Water Supply and Sanitation, among others most needed in more height to help streamline efforts and resources.

3. **Resource Allocation:** The government allocates budgetary resources for WASH programs that include health components. This funding is used to implement projects aimed at providing access to clean drinking water, improved sanitation facilities, and hygiene promotion, all of which contribute to better health outcomes. However, allocated resources are not sufficient to meet the WASH and health targets of the nation.

4. **Capacity Building:** The government invests in capacity building and training programs for healthcare workers, community health volunteers, and WASH practitioners to ensure they have the knowledge and skills to integrate health considerations into WASH interventions effectively.

5. **Community Engagement:** Nepal's government encourages community participation and empowerment in WASH programs. Local communities are involved in decision-making processes and the planning, implementation, and

maintenance of WASH infrastructure. This approach ensures that WASH initiatives meet local health needs.

6. **Hygiene Education:** The government, in collaboration with non-governmental organizations (NGOs) and international partners, conducts hygiene education and behavior change campaigns. These programs aim to promote good hygiene practices at the community level, which has a direct impact on public health.

7. **School WASH Programs:** The government recognizes the importance of WASH in schools and has implemented programs to improve water and sanitation facilities in educational institutions. This supports the health and well-being of students and promotes gender equity in education.

8. **Disaster Preparedness:** Given Nepal's vulnerability to natural disasters, the government includes WASH components in disaster preparedness and response plans. Access to clean water and sanitation is critical during emergencies to prevent disease outbreaks.

9. **Monitoring and Evaluation:** The government and its partners engage in regular monitoring and evaluation of WASH programs to assess their impact on health outcomes. Data collected helps in making evidence-based decisions and refining interventions.

10. **International Collaboration:** Nepal collaborates with international organizations, UN agencies, and donors to access technical expertise and financial support for integrated WASH programs. These partnerships enable the scaling up of efforts and the implementation of innovative approaches.

11. **Policy Advocacy:** The government advocates for WASH policies at international forums and aligns its efforts with global initiatives like the Sustainable Development Goals (SDGs) to garner support and resources for integrated WASH programs.

In summary, the government of Nepal recognizes the importance of an integrated approach to health in WASH and has developed policies, allocated resources, and implemented various initiatives to support this approach. These efforts aim to improve public health outcomes by addressing water and sanitation challenges comprehensively and collaboratively. Likewise, NGOs and INGOs support the integration of health into WASH by educating communities, building sanitation infrastructure, collaborating with healthcare providers, and responding to emergencies with clean water and sanitation provisions.

8.2 How to impact Water and Sanitation in every aspect of the People

No Health & Nutation

Figure 18 No Water Nothing Else

Poor Economy

No Education

No Agriculture, No Livestock

Possible Livelihoods

Lighting City

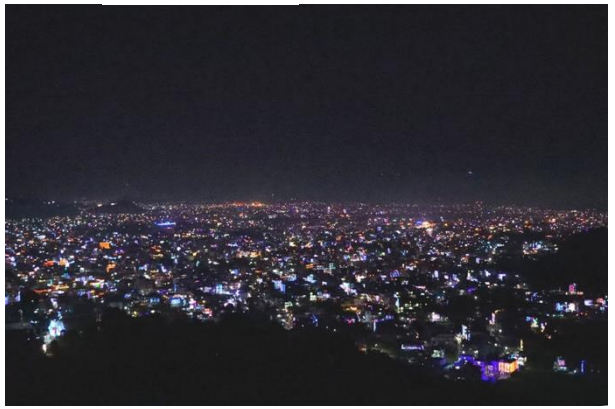
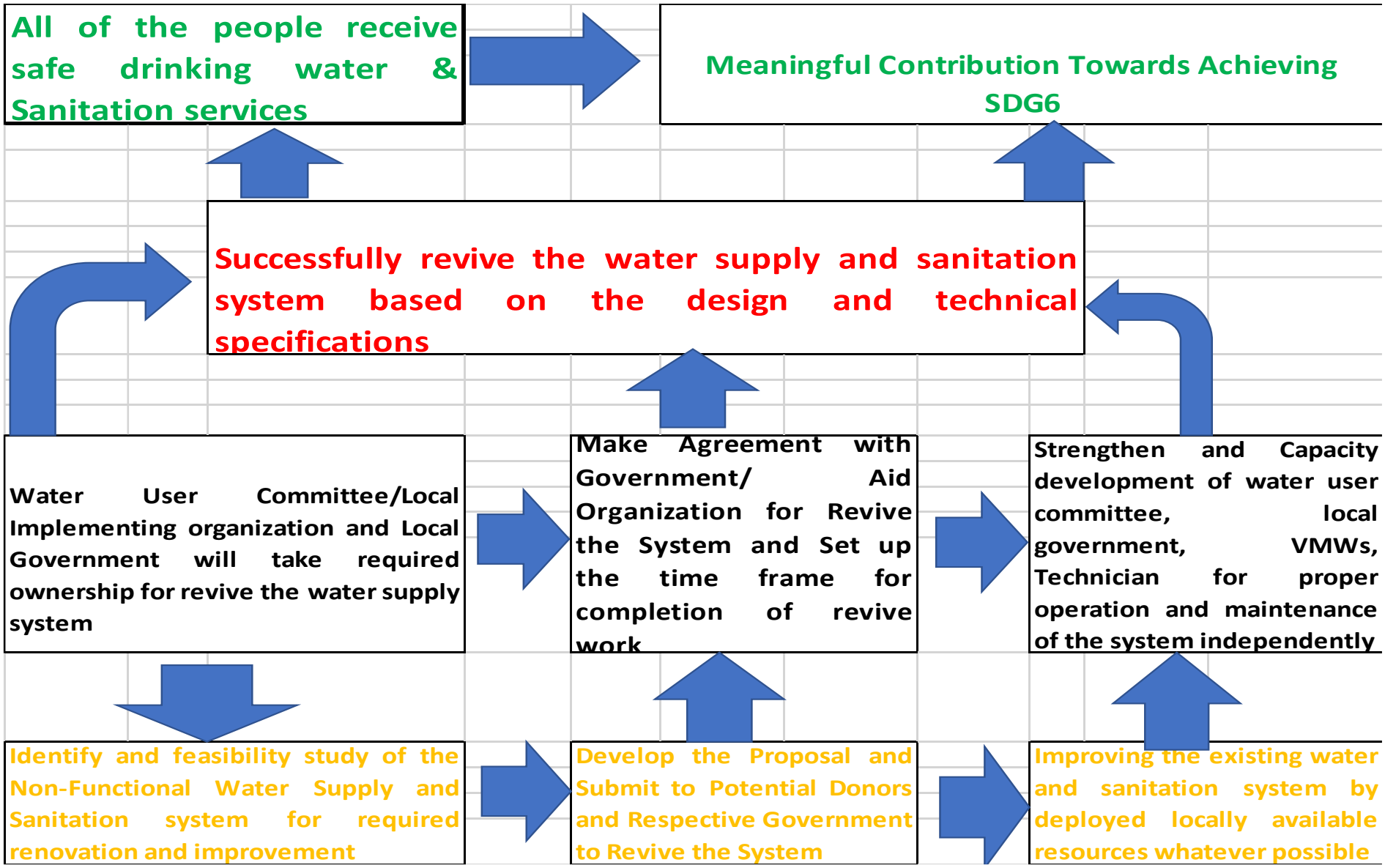


Figure 19 Impact Chain Having Water Everything are Possible

Good Education and Good Health

Sustain Economy

8.3 Theory of Chang



CHAPTER 9 Way Forward and Recommendation:

These kinds of water supply and sanitation problems across the country despite that 97.10 % of people have access to improved drinking water services similarly 93.8% have access to improved sanitation and 98.5 % have access to hygiene services as per the JMP report 2019 and SDG updates 2023 (2023, 2023). However, real situations are some differences in many communities against the JMP report. For instance, my studies project sites where 80% of households have not access to basic water services in the community of Khabari and 55% of households have not access to basic water services in the community of Gothiban in Runtigadhi rural municipality of Rolpa district of Nepal. Simultaneously, 25 % of households do not have access to toilet services in Gothiban community and 15% of households do not have access to toilet services in Khabari community of the Dang district. In this context, very hard to achieve SDG by 2030 but it would not be impossible if the government of Nepal took action to accelerate 6 times more than now for the revival of the nonfunctional water systems and construction of new water supply and sanitation projects in needy areas for the deprived people who are still left behind from the drinking water and sanitation services. The People's lives and livelihoods are highly affected by lack of water and sanitation services As a result community's overall growth is going down and all of the household's economic indicators are highly shrinking. Here are some ways forward and recommendations to address these water and sanitation-related genuine issues to ensure safe water and sanitation services for all considering this fact and the above-mentioned causes which are described in more detail below.

9.1 Role and Responsibility of Government Entities:

Three tiers of government of Nepal have prominent roles and responsibilities for access to safe water and sanitation for all of the people of the country in better partnership and coordination between three tiers of government bodies. This is the most important to the overall cycle of the water supply and sanitation programs: planning and developing, implementation, monitoring, evaluation and learning, successful completion with the sustainability of the programs by proper operation and management of the water supply

and sanitation program taking full ownership for the long term run of the program so that all of the beneficiaries could have access safe water and sanitation services under the theme of SDG6. At present, unprecedented lack of coordination and communication between three types of government bodies (Federal, provincial, and local) As a result many water supply and sanitation schemes are stranded because of a lack of ownership from the concerned institutions and individuals. On the other hand, many international organizations and NGOs have been supporting in WASH sector aiming for access to safe water and sanitation services for unreached people and supporting the Nepal government in achieving SDG6 but unfortunately, the result has not been achieved accordingly and duplication also has not been mitigated due to the clear role and responsibility of the three tires of government authorities to supervision and monitoring of the WASH activities and WASH implemented institutions. However, the Nepal government has approved national WASH Strategy 2080 (2023) for achieving SDG6 towards ensuring safe WASH services for all by B.S.2100 (2043) (Supply, 2080).

9.2Lack of Financial Resources:

Financial resources are one of the major parts of achieving the desired results in the WASH sector. The Nepal government has required US$ 966.66 Million each year and this figure will last up to 6 years by 2030 but the Nepal government's allocated budget is decreasing order to previous years and demand. The government allocated US $ 211 Million for the fiscal year 2080/2082 ((SEIU), 2016). So, how we can achieve the SDG target by 2030 with a decreasing budget trend in the WASH sector? Therefore, financial resources management is a very crucial part of the Nepal government in each sector including WASH to achieve SDG targets by 20230. The budget deficit gap is very high (US$755 million in 2022/2023) so all of the concerned stakeholders should high key attention to managing financial resources from all of the sources such as three tires of government, international aid and donor organizations, NGOs, CBOs, private sector investment, multinational cooperation, banks, and financial institutions, Public-private partnership (PPPs), community contribution whatever possible from various sources otherwise very hard to achieve the SDG targets within the setup time frame. The financial challenge is a greater challenge to the concerned ministry and government of Nepal to achieve the targets milestones of SDG. We can imagine that a vehicle could not run a

meter distance without a liter of investment in gas/oil/energy thus without finance we can't do anything but we can do something good by using the required financial resources.

9.3 Aid Organizations, Donors, NGOs, CBOs, and private sector roles and responsibilities:

Those organization's roles and their contribution are also vital to achieve desired results. The government cannot able to achieve this ambitious result without proper partnership with other concerned stakeholders who have been supporting the sector of WASH for many years in Nepal. The government has already promulgated a national WASH strategy 2080 (2023) which is that guiding and encourages international investment in Nepal in the WASH sector via different ways: Grants, donations, private investments through INGOs, NGOs, CBOs, private sectors, multinational cooperation, business groups, etc. so that Nepal could have received the required fund to accelerating the WASH interventions towards achieving the SDG targets within set up time fame.

The government has still no productive strategy and plan for supervision and monitoring the INGOs and NGO activities even in the WASH sector. Consequently, many organizations have been working in the many communities across the country in their own way means of without proper supervision and monitoring from the concerned government entities so their development activities could not align with the Nepal government plan and priorities thus their efforts could not have contributed to SDG targets. Therefore, the government needs to develop a strong and appropriate plan to monitor INGOs, NGOs CBO activities so that such kinds of organizations can support and align national priorities under supervision and monitoring of the government mechanism. Their contributions can meaningful changes in the targeted people and contribute to achieving national targets. In addition, many duplications can be seen on the grounds such kinds of INGOs and NGOs have been working in their own way As a result national targets could not be achieved as per the desired plan due to the duplications between such kinds of organization's activities so these duplications should be fully avoided by proper supervision and monitoring from the government authorities.

The public-private partnership (PPP) model is also essential in the WASH sector and should be executed effectively and efficiently because without public and private contributions any kind of project/program is not complete so concerned government

bodies and other stakeholders need to encourage respective people and parties build the public-private partnership (PPP´s) for accelerating the WASH initiatives to ensure safe water and sanitation services for all so that each and every citizen's improv theirs lives and livelihoods using safe WASH services. They can develop civilized, healthy, and smart communities using WASH services systematically, which means WASH services will be operating sustainably and people will benefit forever from the proper operation and maintenance of the WASH projects based on the developed and approved O&M Plan and execution policy. I think donor organizations are more focused on progress data than reality so how we can make a similarity between reality and donors' progress data we need to revise it in terms of relevancy.

9.4 Fulfilling gap in Sector and inter-sector Coordination and Cooperation

Sectorial coordination and cooperation have not been admirable in the present between government bodies because of vague of the vague roles and responsibilities of the different levels of government bodies. So, I think some of the acts and policies need to be revised and developed in the WASH sector to accelerate WASH initiatives so that every citizen can receive safe WASH services according to the defined by the constitution of the Nepal government article 35 (4) recognize that every citizen right to access clean drinking water and sanitation. Sectorial coordination and cooperation have also seen the gap in the present but the Government's national WASH strategy highly mentioned this issue problem is still seen in the implementation so the sectorial ministry and Department of Water Supply and Sewerage need to take the required action to execution the national WASH stagey and develop an appropriated action plan to establishing and maintaining strong coordination and cooperation between sectorial bodies of different level Nepal government bodies. Some of the roles and responsibilities also are not clearly defined for the three tires of government so the concerned authorities are not able to deliver quality services due to the indistinct roles and responsibilities. For instance, regarding the registration of the water user committee, we registered the water user committee to the district-level water resources committee before reforming the administrative structures in 2015 which was led by the chief of the district officer. But now after the last time administrative restricting Nepal in 2015, there is not clearly mentioned which government bodies are responsible for the registration of the water user committee so three tires of

government bodies are confused about it and unknown about the registration of the water user committee. in this situation, the scheme could not run long-term, and anyone is not responsible for ownership and proper operation and maintenance of the water supply and sanitation scheme thus we can't imagine for sustainability of the scheme and legal recognition without registration to the authorities body of the government. This is an example that is highlighted in this document but many cases exist in the WASH sector due to the indistinct role and responsibilities of the three tiers of government bodies.

9.4.1 Inter-Sector Coordination and Cooperation

Intersection coordination and cooperation are also pivotal to achieving the milestones in WASH and ensuring the WASH initiatives in more sustainable considering disaster risk reduction and management (DRRM) and climate change aspects in WASH. DRRM and climate change adaptation are two sides of a coin in WASH so designers and implementers are highly serious about it otherwise WASH initiatives could not be sustainable without considering DRRM and the climate change aspects when designing and implementing the phase of the WASH initiatives. In this line, intersectoral coordination and cooperation are most essential between the inter-sectoral level of ministries in federal and provincial, departments, offices, and all levels of government, For example, the WASH sector needs to develop appropriate plans to boost better relationships and maintain good relationships with other sectorial ministries and departments such as Ministry of forest and environment, ministry of energy, water resources, and irrigation, ministry of agriculture and livestock development, ministry of law, justice and parliamentary affairs, ministry of education, science, and technology, ministry of finance, ministry of health and population, ministry of physical infrastructure and transport, ministry of urban development and others as per the requirement in terms of access to safe water and sanitation services for all of the citizens of Nepal. The Ministry of Water Supply can't do anything better way lonely without coordinating and cooperating with other inter-sectorial ministries and its downstream bodies. in this manner, there need to be better coordination and cooperation for a sustainable solution towards sustainable development in the sector of WASH.

In the current scenario, Nepal's spring sources are drying up rapidly, and underground water levels are depleting unexpectedly in a terribly scary way Simultaneously

deforestation activities going on this way and forest land has been encroachment on by people to improve their livelihoods as well as climate change highly affected to people and people livelihoods through different corners such as rising temperature, melting mountains, and outburst the glaciers lakes in the highly melting ratio of snows in the mountain regions. Therefore, all of the aspects related to disaster, deforestation, climate change, and others should be addressed and considered together in response to WASH initiatives for sustainable solutions in terms of sustainability perspectives.

9.5 Local Government and Its role In accelerating WASH initiatives

The local government's role is very important for any kind of development program including in the WASH sector. The local government is a very powerful body of the government and it can make required laws and act for its own municipality for the well-being of the people. The constitution of Nepal's Local government in 2015 gave 22 powers to the local government so they can formulate laws and act using these powers aiming at the prosperity of the people. In the context of Nepal local government is a prominent government authority at the grassroots level to supervise and monitor development activities including WASH which has been implemented from the side of government and other aid organizations, INGOs, NGOs, CBOs, and private sector as well. The local government is also the regulatory body of the government to deploy the different development actors in the priority areas of local government aligning to national and international priorities and commitment.

Now the situation is different in the local areas as some of the INGOs, NGOs, and other institutions have been implementing different development activities including WASH initiatives own interest and less care for local government and national priorities also neglected to coordinate and communicate with local government due to the lack of proper management strategy of local government for development actors in the local area. All of the INGOs, NGOs, and other development actors must come under umbrella of the local government and contribute to local government development targets and priority areas that can be contributed to national targets towards international targets and fulfill international commitments that the government of Nepal international forums such as SDG targets in WASH sector committed. Therefore, local government roles and responsibilities are many more in terms of access to safe water and sanitation services

for all even in terms of long-term operation and sustainability of the water schemes as well as developing and implementing the WASH interventions very systematically so that national targets could be met towards achieving the local government targets.

In Nepal, only 28.13 % of schemes are fully functional means that the remaining schemes need to be repaired and maintained (minor and major repairs) Some of the schemes are ready for rehabilitation and some of ready for reconstruction aiming to revive the system in the full phase that people can benefit from these schemes and SDG targets ladder can be reached next step. Therefore, local government should take full ownership of the water supply scheme's regular and annual operation and maintenance including emergency situations for the sustainability of the scheme.

The local government should consider the following areas to ensure safe WASH services for all in the local areas:

I. Local government should list the existing water supply scheme details and update quarterly, or annual basic depending on the trend of damaging the water systems.

II. Explore and manage the financial sources by coordinating with public-private partnerships, and private investors, and encourage to community contribution and other funds to revive the water systems because of financial resources are the major part of the execution of the WASH strategy and plan.

III. Local government identifies the non-functional water supply schemes with the status of the scheme in local areas.

IV. Local government promulgates laws and acts that all of the schemes should be registered mandatorily to local government so that local government can update register records regularly.

V. Regarding INGOs, NGOs, private sectors, and other institutions must take a letter of permission mandatorily from the local government before beginning the WASH initiatives so that the local government can easily supervise and monetize the development actors effectively and efficiently.

VI. local government can make a WASH master plan and then argue to aid organizations, INGOs, and NGOs for support on the plan of local government nor can work own interest and beyond the plan and priorities areas of the local government so that all of the institution's efforts support on it.

VII. Local government needs to pay attention and set up a monitoring and evaluation team for the supervision and monitoring of the water supply schemes and different organizations' WASH activities in terms of quality assurance and sustainability perspectives.

VIII. Coordinate and communicate with inter-sector government bodies such as the division forest office, division office for water supply and sewerage, water resources and irrigation division, and other government district and provincial level offices for required coordination and cooperation to accelerate WASH activities as per the plan of the sector development plan 2016-2030 (Sanitation, 2016).

IX. Local government also needs to emphasize WASH integrated project in the holistic approach for the sustainable run of the scheme concurrently improving the livelihoods of the people by promoting income generation activities such as vegetable production, livestock, support on children's education, human health using water.

X. Local government can promote the new WASH technologies which can help to achieve the WASH targets within the time frame with desired results so that everyone can access safe drinking water and sanitation services. The local government can organize donor meetings to raise funding for introducing new and innovative WASH technologies that can be accepted by the local people.

9.6 Importance of community contribution:

Community contributions are the legs of the chair in each type of development initiative. Especially in Community-based development initiatives including water, sanitation, and hygiene (WASH) programs, community contribution is a very prominent part of fleeing ownership of the project by communities for community contribution is indispensable things to sustaining the WASH program. In Nepal, lots of the water supply and sanitation schemes are fully dysfunctional and neglected lacking clear ownership proper operation, and maintenance because community people did not feel ownership of the project causing zero contribution to the water supply scheme as a result water supply systems went on dysfunctional swiftly consequently higher number of the users are suffering from safe drinking water and sanitation services. Community contribution not only resources to construct the water scheme. This is the tool for taking ownership, kindness in the water

scheme, and responsibility for caring for and operating the system. Hence, this is an invertible contribution in terms of sustainability perspectives as well.

on the other hand, community contribution is a key resource for the construction of water supply projects because financial resources always have been lacking to build up any kind of development initiative even in the case of the WASH project. In Nepal, 20-25 years ago community people contributed a huge contribution of around 15-50 % of the total cost of water supply and sanitation projects so these schemes were operated until the design periods of the scheme even more than the design periods as well as some of the schemes are still operating in many part of the country because of feeling ownership due the huge community contribution. In another part, 5-10 years before the constructed scheme has been operating partially and almost all schemes were dysfunctional because of did not feel ownership by users because community people contributed less amount up to 3-5% of the total budget and some of the schemes constructed Xero % community contributions as a result schemes are going on dysfunctional and people are depriving of safe water and sanitation services. Therefore, community contribution can big change the water supply projects and the whole community through different aspects so encourage and emphasize to the community people for community contribution for any kind of development project including WASH to achieve meaningful results.

9.7 Institutionalize User Committee and Conscious Users

The user committee and user role are also significant to the proper operation and maintenance of the water supply and sanitation scheme to sustain the project with deliver quality services for users. The user committee should be proactive and aware of the operation and maintenance (O&M) approach and its vital role in the water system to make it more resilient and suitable so that community people can take more benefit from the project and improve their lives and livelihoods in a progressive way. The user committee should be able to proper operation and maintenance independently without full dependency on the government and other aid organizations. They also should be aware of the major repair and reconstruction of the projects and its process as well as well-known about the responsible stakeholders related to this scheme if required to take support from them. Hence, the user committee should be trained about the institutionalized system so they can practice themselves in your organization for quality

delivery and better results, worthy decisions, teamwork, better leadership, better trust, transparency, and Welfare and well-being for the people, user happiness and satisfaction very professionally and systematic way.

In the context of Nepal, not all but many user committees were formed during the time of construction of water supply and sanitation schemes with the major intention to take some profits from this project so they were involved the project in the construction phase of the project but knowingly they had left the committee after the complete the construction of the scheme some of them had left the committee amid the construction time of the project if they had not seen any benefit from the project or complete the financial transaction of the project. Thus users and concerned stakeholders must be conscious of these people and highly sincere about these characteristics of people during the time of formation of user committees and its types of other steering committees and sub-committees. These major reasons are that most user committees were inactive in most of the communities in many parts of the country especially in the areas of hilly and mountainous regions even in the region of Terai. Consequently, water supply and sanitation schemes are converted into non-functional water systems in the records of government data and the number of non-functional water supply systems in the eyes of people and development actors. where there are no active user committees there are higher numbers of schemes that are converting into non-functional rapidly lack of proper operation and maintenance. The scheme goes to non-functional gradually one by one (partial functional towards fully dysfunctional), not all at one time like cancer in the human body. we all can imagine without difficulty the situation after a fully dysfunctional water system in the community where every area could have been affected like health, education, environment, livelihoods, income generation, and all of the other areas associated with water and sanitation lacking water scarcity.

9.8 Operation and Management Committee (O&M) and its role in maintaining the water system smoothly.

The Operation and Maintenance (O&M) Committee and Village Maintenance Workers (VMW) are like doctors of the community-based water supply and sanitation project. VMWs are responsible and accountable to the caretaker of the system and maintain the system very effectively and efficiently to ensure quality water and sanitation services in a

sustainable way so that all of the beneficiaries can benefit from the scheme in the long term, which means the full span of the design period.

The VMWs should be trained in different technical areas for strengthening and capacity development so that they can operate the system in the long term without dependency and troubles. Ultimately, in the rural parts of Nepal where VMWs are prominent actors in the operation and maintenance of the water system to deliver quality services as per the desires of the users. There are lots of examples where VMWs are pro-actively serving there are schemes that are functioning well and where VMWs are less active and not serving there are almost all water supply schemes are dysfunctional and partially functional. Therefore, VMW's roles are vital to operating the water system in a sustainable way. The community people/users are also aware of the importance of VMWs and their roles in operating and maintenance of the system for quality water services for all.

According to the report of the Department of Water Supply and Sewerage Management (DWSSM), only 39% of schemes have VMWs but it figure is not correct so 50 % of VMWs are not actively working in these water systems because many VMWs were migrated to the local market and India for an employment opportunity thus existing scheme are going on non- functional rapidly absence of the VMWs and caretakers. Working VMWs are facing huge problems during the time of regular operation and maintenance due to the lack of financial resources, stock OM materials, lack of support from users, etc. VMWs do not receive their salary/fee on a regular basis in rural areas so they cannot continue their services without regular remuneration/fee hence this is a major part of the continuation of VMWs' service in the scheme. The community culture and trend is very wondering because villagers have no ideas and sense of humor to make payment to VMWs on time to continue their service to operate the water system but they are ready to face water problem every single day after non-functioning their own water system. This is a cultural, social, and behavioral problem as well as a lack of knowledge of and importance of water for the healthy and wealthy life of every citizen.

In rural areas where VMWs roles like a doctor the patients without VMWs, we can’t imagine the sustainability of the water scheme so a selection of the appropriate persons for VMWs, training, and capacity development of VMWs, technical knowledge, and training, operation and maintenance practice, resources mobilization, coordinate with

technical persons, etc. are crucial parts for VMWs so respective government, organizations, water user committee, and users always aware about it and its execution.

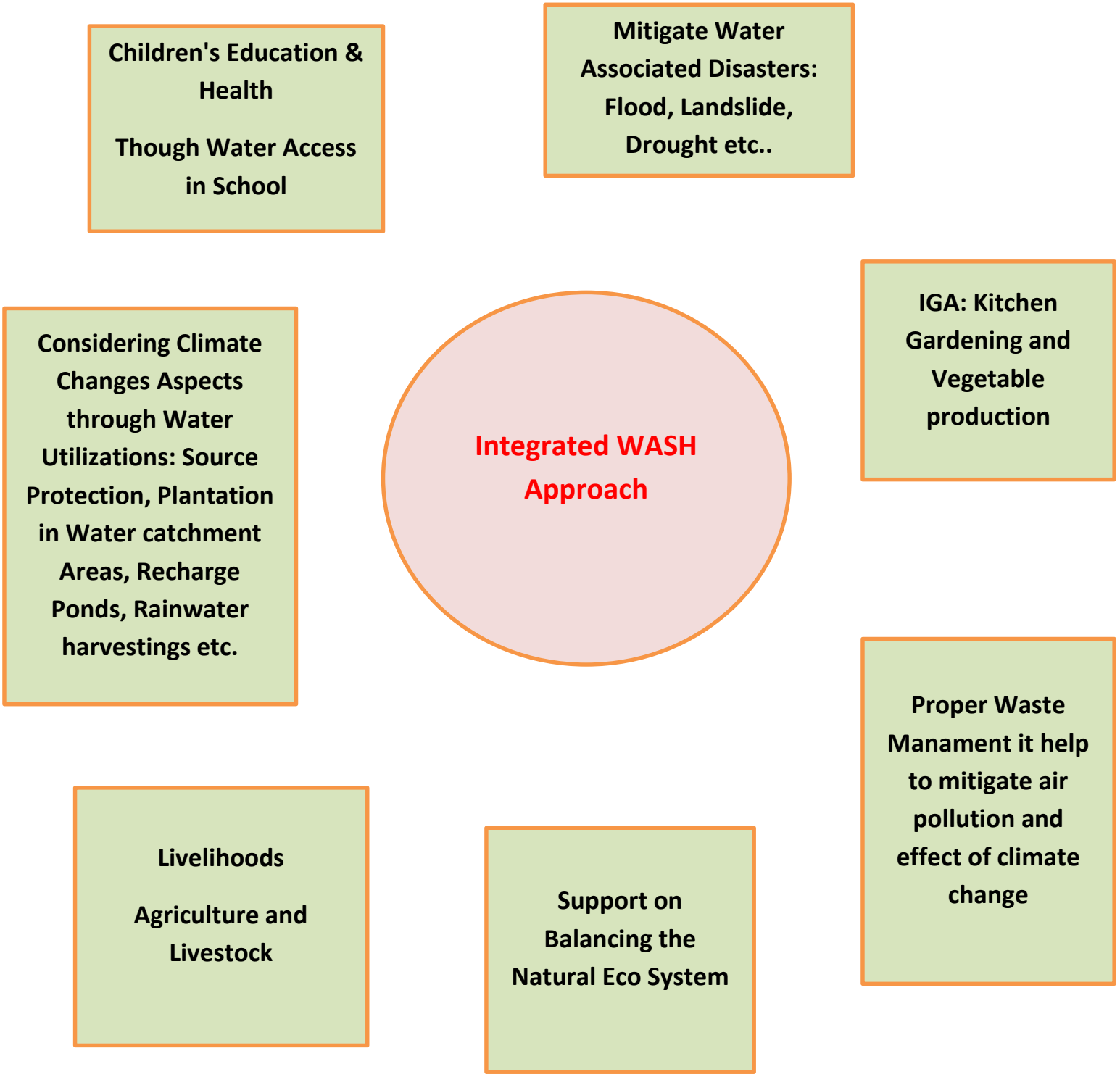
9.9 Integrated Water, Sanitation, and Hygiene (WASH) Approach:

The integrated WASH plan is a holistic approach to sustainable solutions for sustainable development of the communities in sustainable way (University, September 2021). The WASH program could not go forward alone ignoring the other interrelated areas like DRR, livelihoods, health and education, and climate change. The respective water user committees operate the system independently in a systematic way if they have strong economic, socially, and technical otherwise they could not operate the system in the long term without support from external: INGOs, NGOs, Government, and other institutions individuals who can support on WASH sector. Integrate the WASH approach is a very successful model in community-based development initiatives including water, sanitation, and hygiene because this approach improves all of these aspects of humans and livelihoods simultaneously by practicing integrating programs so that people can be strong from all of the corners: education, health, nutrition, economic viable, absorbing capacity of disaster and climate threat in an ingenious way. People's lives and livelihoods can be saved if the people can be viable economically so the WASH integrated approach highly focuses on increasing the household-level economy by promoting income generation interventions to integrate the activities into WASH. Everything is interrelated to water if there is water everything is possible for better lives and livelihoods. The local economy can increase through increasing production by accessing water services for irrigation. We can develop smart and healthy people by providing better education and better health via accessing safe drinking water and sanitation facilities otherwise people could not be smart and healthy without access to quality drinking water and sanitation services. Similarly, we can mitigate flood disasters, landslides, Himalayan glacier outbreaks, and drought and support the balance of the ecosystem by proper utilization of water.

Therefore, the integrated WASH approach is a prominent acceptable, affordable, and Nobel tool for addressing the genuine issues of the most vulnerable communities people in Nepal all of the development actors need to adhere this approach to make an

economically viable community towards sustainable solutions for sustainable development. We can apply this model in other areas of interventions associated with water for economic development towards the economic transformation of the deprived people in Nepal.

9.9.1 Diagram of Integrated WASH Approach :



9.10 Integrating Approach for Health into WASH

The relationship between health and Water, Sanitation, and Hygiene (WASH) is profound and indelible. Health and WASH are intricately linked in a symbiotic relationship where one significantly influences the other. Integrating health into Water, Sanitation, and Hygiene (WASH) programs is crucial in Nepal for several important reasons:

1. **High Disease Burden:** Nepal faces a significant burden of waterborne and sanitation-related diseases, such as diarrhea, cholera, typhoid, and parasitic infections. Integrating health into WASH programs can help reduce the incidence of these diseases by ensuring access to clean water, improved sanitation, and better hygiene practices.

2. **Child and Maternal Health:** Nepal has relatively high rates of child mortality and maternal mortality. Poor water quality and inadequate sanitation contribute to these high rates. Integrating health into WASH can lead to improved maternal and child health outcomes by providing clean water during childbirth and reducing the risk of waterborne diseases for children.

3. **Malnutrition:** Malnutrition is a significant public health concern in Nepal, particularly among children. Poor sanitation and hygiene can contribute to malnutrition by increasing the risk of food contamination and waterborne diseases. Integrating health into WASH programs can help address this issue by promoting proper food hygiene and preventing illness.

4. **Environmental Health:** Nepal's environment is vulnerable to pollution and contamination, and many communities rely on natural water sources for drinking and cooking. Integrating health into WASH ensures that water sources are protected and that communities have access to safe and clean water.

5. **Vulnerable Communities:** Many marginalized and vulnerable communities in Nepal lack access to basic WASH services. This includes remote rural areas and communities affected by natural disasters. An integrated approach ensures that these communities receive the necessary support to improve their health and well-being.

6. **Climate Change and Disasters:** Nepal is prone to natural disasters like earthquakes, floods, and landslides. During emergencies, access to clean water and sanitation is critical to prevent the outbreak of waterborne diseases. An integrated approach includes disaster preparedness and response to address these challenges.

7. **Education and Gender Equity:** Poor WASH conditions can lead to school absenteeism, especially among girls who may face difficulties managing their menstrual hygiene without proper facilities. Integrating health into WASH in schools can improve attendance rates and promote gender equity in education.

8. **Sustainable Development Goals (SDGs):** Nepal is committed to achieving the Sustainable Development Goals (SDGs), including SDG 3 (Good Health and Well-being) and SDG 6 (Clean Water and Sanitation). An integrated approach aligns with these goals and supports Nepal in meeting its international development commitments.

9. **Community Empowerment:** Engaging communities in WASH programs and integrating health considerations empowers local communities to take ownership of their health and well-being. Community involvement ensures that interventions are culturally sensitive and sustainable.

10. **Overall Public Health Improvement:** Improving access to clean water, sanitation, and hygiene practices directly contributes to better public health in Nepal. This, in turn, leads to improved quality of life, reduced healthcare costs, and increased economic productivity.

Integrating health into WASH programs in Nepal is essential for improving public health outcomes, reducing disease burden, and promoting overall well-being, especially in vulnerable and underserved communities. It is a holistic approach that addresses various health challenges and contributes to the country's development and sustainability goals.

9.10 Innovative Proposal for Revive the Non-Functional Water Supply and Sanitation System

The innovative proposal is a key weapon to solving the problems of the communities people in a sustainable way who are suffering from basic essentials like safe drinking water, food, medicine, and shelter as well as being highly hit by chronic and non-chronic disasters and the effect of climate change. The proposal not only manages financial resources. It is a comprehensive plan to address the issues of the people that is developed to consider all of the areas like social, technical, economic, cultural, environmental, regional, administrative, and sustainability as well as envision hypothesis impacts and linkage associated with this designed project and program. This is a concrete document that consists of ideas, outlines, strategies, and processes for services so this is like of driver for the car reaching the destination safely within the setup time frame.

The researcher was able to develop an innovative project proposal to consider all aspects of the people and environment to address the water supply and sanitation issues in those

research study areas. Research has been successful in exploring the donors and convincing them to revive/renovate the non-functional water system in these research study areas. Engineers Without Borders - USA (EWB-USA) was agreed to support Khabari drinking water and sanitation project in Gadhawa Dang district with an initial investment of US Dollar 75,000 and now they are in the process of technical assessment and detailed assessment of this existing scheme. Therefore, this scheme will be revived based on the developed design and technical specification to respond to the desires of the people of Khabari in Gadhawa Dang.

Similarly, another research area at the Gothiban community in Runtigadhi of Rolpa district. research able to develop the proposal and submit the respective donor for required support but now the proposal is waiting for final approval so scheme renovation work will be started soon after final approval from the respective donors and aid organization. This research is somewhat new and different from others because other research documents only disclosed the problems and stated the challenges longest narratively but they were unable to solve the problems that were identified in the research this research is able to make better solutions for the deprived people during the time of research because research able to revive the non-functional water system with financial and technical support from reputed aid organizations that have been working in the water supply and sanitation sector in globally. Most deprived and vulnerable people would like to expect immediate action to address these problems. They do not expect heavy narrative documents, talkative meetings, useless speeches and assured, etc. However, people are always happy to support research and innovators to see some better hope in the future for making a bright future by fulfilling their essential daily needs in the rural parts of Nepal. Hence, researchers also need to take care of the feelings of the deprived people in the community where researchers doing research for the well-being of humans and nature. Analyzing the current situation in Nepal, it is very important to develop and implement such kinds of project proposals to solve the WASH problems. Otherwise very complicated to solve the problem of drinking water and sanitation, so the relevant agencies working in the field of drinking water and sanitation need to pay attention to it on time.

CHAPTER 10 CONCLUSION

The non-functional water scheme in rural parts of Nepal can have significant impacts on human lives and the local economy. Water scarcity has been impacted every aspect of people as a result vulnerable people are being more underlying the poverty line and dangerous zone so their lives are getting worse day by day so very hard to improve and uplift their lives and livelihoods. Thus, this research dissertation highly focuses and recommends that the respective government to adherence these ways forward in order

to revive the non-functional water and sanitation systems to ensure safe, equitable, and sustainable water and sanitation services for all so that people can improve their lives and livelihoods by proper utilizing the available water services to in all areas associated with water. The nation could not fulfill the people's water and sanitation demands and also could not achieve the international commitment and SDG6 within the timeframe by 2030 without addressing the issues of non-functional water systems hence the revival of the non- functional water system is an unwavering commitment and task to solve the water crisis problem in the rural parts of Nepal. Therefore, this research picks up this issue genuinely and concrete suggestions for solving the problem instantly. The water crisis problem on the earth can be seen very worst in the coming future and some of the research also pointed out that third-world water can happen in the near future due to the scarcity of fresh water so this is a very serious problem for human beings (Mangesh, 30 November 2022).

Here are highlighted some potential effects that have affected human lives and livelihoods adversely.

Water scarcity: The non-functional water scheme means that people in rural areas do not have access to a reliable source of clean water but in the cases of study areas they do not have access to basic drinking water so clean water access is very far from the mind of people because they have zero knowledge on water purification and treatment process and procedures. This can lead to water scarcity, forcing residents to travel long distances to fetch water from alternative sources such as rivers, streams, rainwater-accumulated pits, or wells. The lack of clean water can result in hygiene issues, increased vulnerability to waterborne diseases, and overall reduced quality of life.

Health risks: Without access to clean water for drinking, cooking, and personal hygiene, rural communities are at a higher risk of waterborne diseases such as diarrhea, cholera, and typhoid. These illnesses can lead to increased morbidity and mortality rates, especially among children and the elderly. we can’t imagine a healthy human without access to clean drinking water services for people so on the surface this is a simple problem but it plays a vital role in whole human life cycles and livelihoods. Thousands of

people and elders are dying and a similar ratio of young people has been suffering in each single year causing waterborne diseases in many parts of Nepal. People are obligated to spend millions of money for the required treatment of such kinds of diseases. So, in this situation, people's economic condition goes deeper down. It helps to country become a failure economically.

Time and labor burden: The non-functional water scheme often places an additional burden on women and children, who are primarily responsible for fetching water. They may have to spend several hours each day collecting water from distant sources, which can affect their ability to engage in other productive activities such as education, work, or caring for their families. The time and energy spent on water collection could otherwise be utilized for income generation or educational pursuits. Thousands of children and women spend half or fully day fetching drinking water from distant sources and others so they do not have time for other works like IGA, caring for and educating their children consequently children can become illiterate, and women become weak in social, cultural and economically. It impacts not only limited people it impacts overwhelming on the head of overall state.

Impact on agriculture: Agriculture is a crucial part of the rural economy in Nepal. Non-functional water schemes can severely impact agricultural activities by limiting irrigation options. Insufficient water for crops can result in reduced agricultural yields, affecting food security and economic stability. Farmers may face financial losses, reduced incomes, and increased dependence on external aid. In the rural people of Nepal including study areas there are no kitchen gardening and vegetable production practices in many communities including Khabri and Gothiban. All of the people depend on market vegetables which are imported from India. Every person could not make an efforts to buy vegetables and other agricultural commodities from the markets. The majority of the people and their children are suffering from malnutrition lack of good diets and food. In this context, the water supply system can play a vital role in the initiation of kitchen gardening, vegetable production, fruit production, and small-scale poultry farming as well as other water-associated IGA initiatives.

Migration and urbanization: In some cases, the non-availability of functional water schemes in rural areas can lead to increased migration to urban centers in search of better living conditions and opportunities. This can result in overcrowding, unemployment, and the strain on urban infrastructure and services. Rural depopulation can further exacerbate the challenges faced by the remaining population, creating a cycle of poverty and underdevelopment. People are forced to migrate to the local market and nearby cities for better lives and opportunities for themselves and their future generations due to the water and sanitation scarcity and it affects every corner of human lives and livelihoods.

Economic implications: The non-functional water scheme can hinder economic development in rural areas. Lack of access to water affects various sectors, including agriculture, livestock rearing, and small-scale industries. Reduced agricultural productivity and limited income-generating opportunities can contribute to poverty and economic stagnation. Therefore, water access plays an important role in nature including human life cycles directly and indirectly for their progress and prosperous life. we can't envision better economic growth and development without ensuring water access so concerned government entities and organizations should pay key attention to it for access to water availability everywhere for everyone without excuse.

Addressing the non-functional water scheme in rural parts of Nepal is crucial for improving the quality of life, reducing health risks, promoting sustainable agriculture, and fostering economic development in these areas. It requires investment in infrastructure, maintenance, and capacity building, along with effective governance and community participation.

To address the problems associated with non-functional water schemes in rural parts of Nepal, several solutions can be implemented:

Rehabilitation and maintenance: According to the government data (DWSS 2019) 50% of existing water supply and sanitation schemes need to be repaired, maintained,

and rehabilitation instantly to meet the water demand of communities people who are suffering from basic needs of drinking water and sanitation services. The government cannot meet the water demand of people even SDG targets without rehabilitation and reviving these schemes into a full operating phase. In rural areas, schemes that need to be repaired and maintained are more figures than in Terai because the Government has no updated data on such kinds of water supply and sanitation schemes.

Respective institutions and individuals should be aware and give higher priority to allocating resources and prioritize the rehabilitation and maintenance of existing water schemes. Conduct regular inspections, repairs, and upgrades to ensure their proper functioning. This may involve repairing pipelines, water storage tanks, distribution systems, and water treatment facilities.

Community involvement: Involvement of local communities in the planning, implementation, and management of water and sanitation schemes is an important part of sustaining the system in the long term. Encourage community participation through the formation of water user groups or committees. These groups can take responsibility for maintaining the water infrastructure, collecting fees, and ensuring equitable water distribution. Generally, water user committees and users are responsible and accountable for the proper operation and maintenance of the schemes for long-term operation addressing various challenges that can be happening during the design period of the scheme. Community involvement and contribution are inevitable parts of better ownership of the projects so its sustainability could depend on community activeness, involvement, and loveness with the scheme.

Capacity building and training: Provide training and capacity building programs to local community members, including women and youth, on water management, maintenance techniques, and water conservation practices. This will empower the community to take ownership of the water schemes and enhance their long-term sustainability. Strengthening and capacity development is the regular process in any institution and organization for delivery of better and more effective services so need to organize such kinds of events for the capacity development of the water user committees and other associated people to give out meaningful services. This program is also prime

for awareness of respective people on new technologies, tools, and their importance for water and sanitation services.

Alternative water sources:

We can explore alternative water sources such as rainwater harvesting, source protection, groundwater recharge, and small-scale water reservoirs if needed because spring water sources are drying up and the groundwater level is depleting unexpectedly rapidly due to the adverse impact of climate change and disbalancing water cycle in the ecosystem. in this context need to explore and brainstorm about alternative water sources to meet the water demand of people. These initiatives can supplement the existing water schemes and provide additional sources of water during dry seasons or when the main water scheme is not functional.

In fact, many existing water schemes are non-functioning due to the decreased source water yield and many schemes disappeared with swept away during times of flood and landslide so alternative water sources are essential for these locations. Alternative water sources are used and are more essential in the coming future because climate change is highly impacting water sources on Earth consequently people will fight each other for getting fresh water. This time will come soon nobody can resist.

Water conservation and efficiency: Promote water conservation practices at the household and community levels. Educate the community about the importance of efficient water use, such as fixing leakages, using water-saving technologies, and adopting efficient irrigation methods in agriculture. Spring water source conservation is a necessity in the hilly and Mountain regions of Nepal where spring sources are drying up alarming so concerned entities should take immediate action for the conservation of the sources by promoting appropriate programs and initiatives. The same situation in the groundwater has depleted water levels unexpectedly thus, we need to pay serious attention on time to the conservation of the water sources and use efficiency.

Integrated water resource management: Adopt an integrated approach to water resource management, considering the interconnectedness of water supply, agriculture,

income generation, disaster risk reduction, mitigation of climate change effects, and other sectors. This involves promoting sustainable water use, watershed management, and coordination among different stakeholders, including government agencies, INGOs, NGOs, CBOs, and local communities. This approach can help to sustain the local economy through promoting integrated water resources management. This approach can play a crucial role in other water-associated areas such as irrigation, agriculture, hydropower, sewer and water management, and rainwater harvesting as well as support balancing the natural water cycle.

Government support and funding:

The government is responsible and accountable for access to safe drinking water and sanitation services for every citizen because WASH services are guaranteed by the constitution of Nepal and its article 35 (4), as well as these services, are also defined by human rights. Government is the responsible for regular supervision and monitoring of the system so that the scheme can operate smoothly for the long term. Government support is also important for the legalization of the water supply and sanitation scheme so that the scheme can operate under government policy and act in a sustainable way. The government also needs to manage the required finances to revive the non-functional water supply and sanitation system by repairing, maintaining, and rehabilitating to meet the water demand of people and meet universal coverage also respects fundamental and human rights values by accessing WASH services for everyone.

To ensure adequate government support and funding for water infrastructure development and maintenance in rural areas. Allocate resources specifically for improving water access and quality, with a focus on marginalized communities. The government should make an appropriate and effective plan for access to safe and equitable services for all within the setup timeframe aligning with SDG6. For that government needs to make better coordination and communication systems with inter-sector ministries, and departments together with provincial and local level entities as well as develop strong and trustworthy mechanisms to supervision, monitor, and deploy development actors: Donors, INGOs, NGOs, CBOs, private sector and individuals under priorities areas of government of Nepal so that they can worthwhile contributions for

overall nation economic growth and prosperity through ensuring coverage universals WASH access by 2030.

Public-private partnerships: Public-private partnerships are a unique and successful approach to social development and transformation even more practical in community-based development. PPPs are additional energy of government for equitable and sustainable development of the least developed country so their roles are more inevitable for community based development activities including to fulfill the people's dream of safe drinking water and sanitation services in the house premises. Must needs to encourage public-private partnerships to leverage expertise, resources, and technology for the development and maintenance of water schemes. Collaborate with NGOs, private companies, and international organizations to enhance the efficiency and effectiveness of water projects.

Data collection and monitoring: Accurate data, research, and strong monitoring mechanisms are major pillars of sustainable solutions towards sustainable development. We could not done any kinds of development initiatives without accurate data, better research, and monitoring mechanisms. In Nepal, such data are not as accurate nor realistic based on the ground even though many organizations published data also not authentic. The government does not have a strong mechanism to verify such kinds of data so we have seen many cases in the many areas of data including WASH. Therefore, the Government doesn't have time to delay developing a strong and vibrant system in order to address these issues otherwise we are unknown where we reached in the path of development even in the case of SDG targets. We have a better example relating to an open defecation-free state. Our country was declared ODF on 30 September 2019 with unprecedented support and pressure from donors, and international development actors but still, 7% (Indicators, 2022)of the population defecating open according to the government report this figure is around 15% according to the working organizations and experts who are working in the WAST sector in the ground. Thus, accurate data, scientific and realistic research, new innovation, and strong monitoring systems are the prominent things of sustainable development so the government should pay attention to it and take immediate action to respond to these issues.

Establish a robust system for data collection, monitoring, and evaluation of water schemes. This includes tracking water usage, quality, and functionality of the schemes to identify issues and implement timely interventions.

Awareness campaigns: The awareness campaign is one of the recognized and affinity tools to aware and sensitize people in a progressive way and break the social barriers and obstacles on the path of development. Thus, we should be aware and take serious awareness campaigns during the time of design of any kind of development project and even during the time of implementation. This approach is more useful and relevant in rural parts of Nepal than areas in cities because there is the level of awareness is not good so concerned bodies need to give high priority to promoting these awareness and social behavior change communication initiatives to break the social stigma and superstition which are a major barrier in development sector in Nepal.

To conduct awareness campaigns to educate the community about the importance of clean water, hygiene practices, and the benefits of functional water schemes. Raise awareness about the health risks associated with contaminated water and the long-term benefits of access to clean water.

By implementing these solutions, it is possible to improve water access, enhance public health, support sustainable agriculture, and promote economic development in rural parts of Nepal. Collaboration between government, communities, and various stakeholders is crucial to ensuring the success and sustainability of these initiatives.

This research dissertation speaks the voice of thousands of people who are still left behind from the services of safe drinking water and sanitation facilities which are guaranteed by human rights and the constitution of Nepal. Those people are fighting many challenges including non-functional water systems however, they are unable to overcome these necessities due to the lack of knowledge, human resources, financial efforts, and lack of government support and mechanisms to respond to the problems of deprived people.

The researcher has been able to identify, assess, and manage the non-functional water supply systems in these study areas by initiating revival and renovation works aiming for access to safe drinking water and sanitation services as soon as possible in partnership

with EWB-USA and local government in the respective area. The research is also able to the rising suck kinds of problem of non-functional water systems and their impacts on every aspect of human lives and livelihoods very strongly and loudly so that every concerned institution and individual can hear the sound of these problems and can take necessary action for a better solution collectively. This research dissertation speaks not only to the problems of study areas, It speaks to the voices of a huge segment of the people who are suffering from non-functional water supply and sanitation systems across the country. Significantly, the government could not achieve SDG6 without responding to these non-functional water supply systems. How the government can achieve SDG6 with the genuine water and sanitation problem on the ground? On the other hand, according to the JMP report updated 2023 around 97.10 % of people have access to improved water services but another side only 28% scheme only functional as per the report of DWSSM so this figure is also very contrasting is not accurate as per ground reality. Deprived people are fully unknown and don't care about the national and international data and progress figures they only care and believe in the ground reality so they want safe drinking water and essential sanitation facilities especially toilets in their house premises. A higher number of users expressed their views during the time of research discussion, meeting, and interview. Their trust is decreasing to the Government day by day causing an immense lengthy process and supporting mechanism of the Government Simultaneously, youth are very disappointed with the Nepal government and its development practices and mechanisms as a result higher number of people are very optimistic from donors and aid organizations. Indeed, this is not good practice for the nation because the government should take overall responsibility and accountability for prosperous their citizens and needs to develop an enabling environment so that people can feel like parents to the government.

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12 Appendix A

KII Question

Name of the Interviewee:_____ Date of Interview:

Municipality: _____ Ward No.:

Location name/Tole: _____ Position: _____

1. What is the overall water supply and sanitation system status in the Community?

   a) excellent b) good c) moderate d) poor

2. What are the main root causes of the water supply and sanitation system becoming non-functional and what are the preventive measures?

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3. Why are community people, local government, and other aid organizations not interested in reviving the system?

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4. What are the major things that need to be considered in order to revive/renovate the water supply and sanitation system in a sustainable way?

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5. Are all communities aware of using safe drinking water and improved sanitation in a proper way?

6. Are communities happy with the constructed toilet and other sanitation facilities designs in terms of sustainable use?

7. What are the existing operation and maintenance (O&M) practices at the community level for sustaining the existing water supply and sanitation scheme?

8. What are the technical and non-technical issues pertaining to the non-functional and partial functional of the water supply and sanitation system?

9. What are the perceptions of the users about the revival of the water system services provided by service providers?

10. What are the most common problems about sustaining rural water supply and sanitation systems noted by formal and informal service providers?

11. What are the major challenges experienced by community people and service providers in the operation and maintenance of the water system?

12. What opportunities exist for sustainable water and sanitation in selected communities?

13. What is your suggestion and recommendation for sustaining WASH services for sustainable development in your communities?

14. would you like to share anything related to WASH services?

15. Would you like to suggest anything to the researcher?

A. Researcher Publications in National News Papers and Televisions:

1. Clean water and sanitation: Can Nepal achieve SDG 6 by 2030?

https://english.onlinekhabar.com/clean-water-and-sanitation-sdg6-nepal.html

Datta Bahadur Rawal **Wednesday, January 18, 2023**

Photo Courtesy: UNICEF

Nepal is one among 193 countries that adopted Sustainable Development Goals (SDGs) to be achieved by 2030. However, looking back at Nepal's incompetence in fulfilling any goals on time, it is likely that Nepal might fail to achieve the SDGs by the deadline.

So to let Nepal's government complete its SDGs target, concerned government and non-government authorities should give serious attention to it on time. Otherwise, the SDG targets will only be limited to the paper, and the few efforts taken by the concerned bodies will also be worthless.

Among the 17 SDGs, this article analyses Nepal's situation in meeting the target of SDG 6, clean water and sanitation, which principally aims to ensure access to safe and equitable drinking water and sanitation for all.

Clean water and sanitation in Nepal

People queuing up for drinking water at a water sprout.

Nepal was declared open defecation-free (ODF) on September 30, 2019, without fulfilling the required criteria at all levels. We know the status of public toilets in Nepal is miserable. Apparently, Nepal was under the pressure from some international donor organisations to make the announcement.

But, there are still thousands of Nepali people who are defecating in the open and are suffering from a lack of clean water for drinking and toilets. Likewise, there are dozens of community schools that lack basic drinking water and toilet facilities.

Separate toilets for boys and girls, as well as quality drinking water, are beyond the imagination of community schools in the rural part of the country.

Thousands of schoolchildren are suffering from diarrhoea and other water-borne diseases every year. As a result, a huge amount of money is being spent on treatment. Due to a lack of clean water, proper sanitation and hygiene facilities, many schoolchildren drop out of school.

The dropping-out rate is more in the hilly and Himalayan regions of Nepal compared to Tarai. In this situation, how is it possible to build a country with well-educated citizens?

Many water supply projects in Nepal are non-functional and a few are partially functioning in the hilly and Himalayan regions. This fact shows that thousands of the community people are deprived of basic needs like the availability of clean water and sanitation. In this condition, it is impossible to achieve the SDG 6 goal.

2. **How do menstrual taboos challenge Nepal's journey to the SDGs by 2030?**

   https://english.onlinekhabar.com/menstrual-taboos-bar-nepal-sdgs.html2030?

Datta Bahadur Rawal Wednesday, March 1, 2023

Photo: Pexels/ Karolina Grabowska

Despite the progress made in technology and modernisation in Nepal, a significant number of women still lack access to proper education and healthcare, particularly regarding menstrual taboos existing in society.

Menstruation is a natural and inevitable process in every woman's life, but it remains heavily stigmatised, and the cultural taboos surrounding it perpetuate discrimination and shame against women.

Each day, an estimated 290,000 women and girls in Nepal experience menstruation. Shockingly, 82 per cent of Nepali women residing in rural areas resort to unsanitary, unhygienic and potentially harmful menstrual hygiene management practices, which is pushing Nepali women deeper into the crevice of marginalisation and reproductive health morbidity and reinforcing gender inequities and exclusion, thereby affecting Nepal's journey to the UN Sustainable Development Goals by 2030.

Hindrances to achieving menstrual hygiene

Achieving sustainable development for all by 2030 is a crucial goal for the nation. However, many communities, particularly women and girls there, are still struggling to access basic water, sanitation, and hygiene (WASH) services and proper menstrual hygiene, which are the challenges to obtaining the SDGs by 2030.

In this context, it is unfortunate that menstrual taboos, including the harmful practice of chhaupadi, continue to affect a large number of women and girls in the Karnali and Sudurpaschim provinces of Nepal. Nine out of 10 women and girls across Nepal face challenges related to menstrual taboos. Although various governmental and non-governmental agencies have made tremendous efforts to address this issue, the long-standing cultural practices and beliefs make it difficult to eradicate them easily.

In the past, many unexpected accidents have occurred when women and girls are forced to live separately in small, muddy homes or sheds during their periods. In the present context too, they are at risk due to such practices as they are in a vulnerable state while staying in sheds. Apparently, these sheds are unsafe and they might get attacked by

wild animals, snakebites, rapists, and thieves, and be affected by diseases related to poor menstrual hygiene.

According to the 2021 UNESCO data, almost 89 per cent of women and girls in Nepal experience some form of discrimination or challenge originating from menstrual taboos, with variations depending on factors such as education level, cultural beliefs, religious practices, and societal diversity.

Expectation vs reality

Chhaugoth. File Photo

In a major action to counter menstrual taboos, the government has finally criminalised the chhaupadi system in 2017. According to this law, any family member who forces a woman to practise chhaupadi can be punished with a jail sentence of three months and/or a fine of approximately $30.

But, these practices have been proven difficult to eradicate completely. This serves as a valuable lesson that changing deeply ingrained social behaviours requires convincing and raising awareness among communities, rather than simply forcing change without addressing underlying beliefs and practices.

A community-based and practical plan is necessary to effectively transform minds and ultimately change social behaviours to remove menstrual taboos. Basic services such as access to water, washing stations, sanitary pads, and separate, privacy-maintained toilets are essential.

However, as of now, only 64 per cent of schools have access to toilet facilities, and just 20 per cent of schools have separate toilets for girls, which means that around 80 per cent of female students are struggling to maintain menstrual hygiene during their periods.

Water access is another crucial aspect of maintaining menstrual hygiene and removing menstrual taboos, but according to the Joint Monitoring Programme (JMP) report of 2021, only 71 per cent of schools have access to basic water services, leaving many students without access to water and sanitation facilities, making it challenging for students and school management to maintain proper hygiene.

This is a very serious matter for government authorities and concerned institutions.

Further action required

File: Ministry of Health and Population

The Government of Nepal has been taking several actions from the respective downstream bodies in terms of menstrual health and

hygiene management. The government of Nepal had allocated USD 16 million to provide free, compostable sanitary pads to 130,000 girls of menstruation age studying in public schools in 2020-2021, construction and renovation of school toilets and washing facilities, various awareness and education campaigns considering menstrual taboos and hygiene management.

Despite the ongoing efforts by the government and aid organisations to improve menstrual hygiene and eradicate menstrual taboos, these initiatives have faced numerous challenges such as financial constraints, social and cultural barriers, and technical limitations. However, the solution to achieving sustainable progress lies in addressing the smaller, yet equally important issues faced by the people at the grassroots level.

To achieve sustainable development in menstrual hygiene and the reduction of menstrual taboos in Nepal, systemic solutions are needed to address root causes and obstacles. This requires a transformation of conservative mindsets at the individual level as well as access to safe water and sanitation facilities that prioritise safety and privacy.

Additionally, easy access to menstrual hygiene products and services should be ensured in public institutions and public places. Local sanitation products should be developed using local resources, and local people should be mobilised to organise relevant and affordable menstrual hygiene and taboos awareness programmes. By addressing these key factors, it is possible to make Nepal free from the chhaupadi tradition and a fully sanitised area, ultimately achieving the Sustainable Development Goals in menstrual hygiene.

3. Pollution: A challenge to public health

By DATTA BAHADUR RAWAL

Published: 11:13 am Feb 15, 2023

https://thehimalayantimes.com/nepal/pollution-a-challenge-to-public-health

File Photo: THT

Industries must be encouraged to adopt cleaner technologies and processes that minimize their impact on the environment. This includes advanced filtration systems

KATHMANDU, FEBRUARY 14

Air pollution can be defined simply as the presence of one or multiple contaminants, such as dust, fumes, gas, mist, odour, smoke or vapour in the atmosphere, which can be injurious to plants, animals and humans in many ways.

Human activities contribute to the mixing of harmful gaseous and particulate matter in the air, causing air pollution. Some major human activities causing air pollution include industries mainly run by fossil fuels and burning of different substances, dumping of solid and liquid wastes, and smoke from cooking, airplanes and automobiles.

Air pollution in the Kathmandu Valley and some other major cities of Nepal has led to a deterioration of the environment. Add to this the pollution caused by solid waste, waste water and even dirty

politics at the historical and cultural cities, and improving the pollution level becomes a major challenge without a scientific and practical plan and its strict implementation.

The latest air pollution updates show that the major cities like Kathmandu, Patan, Bhaktapur, Dhankuta, Tulsipur and Pokhara all have critical air quality.

Without a doubt, pollution has been affecting human lives and their environment in a negative way.

Pollution damages every aspect of humans and the environment, such as health, economy and overall civilization of the people.

So we can't build a civilized nation without first building a clean environment by managing the waste sustainably.

According to the State of Global Air (SoGA) report, around 42,115 people die each year from illnesses related to air pollution in Nepal.

Similarly around 3,500 children die each year due to water-borne diseases in Nepal (Department of Health Services, 2017).

Consequently, huge amounts of resources are being spent on the treatment of those suffering from such illnesses caused by polluted air and water every year.

Reports from different organisations worldwide suggest that one-third of the deaths from lung cancer, heart disease and stroke are due to air pollution.

Air pollution, both indoors or outdoors, has a negative impact on human health. The particles and toxic gases emitted by different industries, vehicles, cooking processes, firewood and many other sources end up in the lungs during respiration and impact human health in a detrimental way. A range of particles of different diameters are emitted from different sources that can affect the lungs, blood, heart, eyes, brain and many parts of the human body.

More specifically, particles of less than 10-micron diameter can easily penetrate deep inside the lungs and cause respiratory diseases. Particles of less than 2.5-micron diameter can even enter the blood system through the lungs, which can affect the heart and cause strokes, lung cancer, chronic respiratory diseases, asthma and many more. Also, the particles causing the pollution can stick to the eyes and cause irritation and even permanent damage to the eyes.

The government and its related departments need to develop a practical plan considering the current situation.

People face pollution everywhere in a single day, while drinking water, breathing, walking, sitting in a park, and going to public places community schools, cultural places and even inside the building of the parliament. Major cities stink due to the garbage produced from the home and other sources, which will become a very serious issue in the near future.

A large number of people are aware of the different kinds of pollution, and their prevention measures, but they refuse to comply with the mitigation measures in their daily lives. The government and the related authorities have developed dozens of policies, guidelines and regulations considering these issues, but they have never been implemented properly. As a result, these documents are gathering dust on the office shelves.

The federal and local governments had developed policies regarding construction of new homes, and the house owners were required to maintain some space around their homes for some greenery. But this has not been practised because the local government is unwilling to take action against those who break the rules. Similar policies were also developed for other areas regarding building disaster-resilient infrastructure following the devastating earthquake in 2015 that killed thousands of people

and destroyed tens of thousands of homes. Instead, after the earthquake, the buildings have grown only taller and leave no open spaces as required.

The old practice of building homes still continues, with no change in the attitude of both the government and the people at large.

Additionally, individuals can play a vital role in improving the air quality by being mindful of the energy they consume, reducing waste and emissions, and choosing eco-friendly products. Individuals can also take other simple actions, such as using eco-friendly products and reducing the amount of waste they generate in their daily life.

Another important step is to improve energy efficiency and switch to renewable energy sources, such as hydro, wind and solar power. Nepal is well-endowed with hydropower potential, and its location in the Himalayas provides ample water resources for power generation.

Thus, increasing the use of hydropower and other renewable energy sources will not only reduce emissions from energy generation but also help to slow down the effects of climate change, which is a major contributor to air pollution and other environmental problems.

Moreover, industries must be encouraged to adopt cleaner technologies that minimise their impact on the environment. This can include investing in advanced filtration systems, reducing waste and emissions, and improving the efficiency of energy use.

Moreover, planting trees and maintaining greenery are the most important factor in maintaining clean air, which plays a vital role in maintaining the ecosystem.

A version of this article appears in the print on February 15, 2023, of The Himalayan Times.

4. **Drinking water crisis In Himalayan Times (National News Paper)**
   https://epaper.thehimalayantimes.com/popovers/dynamic_article_popover.aspx?artguid=aa6afc92-7b5b-4168-9ca0-5ff5ad2e2274&appcode=HIMTIM&eguid=7d6b9d53-8b40-4634-b565-276db2b23195&pnum=23&fbclid=IwAR1_eEVFiTYW9d23PLLdnAHDzyV4WNI4rlT8lT04cakNrDK8eheJCzdp6OQ#

• TOPICS

Datta Bahadur Rawal

Nepal faces a freshwater crisis, which is expected to become even more severe in the near future. Water is an indispensable element for sustaining life, and its scarcity affects everything, from the health of the people to the welfare of their livestock, income generation, and even education, with schools lacking adequate toilet facilities and water supply.

According to government data, 87.88 per cent of the people in Nepal have access to basic drinking water, and 99 per cent to basic sanitation services. However, despite these statistics, genuine drinking water issues remain unsolved by past and current governments.

Despite the significant investment and support from various institutions, including the three tiers of government, INGOs, NOGs, and individuals, many communities in Nepal still struggle to access clean drinking water. The Chaurange community in Madhyabindu-10, Nawalparasi, is one such example.

The lack of access to water not only threatens the livelihood of these communities but also puts Nepal's progress towards achieving Sustainable Development Goal 6 in jeopardy.
Inadequate toilet facilities plague communities and schools. Although the government and aid organizations have supported the construction of toilets in many areas, the lack of water services has rendered these facilities non-operational. As a result, schoolchildren are left with no choice but to engage in open defecation. Unless immediate action is taken to address the water crisis, there is a high chance that open defecation may revert.

Climate change is having a significant impact on the country, leading to the drying up of spring sources, the melting of glaciers and the depletion of groundwater. In addition, pollution is affecting the quality of water available for consumption and use. Despite these pressing concerns, the government has been slow to prioritize and address the issue of water scarcity.

Currently, municipalities are competing to create smart cities, with elected officials giving speeches on the matter without proper planning or knowledge. It is a case of misplaced priority as many municipalities still lack access to basic drinking water services.

As such, it is crucial for the government to give priority to the development of effective policies and strategies to address these water-related issues.
The government must work to develop and mobilize the related partners to align their efforts with national priorities and goals to achieve meaningful progress in this sector.

B. Researcher Interview In National Television

Interviews:

1. **Interview at National Television On the Occasion of International Water Day 22 March 2023**
   https://www.youtube.com/watch?v=jqN-AoW46No

2. **Interview at National Television about the Current water and sanitation condition of Nepal**
   https://www.youtube.com/watch?v=53FNlej71tY&t=186s

3. **Contribution to recovery and reconstruction in Nepal after occurred devastating earthquake in Nepal in 2015.**
   https://www.youtube.com/watch?v=C6yj_Q10x0U

4. **Strengthen and capacity development training to government engineers for the development of a resilient society through resilient infrastructures**
   https://www.facebook.com/kumarnegee/videos/10221041116527570

5. **Contribution to earthquake recovery**
   https://www.facebook.com/avenuestvnews/videos/911769955846019