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**Public health system in promotion of water sanitation and hygiene: an analytical study**

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# Public health system in promotion of water sanitation and hygiene: an analytical study

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**Abstract:** Public health is defined as the science of preventing disease, prolonging life and improving quality of life through organised efforts, choices of society, communities and individuals which are achieved by promoting healthy lifestyles, prevention, detecting, and responding to diseases. Prevention is carried out by implementation of educational programs, recommending policies, administering services and conducting research. The aim of public health is reached through surveillance of cases and health indicators, promotion of healthy behaviours and limiting the health disparities by promoting healthcare equity, quality and accessibility. The concept of health takes into account physical, psychological, and social well-being as prescribed by World Health Organization that health is not merely the absence of disease or infirmity and more recently, a resource for everyday living. Common initiatives also include promotion of hygiene, education on water and water borne diseases, sanitation, vaccinations, etc.

**Keywords:** public health; water sanitation and hygiene; WASH.

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**Biographical notes:** Bikash Bage is the Founder and Head of the Department of Sociology, Rajiv Gandhi University Doimukh, Arunachal Pradesh *cum* Nodal Officer, RGU-Tribal Research Institute. He presented 25 papers with two papers at international level. He has published 15 articles in international/national journals and edited six textbooks (UG/PG-RGU). He completed two projects funded by NHM and ISRO with nine ongoing major projects funded by MoTA GoI. He is lifetime member of ISS and Founder Patron of Arunachal Sociological Forum. He is a recipient of State Governors' Recognition (Creation of Department of FW and ME Research Training Govt of Arunachal Pradesh).

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## 1 Introduction

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal

(WHO). Poor sanitation is linked to transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis, typhoid, polio, etc. Poor sanitation reduces human well-being, social and economic development due to impact such as anxiety, risk of sexual assault, and loss of educational opportunities

Public health is organised efforts of society including social and political concept aimed at improving health, prolonging life and quality of life among whole populations through health promotion, disease prevention and other forms of health intervention. Further people are expected to maintain proper hygiene and support the system in place. The livelihood and health status of a community, well versed on *water, sanitation and hygiene* (WASH) is equated with human development of the nation. Poverty has a major role in understanding the exclusion in sanitation and health care system and the present research study focuses on these aspects.

Water, sanitation and hygiene (WASH) refers to the combination of technical and human development components which must have the potential to produce a healthy environment and to evolve appropriate health and hygiene behaviour in the social system. Sanitation and hygiene require rapport among various components and stakeholders like the government, the administration, civil society, water and sanitation committees, public health engineering departments, voluntary organisations and community-based organisations (CBOs). The lack of clean water, proper toilets, and hand washing amenities in a healthcare setting can lead to numerous health problems. The global health facility-acquired infections (HAI) has reported the ill effects of lack of water and sanitation amenities leading to lack of practice of hygiene so the improvement in WASH will prevent infection and further transmission. Political will and commitment from the concerned government, voluntary organisations, civil society and individual efforts towards behaviour change communication (BCC) are essential in implementing action plans and policies to achieve the universal access to WASH especially in public health system.

The role of WASH in enabling standard environment must include sufficient water quantity for daily washing and safe drinking potable water for community consumption. Sanitation is further necessary for every member, several times in a day. In this regard, lack of hygiene and sanitation can lead to exposure to infections. Past practices have included antimicrobial-resistant infections in healthcare facilities. The main thrust of the intervention is based on preventive measures that contribute to the control of antimicrobial resistance transmission. Environmental reservoirs of pathogens are found in inadequate management of garbage, faulty sewerage systems and lack of initiatives from government setups like the municipalities, the urban development and housing departments and health directorates. The outbreaks in the community and public health management issues are based on the successful implementation of WASH.

Clean and safe environment is every person's right and access to clean water, basic toilets, and hygiene practices can boost the morale of an individual. The COVID-19 pandemic has once again given us the opportunity to retrospect on the importance of hand wash and masking so as to prevent the spread of the corona virus. The standard operating plan has mandated to personal hygiene and environmental sanitation. However, people settled in rural areas where public health system is not satisfactory are the most vulnerable and susceptible to infection.

Some of the related facts are as follows:

- worldwide, 2.2 billion lack access to safe and potable drinking water
- about 50% of the total world population is debarred to access to proper sanitation services
- three billion lack hand washing facilities with soap
- 673 million practice open defecation and are vulnerable to unmanaged wastes.

### *1.1 Water*

Clean water and its inaccessibility can negatively impact peoples' health, nutrition, education and other aspect of their lives. Globally, 785 million do not have basic access to water. One of the goals of United Nations is achieving access to safe drinking water by 2030 for all. But the fact is that the total global investment on the purpose is insignificant.

### *1.2 Sanitation and open defecation*

Sanitation is to do with cleanliness and it is beyond washrooms and toilets. Sanitation includes individual behaviours, responsibility, hygiene services that provide the hygienic and healthy environment. Developed communities though have access to sanitation; underdeveloped communities do not have them leading to hindrances to individual prosperity and sustenance. For instance, lack of separate and proper wash rooms will see gradual dropout of girl children in schools leading to threatened education system. This further in dropping health systems can lead to questionable productivity and economic downfall.

Open defecation is seen mostly in underdeveloped communities. 2 billion people do not have basic sanitation facilities and 673 million people practice open defecation. The practice of defecating in the open like in the open land area, off monsoon agricultural lands, forest areas or in the river banks or stream causes health hazards. Exposed faecal or excreta are capable of contaminating water and the environment leading to infections. Further, in continuum, waste management is to be proper as lack of containment of waste management may lead to human infection and deteriorating health conditions.

### *1.3 Hygiene*

Practice of hygiene is critical in prevention of all forms of infections leading to less stress and out of pocket expenses on health ailments. Staying healthy ensures self confidence and healthy family is a social status. Correct and complete knowledge and awareness on hygiene practices is critical along with societal and neighbourhood support. However, most of the population especially in underdeveloped communities find it difficult to maintain good hygiene. People in poor countries rear animals which also require hygienic practices otherwise; there can be community infections of diseases like foot and mouth.

## 2 WASH: a public health issue

To have a holistic health care service and to include WASH in the public health system the UN Water and the government of Spain conducted the Madrid world conference in 2014. Following activities were identified and these activities were proposed for a global action plan for WASH in health care facilities:

- national policies and standards
- targets in improving and managing WASH services
- monitoring and operational research.

Urgent action at the global, national and facility level is needed to improve WASH conditions in public health system.

## 3 Statement of the problem

There is lack of studies and research work in Arunachal Pradesh, India particularly focusing on sanitation and health care status. Various works have been done on culture and tradition; however, research related to inclusion of sanitation and health care is essential in the state and on this pretext the present study is assumed as a genuine effort.

Sanitation refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excreta with proper sewage system. Preventing direct human contact with faeces is part of sanitation, like wise hand washing is with soap. Health and sanitation is important and people follow good hygiene practices with proper sanitation system, but many are not aware enough of the sanitation system and their operations in the tribal societies of Arunachal Pradesh. Most of the population is affected by the badly manned sanitation system. The ground water considered to be product of 'natural nature' is affected by the 'manmade nature. The drainage system along the market line and residential colonies are not sufficiently hygienic, leading to manmade communicable diseases. In the contemporary global village, sanitation and healthcare status although is compressible in process, it is of growing concern globally today. Clean and potable drinking water and washing hands with soap and soap-based liquids are the foremost step to hygiene and sanitation for good health, invariably the mass seldom follow them.

In the recent times Arunachal Pradesh along with the rest of the nation has launched the *Swaach Bharat Mission* for generating awareness on WASH policies and programmes and further government assistance to implement them in the communities.

## 4 Study area

The present study has been carried out in the Tezu Township, the district head quarters of Lohit District in Arunachal Pradesh, India. Tezu is located in between 27°33' N latitude to 29°30' N latitudes and 95°15' E longitude to 97°24' E longitude at an altitude of 210 metres above the sea level. As per 2011 Indian census, Tezu Township had a population of 18,184 and covers an area of 1,280 sq km. It is surrounded by important

settlements like Paya and Dening in the north, Chowkham in the west, Demwe in the east and Kharem and Kadum in the south. Both Arunachal Pradesh Schedule Tribe (APST) and non-APST population inhabit the township.

**Figure 1** Map of study area (see online version for colours)



Source: <http://www.mapsofindia.com>

The major APST inhabiting the Tezu town are the Mishmis. The Mishmis are divided into three main groups of people namely, the Idus, the Digarus and the Mijus. Most of the Digarus and Mijus are settled in the Tezu town. The main language spoken by the people of the town is Mishmi, besides Assamese, Hindi and English as medium of lingua franca. The Mishmis have their own custom and religion. The conception of a high impersonal good spirit, whom they regard as the supreme creator based upon the beliefs in the spiritual qualities of natural phenomena and of all things, animate or inanimate. The main festivals of Mishmis are Tamladu, and Reh. On 13 August 1952, Tezu became the headquarter of Mishmi Hills. From that day onward, Tezu developed as an administrative centre. It has a geographical area of 1,280 sq km.

## 5 Aim

The purpose of this study is to strategise document for public health system and WASH to facilitate the existing programmes on WASH in the research area and also to contribute to the literature by adding to the varied contributions from across the globe in achieving the UN SDG 6: Ensure access to water and sanitation for all by 2030.

The study has been designed to inform and support the state governments planning policies towards WASH and their effective implementation in Arunachal Pradesh.

### 5.1 Specific objectives

- To understand the status of access to drinking water and sanitation services in the study area.
- To understand the level of knowledge and awareness and the facilitation of safe environment and hygiene practices in the study area.
- To understand the level of involvement of civil society and voluntary organisation and authorities in the study area and the management of health services and WASH programme.
- To suggest for community health and WASH promotional activities for the vulnerable and affected in the study area.

This study is one of the first of its kind of report in the state that has been done in a comprehensive way in assessment of WASH and its relation to public health system of the study area. For instance, the study has found the lack of sanitation service, absence of basic hygiene services and safe segregation and proper disposal of waste and its poor management which is believed to be useful and adding to the existing related literature.

## 6 Literature review

Verma (1982) on his book, *Health Care and Family Welfare*, focused some major issues on the development of health care and family welfare relating to men and environment condition in healthcare. Barua (1992) has mentioned that the existence of proper infrastructural facilities provides condition and inducements for direct productivity of the state and region. Sharma and Shukla (1992, p.15), *Geography and Development of Hills Area*, have spoken on aspects of economic development in Arunachal Pradesh.

In Gowda and Susheela (1997), *Infrastructure Development For Economic Growth*, different aspects of infrastructural development viz., concept dimension and significance of infrastructure, transport and communication, education, sanitation and water supply system have been mentioned, which for them provides basic requirement of human life and advancement.

In Bhattacharjee (2000, p.87), *Economic Development of Arunachal Pradesh*, infrastructural features in A.P have been discussed. Arunachal Pradesh is changing and these have affected the administration of the territory and there is the need felt by the government to introduce development activities, reforms emphasized improvement and

development in condition depicting social and economic dimension of the inhabitants for transport and communication, power, water supply, sanitation etc.

## **7 Hypothesis**

- 1 Large share of the concerned population still are devoid of public health and sanitation facility systems.
- 2 With the increase of population and urbanisation in the concerned area, the lack of proper drinking water is travelling towards a phase of likely scarcity.
- 3 Lack of sanitation and health awareness among the concerned population of the area.

## **8 Methodology**

In order to find the answers to the research questions, the Mishmi tribes residing in Tezu town have been selected. A total of 100 respondents from as many as 70 households spreading across the township were interviewed with interview schedule prepared with pre testing done earlier. The primary data collection method included survey method and structured interview schedule. The data which was provided by respondents was filled directly during the process of interview. The questionnaires were prepared on various measurement scales. Interviews with informants and the case studies from different NGOs and colonies of Tezu township were incorporated.

Five focused areas selected were DRDA Colony, Minister Line, Shivaji Nagar, Tezu Nallah Colony and Reserve Line (APP Colony). Various data related to sanitation and health of the area have been collected from the people of the study area as well as from the concerned department. Both quantitative and qualitative techniques and method were applied for analysing the information collected from the field. The collected data/information have been compiled and tabulated as per the requirement of the work to arrive at the appropriate conclusion. The table charts and bar diagrams were developed to illustrate the patterns of sanitation, health, and hygiene condition, water supply, waste management and awareness of people.

The database for the present study has been collected from both primary and secondary sources. The primary data is collected from field survey of different location of the study area. The secondary data are mainly collected from published books and research papers. Data have been collected from different offices like PWD, RWD, District Statistical Office, WRD office, DDSE office and others.

## **9 Findings**

### *9.1 Mass awareness*

During the survey of the study area it has been found that there is lack of awareness regarding hygiene practice in some of the colonies of the study area. During the time of survey, NGOs and SHGs were contacted and though the establishment and functioning of them seem to be not up to the mark, they are investing efforts in generating mass

awareness on sanitation and health issues. Further, these organisations were running voluntarily without much support from any agency or central/state governments.

Most of the local populations of the study area have basic knowledge on hygiene practices, but most of them were not practicing them due to being preoccupied with other basic priorities in life. The status as found is due to the lack of proper education among the population as most of the people living in the study areas of Shivaji Nagar, Tezu Nallah and Reserve Line either had less education or are not well educated. Proper education can spur out solutions to WASH concerns of the area as it will equip them in understanding and acknowledging the basic needs of sanitations, water, waste management and clean environment.

Most of the people residing in the mentioned three areas excluding DRDA Colony and Minister Line are engaged in agricultural activities. Some of them are domestic workers and daily wage earners. Hence, the literacy rate in these areas was very low as compared to DRDA Colony and Minister Line, who are mostly Government Officers and Educated Contractors. It was found that in these two areas, the sanitation system is maintained well on account of proper implementation of sanitation system and lesser population as compared to Shivaji Nagar, Tezu Nallah and Reserve Line.

**Table 1** The literacy rate of the selected areas

Sl. no.	Colony name	Literate (in %)			Illiterate/dropouts (in %)
		Upto class 8	Class 10–12	Graduate and above	
1	DRDA colony	5	20	70	5
2	Minister Line	8	30	54	8
3	Shivaji Nagar	25	55	14	6
4	Tezu Nallah	38	40	5	17
5	Reserve Line	26	52	17	5

Note: Data shown were not subjected to be real as may vary.

Source: Field data

Table 1 shows the literacy level of the study areas and sl. nos. 3, 4, and 5 show low level of education leading to lower level of awareness on health and hygiene that has affected the health of the people. The population of the area rear domesticated animals and birds like duck, poultry, cattle and pig. Domesticated animals and birds do not have proper designated herds as they were found roaming in open leading to loitering and possible transmission of communicable infections among them and chances of infecting the humans.

Most of the residents of the study areas have makeshift toilets built with temporary raw materials like old garments, gunny bag, plastic and flex sheets and the condition of the toilets were extremely unhygienic that could lead to transmission of fatal infections. The NGOs of the area are involved in helping the people to build hygienic toilets. The state government has also provided toilets on SBM scheme; however, as the fund is very meagre to construct reinforced toilets, most of the people seem to have used the allocated received funds on other essential basic needs of the house instead of construction of the toilets.

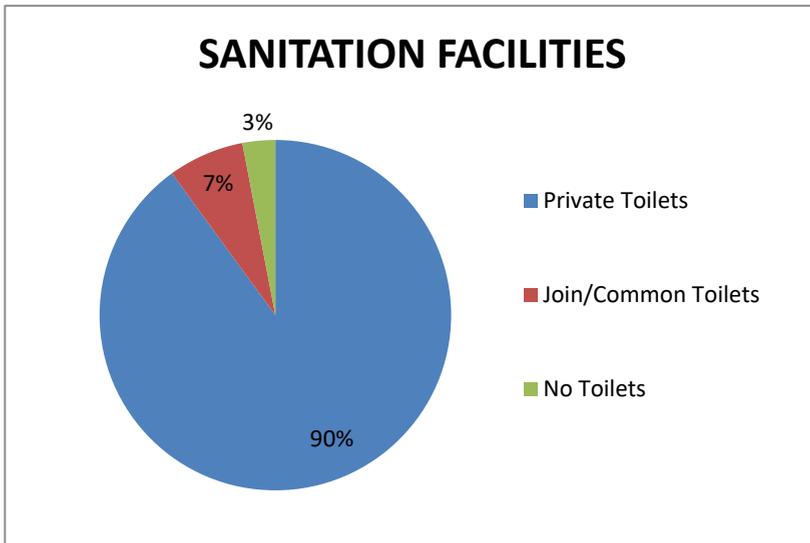
## 9.2 Sanitation

Sanitation is a driving force for community health of any society. A clean environment, open defecation free, personal hygiene practices among the individuals, proper solid and liquid waste management, and availability of adequate safe drinking water determine the health of individuals as well as the community. These will ensure that there are lesser mortality owing to unhygienic and water borne ailments. It is estimated that in India, 88 % of child deaths are estimated to be related to diarrhoeal diseases.

Sanitation can pose major problems in growing urbanisation and it is evident in settlements in towns and Tezu, the study area a township which requires sanitary system for healthy environment. In compared to other towns in the state of Arunachal Pradesh, Tezu is comparably planned well but this contest is being challenged by the management of sanitation. Mostly during monsoon season, the overflow of drainage with dirt and sewage in rainy season is common. Since few years the Department of Urban Development has taken up the job of cleaner town settlements but this effort false prey to the casual attitude and lack of zeal to work displayed by the employees have failed to achieve targets of sanitation in the township.

In addition, it was found that open defecation is practiced where people use agricultural fields, wastelands, banks of rivers and streams, forestlands and open waste places to defecate though mostly the defecation sites are far from human settlements. The influence of modernisation, changed cultural behaviour, changes in social life and education, have developed technologies for sanitation ranging from using dry toilets to flush toilets and ecological sanitation.

**Figure 2** Pie chart showing the sanitation facilities of the study area (see online version for colours)



*Source:* Field data

90% of household are having good sanitation facilities, 7% of the household were having common/joint toilets facilities and 3% of the households were not having toilets facilities in their houses due to reasons like space problem, not able to afford and most alarmingly due to mind set and priority issues.

Pit toilets covered with temporary makeshift arrangement are commonly used in the area. 98% of household in Shivaji Nagar, Tezu Nallah and Reserve Line used pit toilets, and the remaining 2% toilets and their waste are disposed to the nearby streams or rivers.

57% of toilets were made with raw materials like bamboo or constructed temporarily wrapping waste garments, gunny bags and plastics. Due to which there have been instances of waste being exposed in the open is area that are polluting the environment. 40% of the households are using permanent and well built pour flush toilets, especially in DRDA colony and Minister Line. There are some bamboo built toilets that are also connected with pit and septic tank. It was observed that people are aware of having toilets for the nature call; however, there is lack of awareness on disposal of waste.

### *9.3 Waste management*

There are two types of wastes based on the physical properties they own and they are categorised into solid waste and liquid waste. Any wastes other than human excreta, urine and waste water are called as solid waste. On the basis of biodegradability solid waste are further classified into biodegradable and non-biodegradable waste. Used water which is left out from various purposes is called as liquid waste. Liquid waste in general is categorised into grey water and black water. Waste water generated from the toilets is called as black water which contains mixture of faeces and urine which also contains harmful pathogens that require should separate treatments. The grey water which is generated from kitchen, bathroom and other sources should not be mixed with black water.

According to the people of the study area during the field study, it was learnt that the state government does not put in sufficient action for the management of the wastes; however the NGOs and SHGs members sometimes voluntarily clean up their localities and dispose the waste. In such occasions of social service, the UD department and the district administration join with the mass in clearing the waste and also provide garbage trucks for collection, hand gloves and mask for the cleaning and disposal of the wastes.

On asking on if there were government fund provisions for waste management, the NGO and SHG members clearly denied of such support. However the PHED department and the UD department have constructed and installed permanent dustbins in various sectors of Tezu Township. However, there have been errors on the part of the government on clearing the designated filled bins and failing to keep them ready for next lot of waste collection. This standstill in the cycle of waste management has resulted in foul smell all over the atmosphere of the township and probably leading to diseases in the neighbourhoods. The UD department is responsible for used to disposing the garbage in proper landfills but they actually do in the nearby river site. IT was also found that there the practice of burning of wastes which often burns and produces unnecessary smoke for several days leading to spread of toxic air to the nearby surrounding causing huge air pollution.

To dispose the human excreta, at least some households used pit toilets but others did not as they used runnel or river to dispose the excreta which is not favourable for

environment and human health which worsens the situation on lack of drainage system. There is no management system for the removal of animal wastes too.

#### 9.4 *Public health*

The traditional tribal societies since time immemorial have had healing and treatment system for various ailments. They used herbs/roots and leaves of wild plants as preventive medicines. Gradually, the modern scientific methods replaced the old traditional healing methods by introducing modern biomedical advancements and cure and treatments regimes.

Presently, the town has one district hospital and few health and wellness centres, CHCs and PHCS nearby with various medical facilities including general medical checkup, blood test facilities, DOT centres, ICTCs, OT facilities for minor and major cases, labour room, etc.

#### 9.5 *Water supply*

Water is the most essential part for survival of human being. Water supply in Tezu Township is fairly well. The PHED water pipe line, a government facility is the main source of water supply in the town. Out of 2,592 government houses, 1,217 houses are connected with the pipe line. On the basis of primary survey, it is reflected that Tezu has 100% connection of pipeline. According to PHED department, 95% of the houses were well connected with pipeline and the remaining 5% account to non-inhabited residences. The PHED department maintains with a total of 20 tankers in the town for water supply during exigencies and maintenance.

**Table 2** Government charges on pipeline water

<i>Sl. no.</i>	<i>Type</i>	<i>Monthly bill</i>
1	Charge for private house	100
2	Barrack and type 1 quarter	50
3	Type 2	75
4	Type 3	100
5	Type 4	125
6	Type 5	150
7	Type 6	175

*Source:* PHED, Tezu

All the study areas were well connected with the water pipeline and there is only one major problem observed, that most of the connections were given directly from the river stream, therefore, during the rainy season the contaminated water are being used for cleaning and human consumption. The treatment of the water is spelled by the concerned department, but it was difficult to ascertain the contest during the study.

Many a time it is recorded that the water supply get disrupted due to washing away of the main pipelines due to flood in the river and the pipeline often got blocked due to the surge of stone pebbles and river water fish and other weeds.

## **10 Suggestions and conclusions**

However, in spite of all findings there is need of encouragement on participation of NGOs and SHGs along with proper implementation of sanitation and public health schemes by the implementing and expediting government administration and agencies.

The study shows that the government departments need the community involvement for the proper implementation of government programs. However, the community seems to have less dependence on the government institution due to lackadaisical attitudes of the manning machineries.

The government should encourage NGOs and SHGs to implement public health objectives. Local district administration must encourage their efforts as the mass trust them. The district administration must conduct awareness camp/programs with collaboration for better public health delivery.

Waste management responsibilities should be done with more man power and resources. There should be sufficient designated manpower for each waste management process.

The study area of the township consists of both urban and rural population. There has been tremendous development in the field of education, transportation and communication, medical facilities, etc. The Tezu Township is constantly expanding demographically which is an important reason for the evolving functional character of the community, which has profound impact on sanitation and public health and it requires more insight on the part of future policies.

This work within public health system and WASH can be referred in the following:

- planning new programmes of place specific strategies
- used as reference work for training of personnel of voluntary organisations, government officials, school teachers, public health engineering staff, etc. involved in implementing WASH
- useful for future research purpose in similar topics.

Public health and WASH services and facilities require tougher national and state level policies, funding patterns, monitoring and evaluation so as to have sustainable, resilient and accountable communities. Practically many societies and their institutional structures remain fragile and there is lack of commitment by the government and administration. States that are unable to sufficiently fund public health system and WASH services must come up with revamping of their system in having congenial rapport and mainstreaming of all the stakeholders and partners in the cause, at all stages of formulation and implementation of the same. Further, there is need for pumping sufficient manpower and trained personnel in critical handling of public health and WASH services so that it reaches to the last man standing in the queue. Adequate human resources and clear roles of government institutions and regulators are critical. WASH services should be planned and funded as per the real time requirement of the community on the basis of actual needs of the population. Private sector investment can be invited or adopting public-private partnership (PPP) in running the WASH programme.

At global level, there are numerous initiatives where WASH and public health system are considered as the fundamental components for there are many nations who are enduring in proper standards of implementation and evaluation and monitoring of the

joint programmes. It is assumed that with constant coordinated global action and political will of the public health system, the targets of WASH can be achieved. However we need to retrospect that no government or administration can put forward the realisation of MDG 6, unless there is self-realisation and drastic change of behaviour among the individuals of the society.

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