MISSION BHAGIRATHA BASELINE SURVEY 2017

Executive Summary

CENTRE FOR ECONOMIC AND SOCIAL STUDIES
HYDERABAD, TELANGANA STATE

Executive Summary

I Context

Telangana State, India's newest state that was carved from the erstwhile state of Andhra Pradesh in 2014 has launched the Water Grid Scheme named as 'Mission Bhagiratha (MB)' to seek a permanent and sustainable solution to the drinking water problem in the state. MB is designed to provide potable drinking water to every household in their premises through piped water supply (PWS) by 2018. The vision of the project is to ensure safe and sustainable piped drinking water supply from surface water sources. This attempt is also in line with the guidelines of the National Rural Drinking Water Supply Programme being implemented at the national level. Under MB, the Government of Telangana plans to supply 100 liters per capita per day (LPCD) in rural areas, and 135 and 150 LPCD in semi-urban and urban areas respectively. The mandate of MB is to provide safe, treated drinking water on an adequate and sustained basis within household premises across all rural and semi-urban areas in the state. This enables Telangana State to comply with the Sustainable Development Goal (SDG) 6.1 to achieve universal and equitable access to safe and affordable water for all. According to the project design it covers 1.11 lakh sq km geographical area, 24,225 rural habitations, 65 urban local bodies, 99 constituencies and benefits 2.72 crore population. MB contemplates to draw about 87.64 thousand million cubic feet (TMC) of water both directly from the Godavari and Krishna rivers and also indirectly from some of the identified reservoirs fed by these rivers and their canals. Importantly, MB is a future-oriented scheme because it is designed to meet the growing drinking water requirements of the state over the next 30 years with a 100-percent coverage basis. In the above backdrop, baseline survey (BLS) was conducted with a view to assess the impact of MB. The basic mandate of the BLS is to capture and analyze the status of water services and other related services like sanitation and hygiene in the pre-project situation of Mission Bhagiratha in the rural and semi-urban areas of Telangana State. This report prepared on the basis of BLS enables to identify the challenges in regard to water services and other related services to be addressed by the Mission Bhagiratha Project.

II The Approach

The BLS is planned from three premises. They include: policy feedback from grass-roots to calibrate the content of the policy relating to water services and other related services; monitoring the implementation process, progress and outcomes of MB at the district level below the state; and the context, content and contours of the MB. The objective of the BLS report is twofold, viz., capturing and analyzing the status of water services and other related services (sanitation and hygiene) prior to the MB at the household, public institutions of education and health care as well as industries level in Telangana State; identifying the constraints to realize the potential of MB and assessing the potential impact when the constraints are addressed.

A sample of 12,000 households spread across 1500 villages and semi-urban wards, representing 10 per cent of the total villages and wards, from all the 30 districts, except Hyderabad, are selected. The sample households include households with piped water

connection and without piped water connection in the household premises. The sample villages are drawn from the STs, SCs and other castes concentrated villages. The sample wards covers the slums and non-slum wards from Nagar Palikas. This sample design with stratification is used to take care of heterogeneity with reasonable sample sizes as well as intended to provide statistically reliable estimates of the parameters of water and other related services at district level. Data to be collected for the BLS has been identified in the backdrop of the objectives and sample design. Accordingly, broad domains of enquiry of BLS include: status of water services, sanitation, hygiene, health, schooling, employment and income, and their status from the view point of socio-economic-spatial inequities. Five different types of schedules are designed to collect data required. They are: Listing Schedule; Household Schedule; Schedule for public institutions of education and health; Schedule for rural industries; Schedules for local bodies- village panchayats, in rural areas and local bodies in semi-urban areas.

A three-stage scheme of analysis has been conducted to identify the challenges to be addressed by MB. The purpose of this analysis is threefold: (a) assessment of status of water services and thereby sanitation and hygiene services and their inequities across socio-economic and spatial groups; (b) identify the ways and means to improve the status and reduce the inequities in WASH services; and (c) identification of the challenge to be addressed by MB. The details of this schema are in order. In the first stage, water conditions at the state level has been analysed, the water services have been validated against the SDG related to safely managed water services. Water services in the households and public institutions of health care and education has been analysed. The dimensions of water services considered for the analysis include safety, quality, adequacy, sustainability, availability of piped water connection in the household premises, and dependency on water markets. The same analysis has been extended to measure inequities across socio-economic groups and spatial groups like rural, semi-urban and districts.

In the second stage of analysis the constraints to realize the potential of water services have been analysed. Access to PWS on premises has implications for employment and hence, income; schooling and health outcomes. Along with providing water through PWS other dimensions of adequacy, quality, sustainability, efficiency in supply matter for positive implications. The costs involved for the households in terms of employment and schooling due to incidence of illness has been analysed. Similarly, the health implications of inadequate and unsafe water services on the incidence of waterborne and water related diseases have also been analysed. The health costs are assessed in terms of loss in employment (income) for workers and schooling loss for school going children and related costs incurred for all the members of household for the recovery from the episodes of ill-health.

The relation of water services with those related to sanitation and hygiene at the household level are also analysed in this stage. Availability of toilets in the household premises and water facility in the toilets are considered to assess the sanitation services of the households. Safe disposal of wastewater and garbage are considered to assess the hygiene services.

The efficiency of local institutions, such as village panchayats in the rural areas and Nagar Palikas in semi-urban areas, in providing water services as well as sanitation and hygiene services have been assessed. At the same time, policy measures through which the efficiency

and performance of these institutions can be improved in delivering WASH services are also identified.

In the third stage of analysis the benefits that accrue to the households and those that can accrue to the economy and society of Telangana State due to Mission Bhagiratha are assessed. Mission Bhagiratha has the potential in removing the present costs borne by the people, economy and society in terms of employment (income), schooling, health, state income and natural resources like groundwater because of the deficits in water services.

III Deficits in Water Services and their consequences on Households, Community and Economy of Telangana State

A. Deficits in Water Services and Their consequences on Households

Deficits in Water Services of Households

The pattern of water sources from which water needs are met has revealed interesting issues. Dependency of households on water from unsafe sources like unprotected wells, water tankers and open water sources is 3.9 percent in rural areas while it is 9.3 per cent in semi-urban or Nagar Palika areas (Figure 1). Higher dependency of households on PWS in the premises and purchased bottled water and lower dependency on groundwater is the pattern of water sources in semi- urban areas compared to rural areas. The dependency, though to lesser extent, on unsafe water, is pronounced with ST households, the poorest, the ST concentrated, fluoride hit and drought prone districts and among the Nagar Palikas located in drought prone and fluoride hit districts. PWS in household premises has enabled households to depend less on groundwater and unsafe water. The dependency on purchased bottled water is the lowest among the poorest, STs, STs concentrated districts, the districts which are far away from the capital city (Hyderabad), and similar categories in the Nagar Palikas.

Figure 1 Percentage of HH getting water from different sources in rural and semi-urban areas
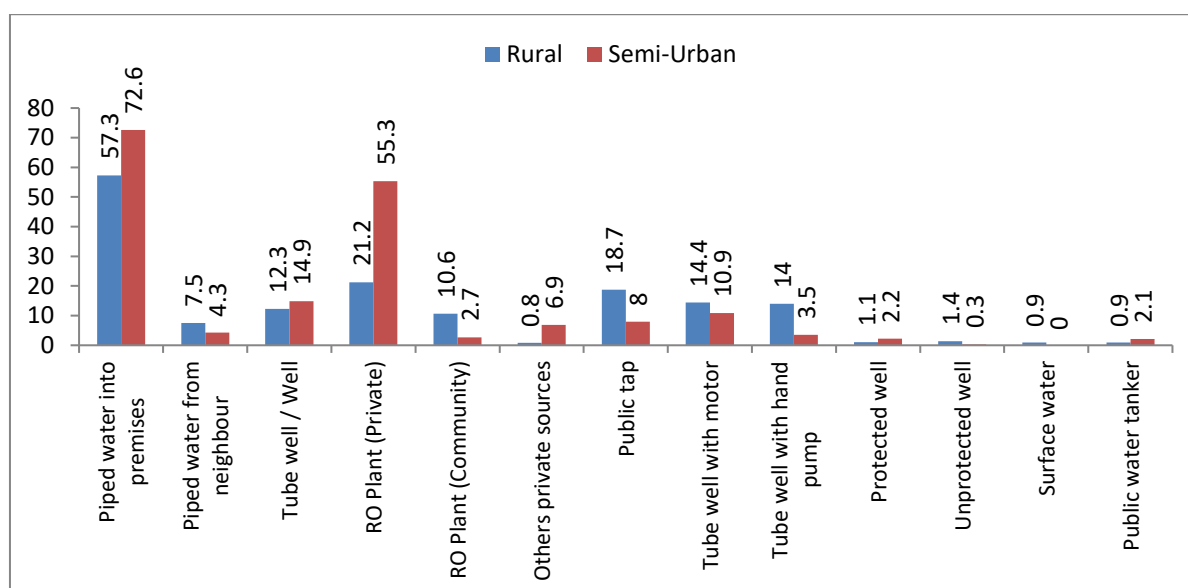

As high as 64 per cent of households in rural areas and 85 percent in semi-urban areas have experienced inadequacy in water collected from different sources, as per the norms of MB

(100 and 135 lpcd in rural and semi-urban areas) in regard to supply of water (Figures 2 and 3).The scarcity of water during summer induces households to depend more on groundwater and unsafe water for meeting their water requirements. Women face hardship in meeting water needs for their menstrual hygiene management during summer and this is more so among women who use reusable sanitary napkins. Inadequacy of water, as per the norms of MB, is felt by larger proportion of households belonging to the poorest, STs, the STs concentrated districts and varies considerably across other districts and Nagar Palikas. Water scarcity during summer season is felt by rural households across all the districts especially by more households in Khammam and Sangareddy districts. It has led to more dependency on piped water outside premises, groundwater and unsafe sources (Figure 4). Further, scarcity is felt more in water use for domestic purposes than for drinking and cooking. In Nagar Palikas, households in slum wards compared to non-slum wards felt scarcity of water for all purposes.

Figure 2 Percentage of rural households with water inadequacy across districts
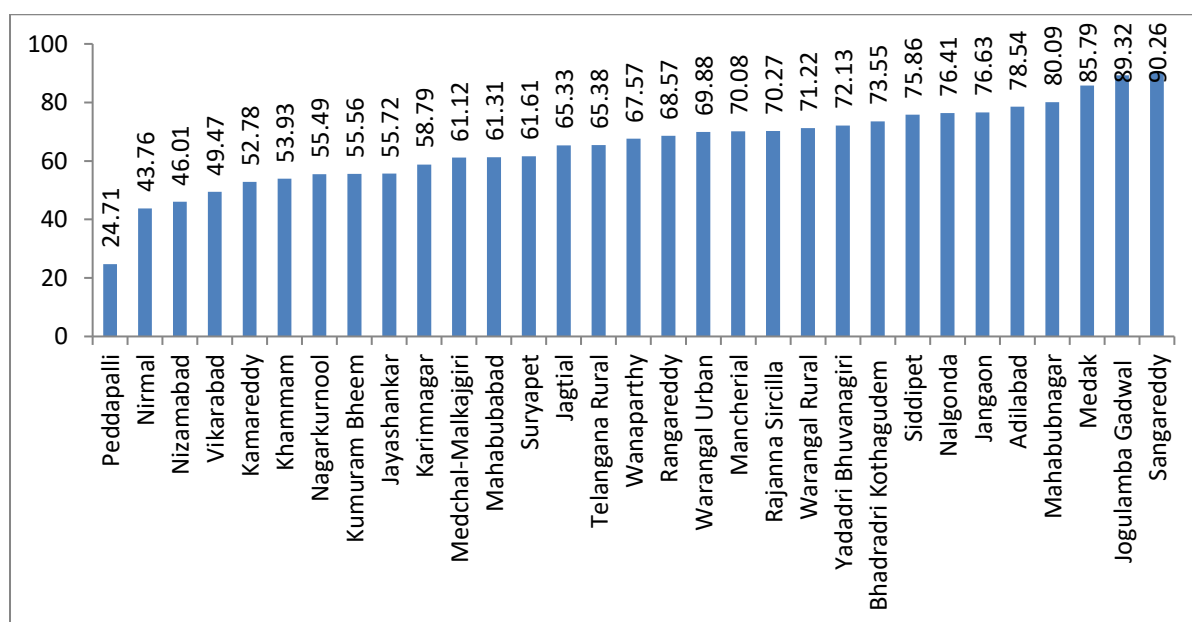
Figure 3 Percentage of households with water inadequacy across Nagar Palikas
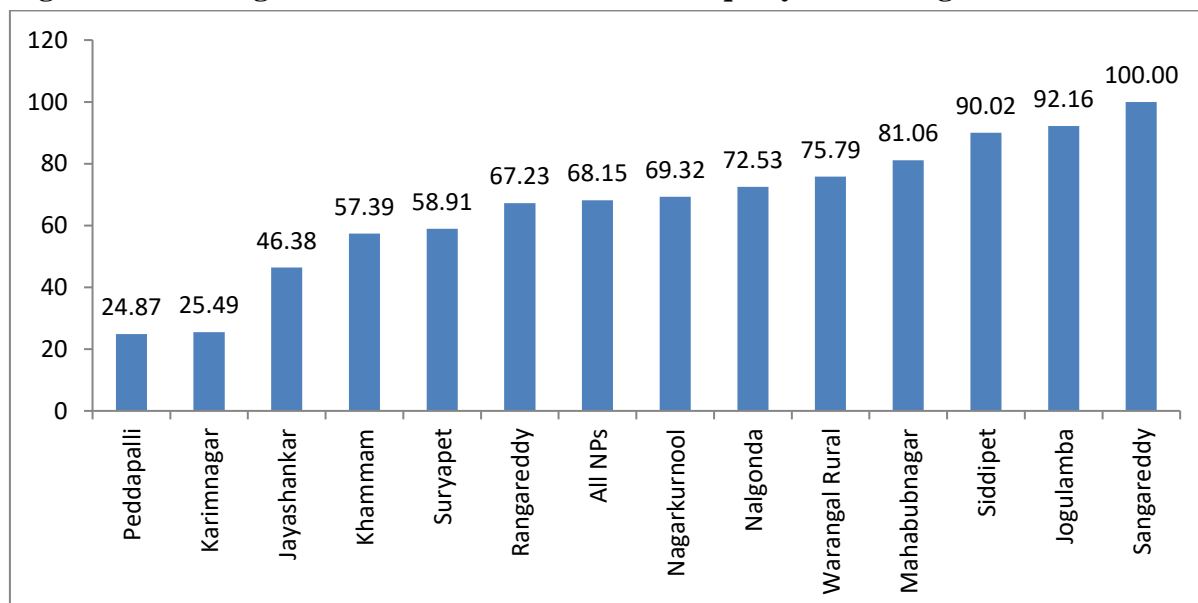
Figure 4 Percentage of rural households relying on different water sources during the reference period and summer season
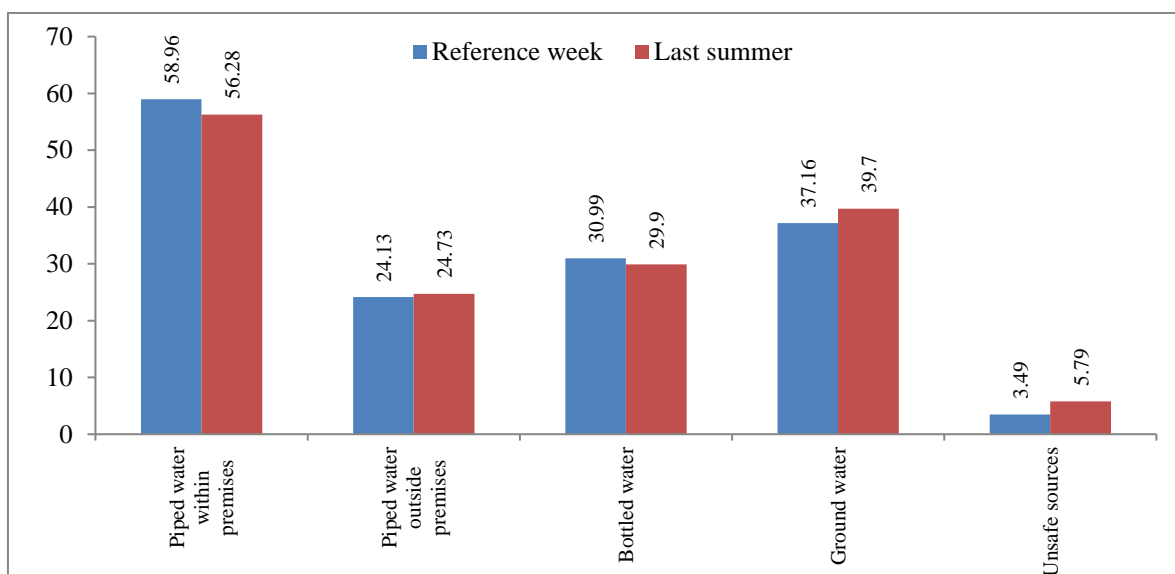

Water free from bacteriological contamination that ensures safe water is pronounced among purchased bottled water, PWS and ground water in that order. But there are variations across the districts in this pattern of water quality. It is evident that the districts like KumaramBheem, Khammam, Nagarkurnool, Wanaparthy, Nalgonda, Suryapet, Sangareddy, Medak, Nizamabad, Kamareddy, and Warangal Urban have suffered distinctly from others in this regard (Figure 5). These districts have experienced the problem of contamination in case of at least two out of four water sources. Quality of water also varied across semi-urban households in Nagar Palikas (Figure 6). Slum wards, with dominantly the poorest households, compared to non-slum wards have comparatively lower percentage of households with safe drinking water in Nagar Palikas. The quality of drinking water supplied through PWS into the household premises varied across households due to drinking water maintenance practices and the hygiene environment around the main source of water in the premises at the household level given the variations in the quality of water and sanitation conditions across the villages.

Figure 5 Percentage of rural households having good quality of drinking water across districts by H2S test
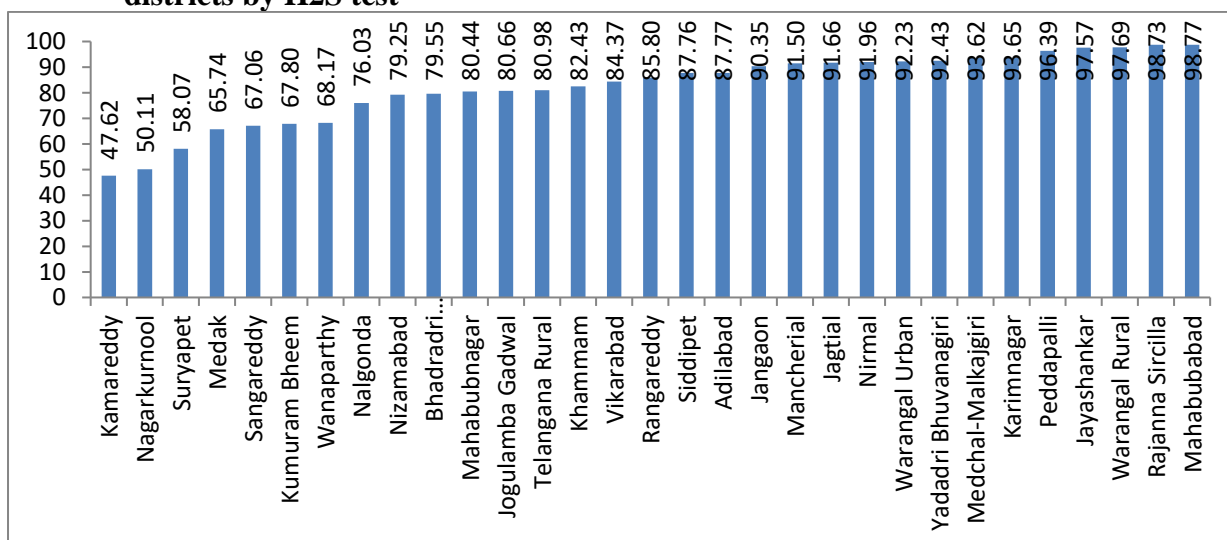
Figure 6 Percentage of semi-urban households having good water quality by H$_2$S test
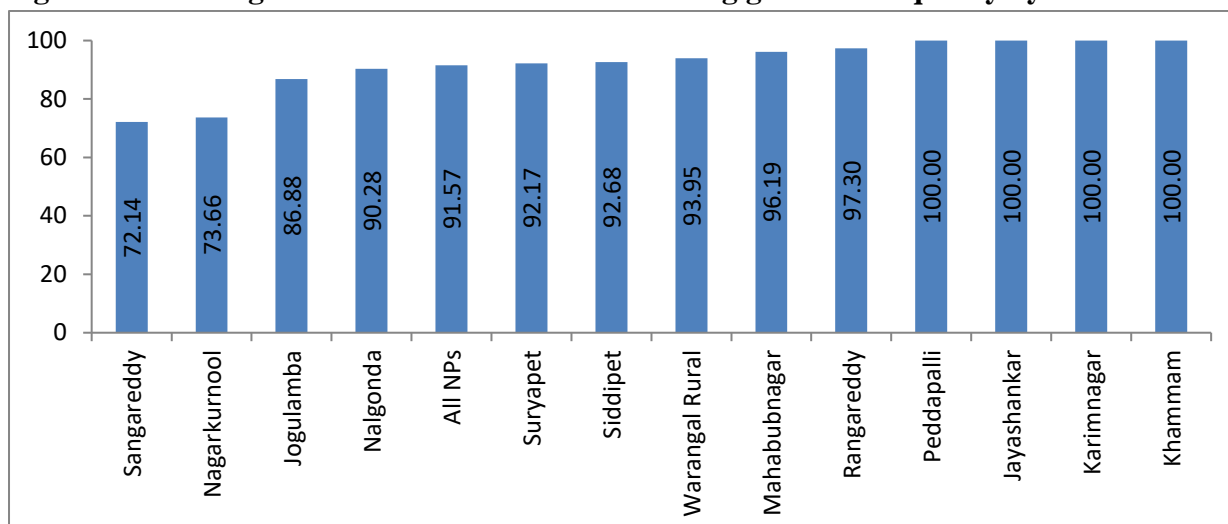

73 per cent of households from semi-urban areas and 57 per cent from rural areas have PWS in their household premises (Figures 7 and 8). Many benefits have accrued due to this. PWS in the household premises has led to less dependency on unsafe water, groundwater and piped water from outside household premises. Safe water is ensured, though inadequacy of water is felt by households. The involvement of women and children as well as their time spent in fetching water is drastically reduced. Incidence of ill health is also lower among the households with PWS in the household premises. Hence, all the dimensions of water services like safe, adequate, and sustainable and PWS in the household premises should be provided. Households belonging to STs, the poorest and the STs concentrated districts have the lowest coverage under piped water connection in the household premises in the rural areas. Also, the districts like Mahabubnagar and Jogulamba Gadwal which have lower rank in development; and the other districts like Sangareddy, Vikarabad and Medak despite their proximity to capital city have lower coverage. There are considerable inequities across Nagar Palikas. The poorest, SCs and STs have the lowest coverage in the semi-urban wards, as in the case of villages in rural areas. Slum wards have lower coverage compared to non-slum wards in Nagar Palikas.

Figure 7 Percentage of rural households with piped water supply within premises across districts
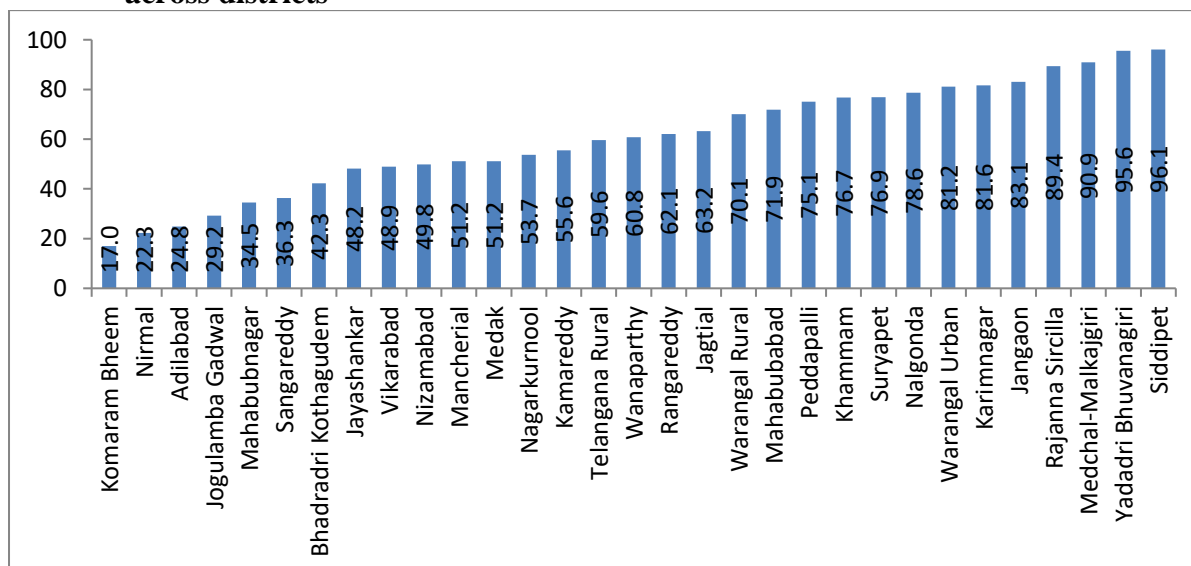
Figure 8 Percentage of households with piped water supply within premises across Nagar Palikas
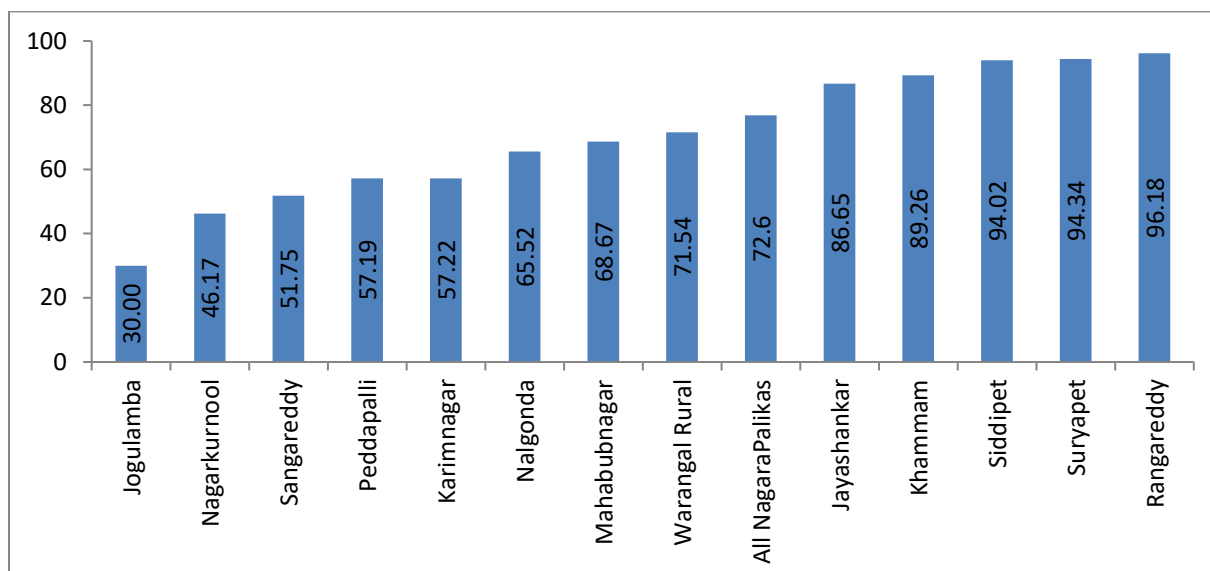
## Consequences of Deficits in Water Services on Households

The consequences of deficits in water services are measured in terms of three dimensions, viz., time invested to fetch water, impact on health, and impact on sanitation and hygiene services.
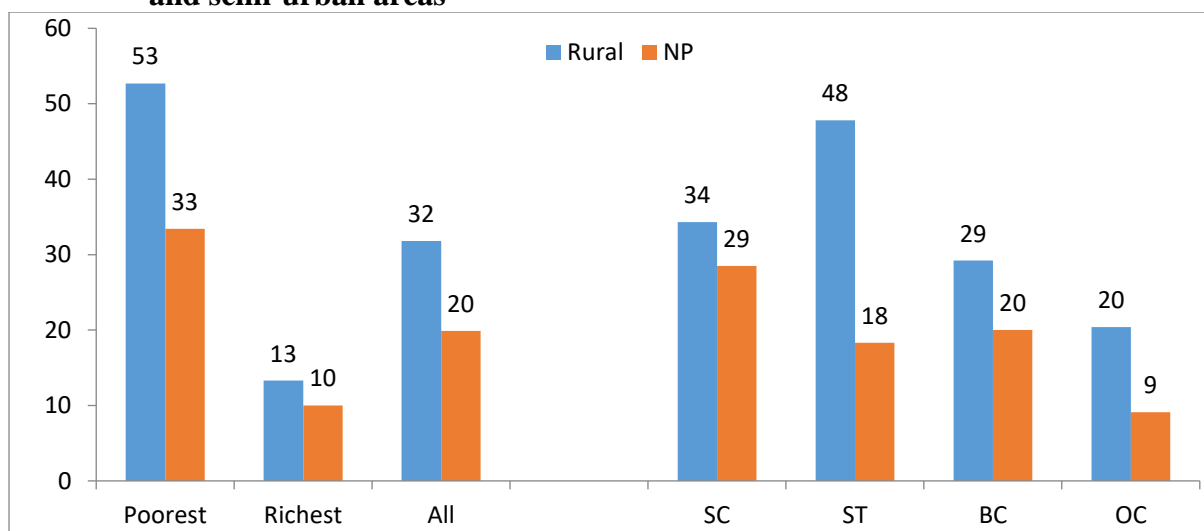
Fetching Water

Higher percentage of women and girls compared to men and boys fetch water in tribal concentrated districts and districts with lower rank in development status in rural areas. More boys and men are involved in fetching water from RO plants. They have reported that the drudgery they put up with this is relatively lower, compared to that of women and girls, due to the use of cycles/motorcycles for fetching water. But the districts where the RO water penetration is slow, women and girls have borne more burden of fetching water with drudgery. Household members involved in fetching water constitute lesser proportion in semi-urban areas compared to rural areas. This is due to the fact that larger proportion of households in semi-urban areas over rural areas has piped water connections in the household premises. Larger proportion of household members in slums compared to those in non-slums have involved in fetching water in the Nagar Palikas. The poorest, the SCs and the STs in the Nagar Palikas have participated in larger proportion in fetching water especially from the slum wards. It is very interesting to note that the girls' and womens' involvement in fetching water is lower in semi-urban areas over rural areas (Figures 9 and 10). Workers and casual labour among workers are involved more in fetching water in rural areas compared to semi-urban areas (Figures 11, 12).The average time spent by women in fetching water each time is lower in case of semi-urban areas (Figure 13). The response of semi-urban households to the water scarcity seasons is similar to those of in rural areas in regard to participation of members of household, the time taken and the distance travelled to fetch water. It is also evident that summer (water scarcity season) in contrast to normal seasons has demanded involvement of more persons, travel for long distance and more time to fetch water or travel the same distance but more time in fetching water. This clearly indicates that the drudgery of persons especially women and girls goes up in fetching water during the water scarcity season.
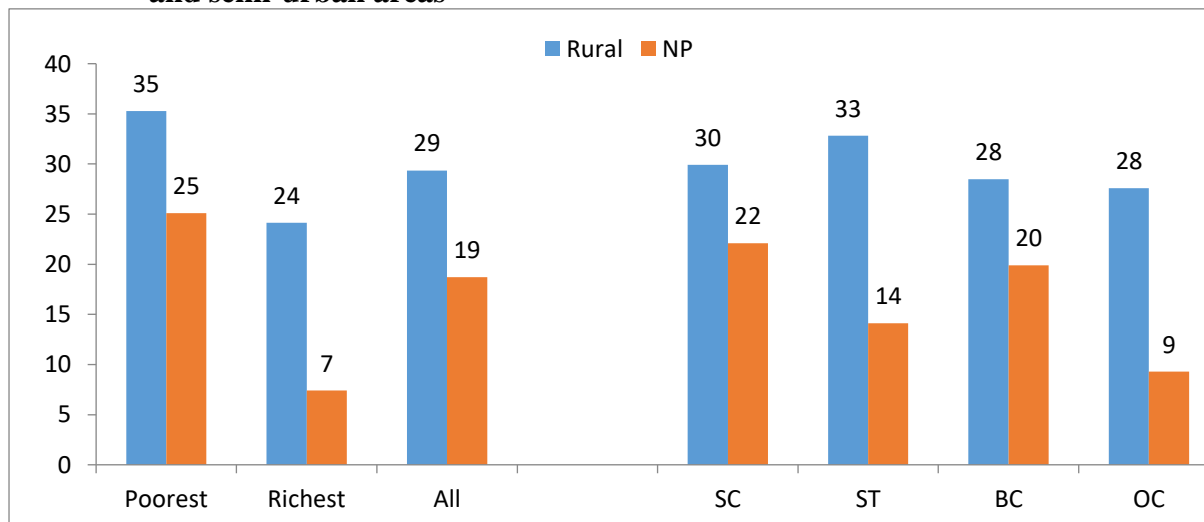
Figure 9 Percentage of persons fetching water across socio-economic groups in rural and semi-urban areas
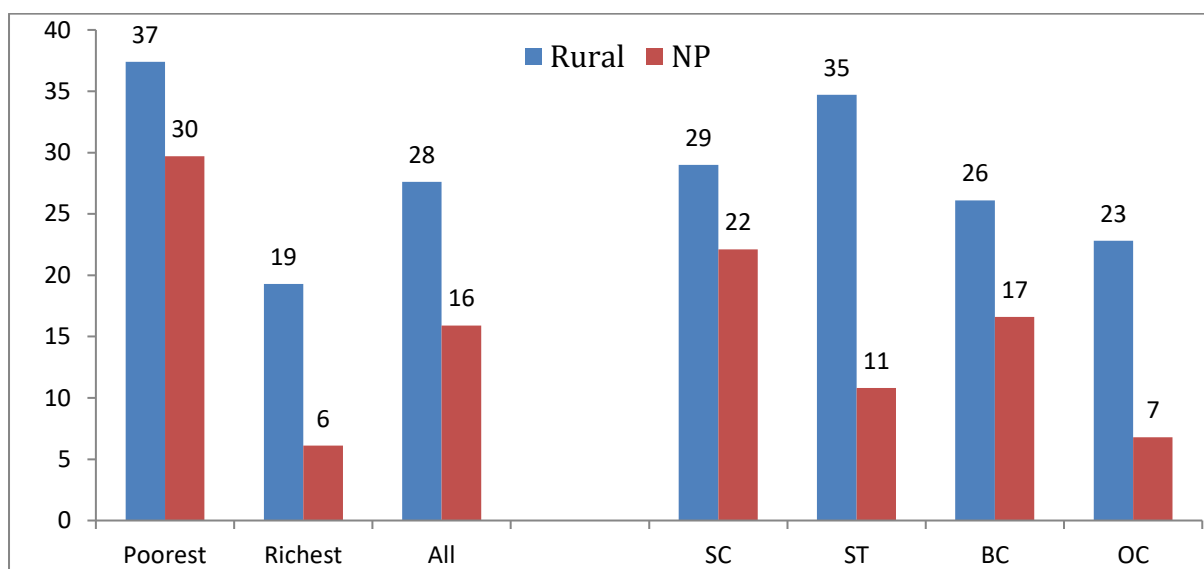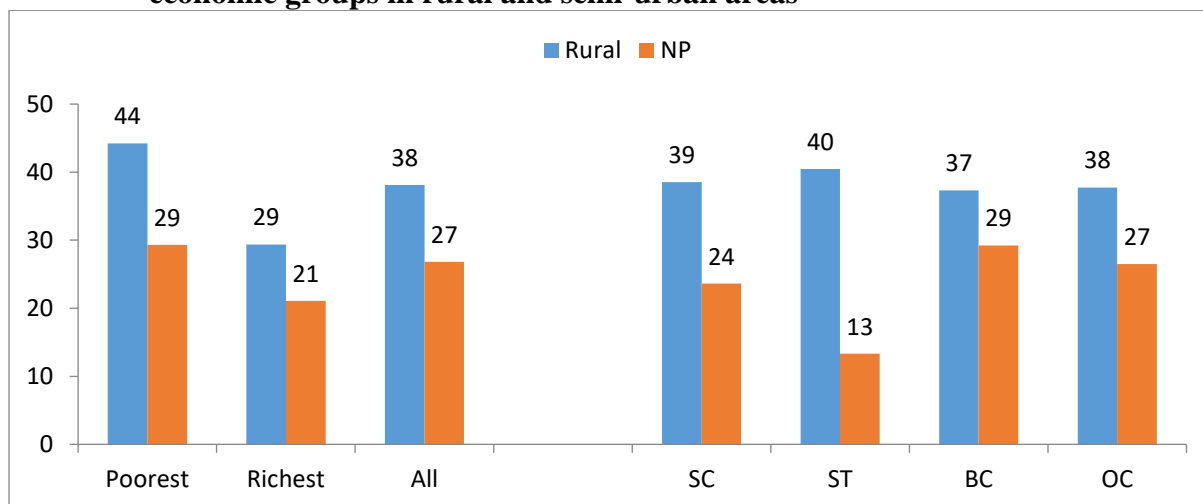

**Figure 10 Percentage of women fetching water across socio-economic groups in rural and semi-urban areas**

Figure 11 Percentage of workers fetching wateracross socio-economic groups in rural and semi-urban areas

Figure 12 Percentage of casual labour among workers fetching water across socio-economic groups in rural and semi-urban areas

Figure 13Average time spent by women every time fetching water (minutes) across socio-economic groups in rural and semi-urban areas
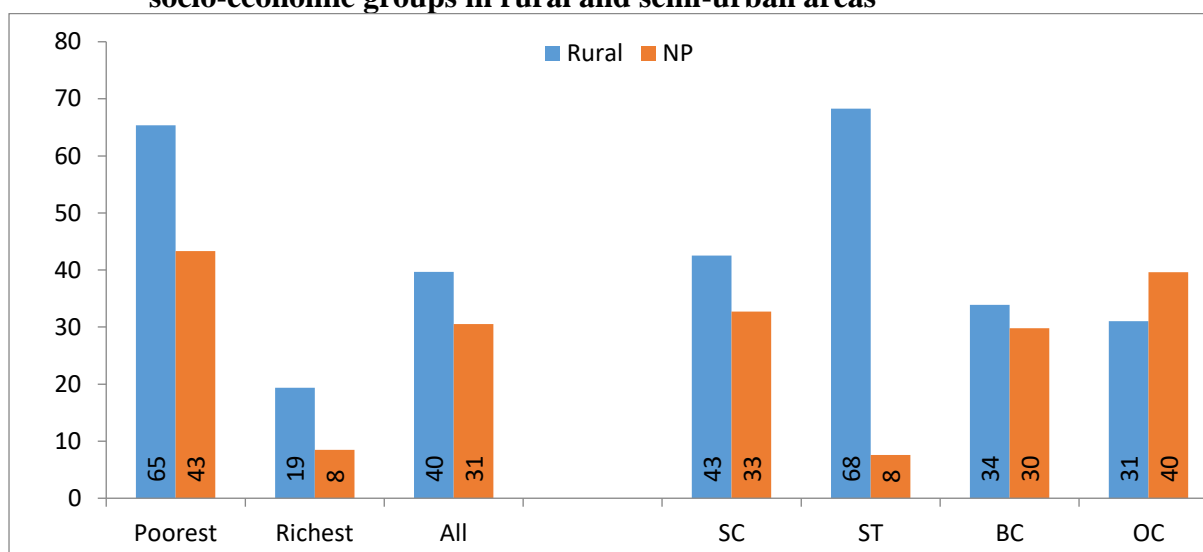
Impact on Health

Inadequacy of water for consumption purposes and bad quality of drinking water affects the health of the individual adversely. From the analysis in chapter 2, it is evident that water for consumption is inadequate and there is bacteriological contamination of drinking water. These deficits in water result in incidence of illness among the household members. Water related diseases (malaria, stomach pain, skin problem, and intestinal worms) occur due to inadequacy of water while water borne diseases (diarrhoea/dysentery, cholera, jaundice, dengue/chickungunya) occur due to bad quality of water. Water may be inadequate and may also not be clean and safe to use for the privacy needs of women, which may cause reproductive ailments like rashes, leucorrhoea, or urinary infection.

Incidence of illness in general and diarrhoea in particular due to inadequacies in water services is much higher in semi-urban wards compared to the villages. It is very high among the young children of 0-3 years. The higher incidence of these is observed in households without water connection in their premises compared to those who have, in villages as well as

in semi-urban wards. Water supplied through piped connection into the premises of the households is found to be cleaner and safer compared to water supplied through public taps. This is due to unhygienic environment created around the public tap by the communities and because of lack of proper wastewater disposal arrangements.

The women from the poorest, STs and the STs concentrated districts have faced water scarcity in large proportion during menstrual cycle. This is more so in the summer season. This is reflected through the coping mechanisms (like travelling long distances to fetch water) adopted to meet additional water requirements for menstrual hygiene management.

Casual labour fetching water and consequent loss of employment days are higher in villages over semi-urban wards. These are also higher among the households those who did not have piped water connections in their premises compared to those who have, both in villages and semi-urban wards. This is also found in case of ill health due to deficits in water services. However, loss of employment is higher due to ill health over fetching water.

School going children have missed schooling due to their involvement in fetching water. They have also missed schooling because of ill health caused by the deficits in water services. These are pronounced among the households without PWS in their premises in rural as well as semi-urban wards. But the percentage of children missed school due to ill health is higher in semi-urban areas compared to those in rural areas (Figures 14 to 20). However, missing school due to ill health is higher over that of fetching water. Thus, it is clear that the status of employment, health and education, the three components of human development are in poor status due to the deficits in water services.
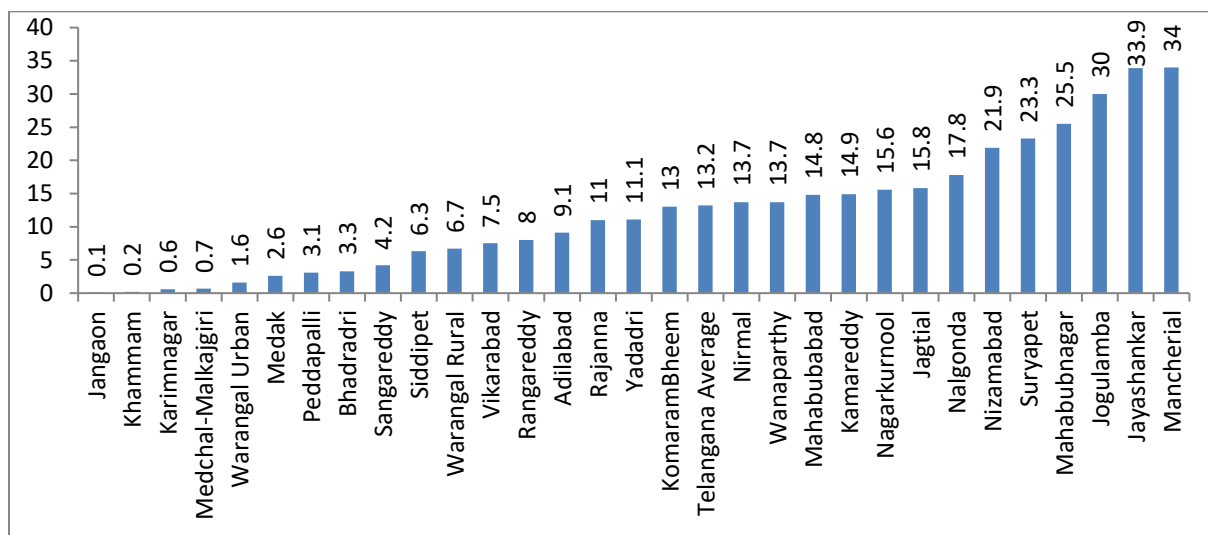
Figure 14 Percentage of persons reported incidence of illness according to socio-economic and gender groups (rural and semi-urban areas)
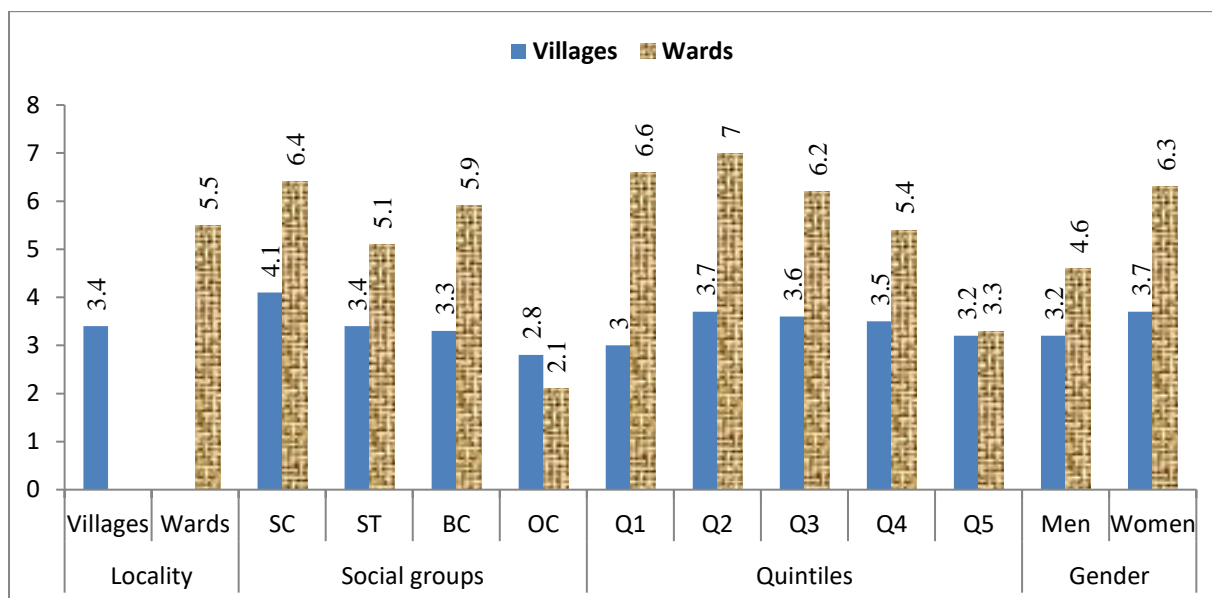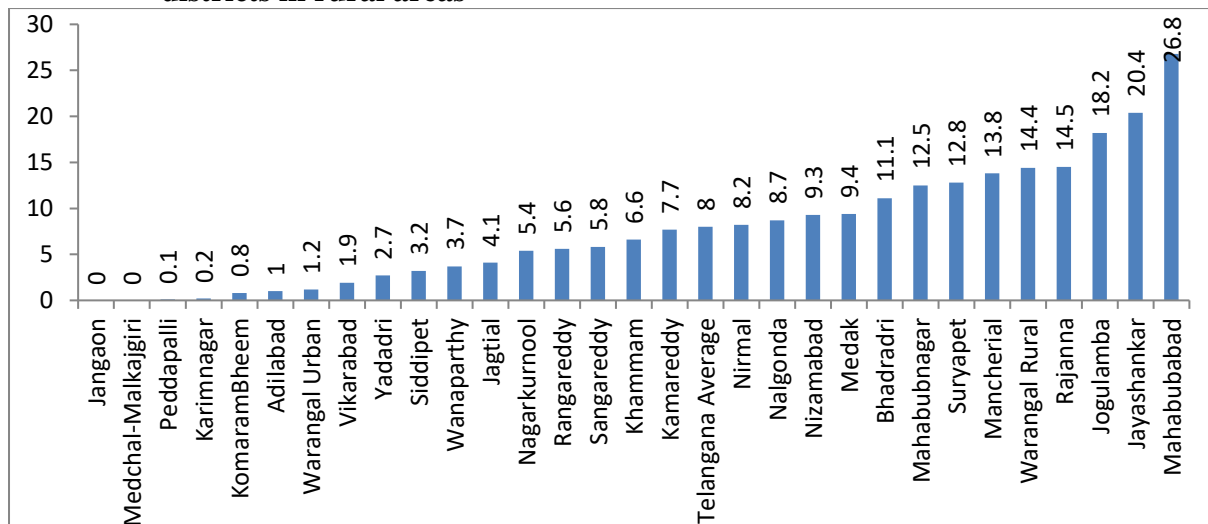
Figure 15 Percentage of persons reported incidence of illness according to districts in rural areas
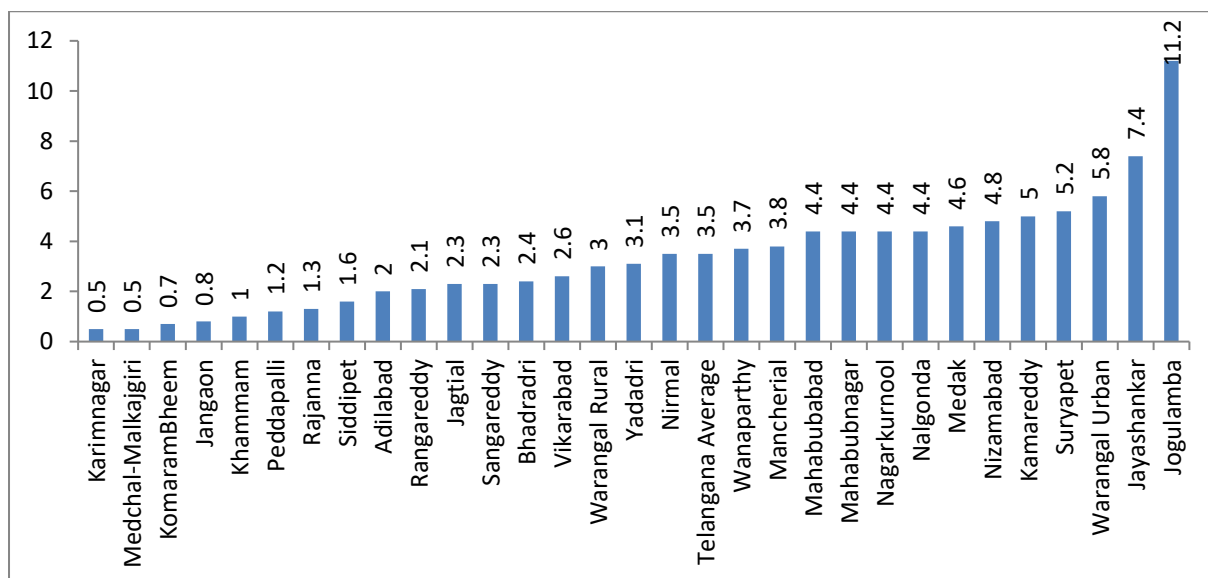

Figure 16 Percentage of children (0-3 years) reported incidence of illness according to districts in rural areas


Figure 17 Percentage of children (4-5 years) reported incidence of illness according to districts in rural areas

Figure 18 Estimated percentage of persons reported incidence of water related diseases according to socio-economic and gender groups (rural and semi-urban)
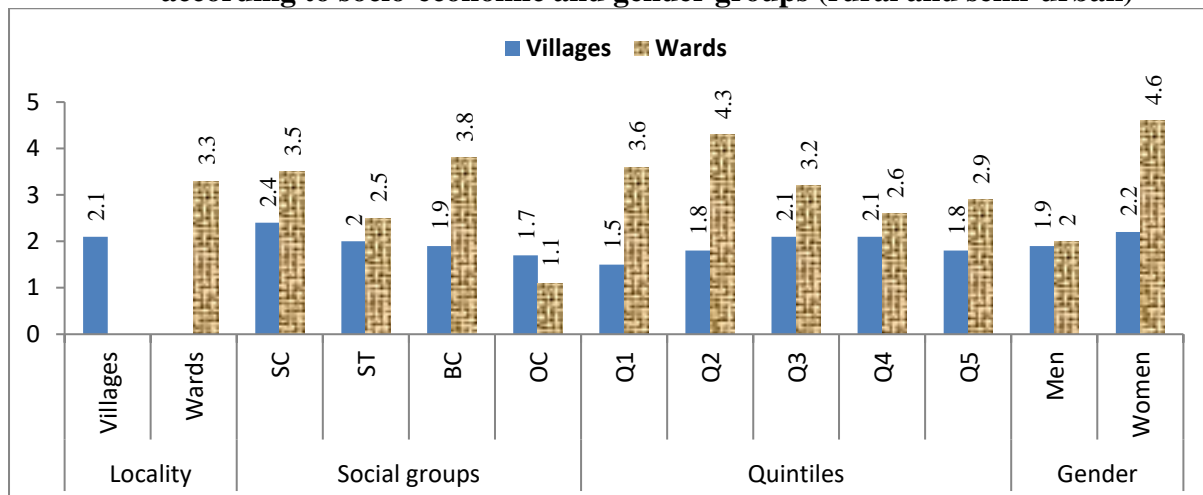
Figure 19 Estimated percentage of persons reported incidence of water borne diseases according to socio-economic and gender groups (rural and semi-urban)
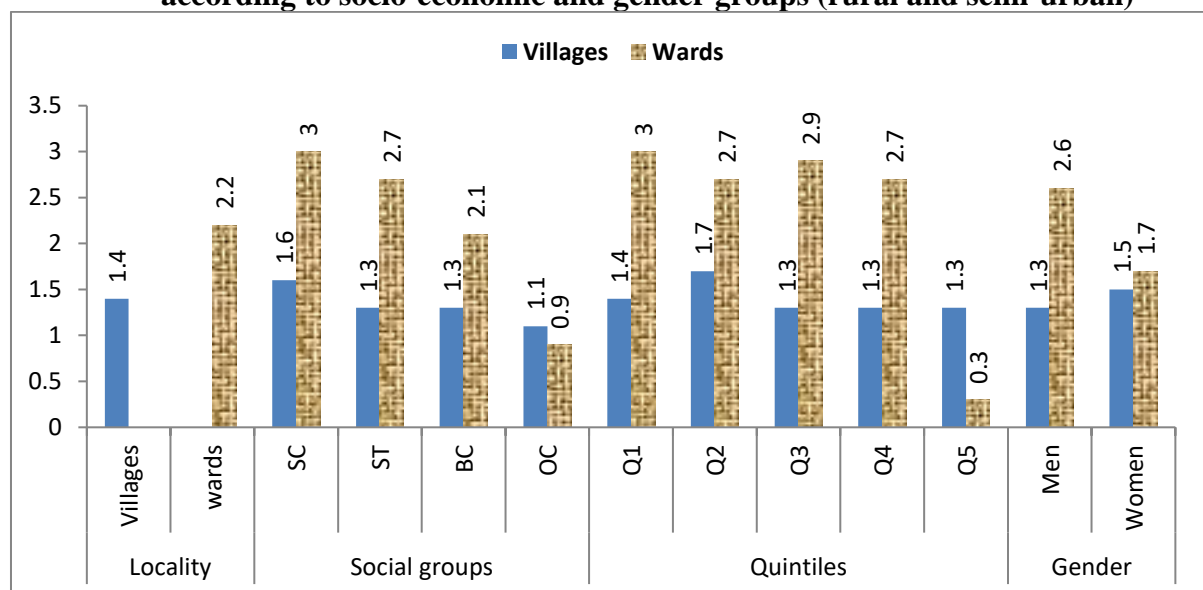
Figure 20 Percentage of persons reported incidence of diarrhoea according to socio-economic and gender groups (rural and semi-urban)
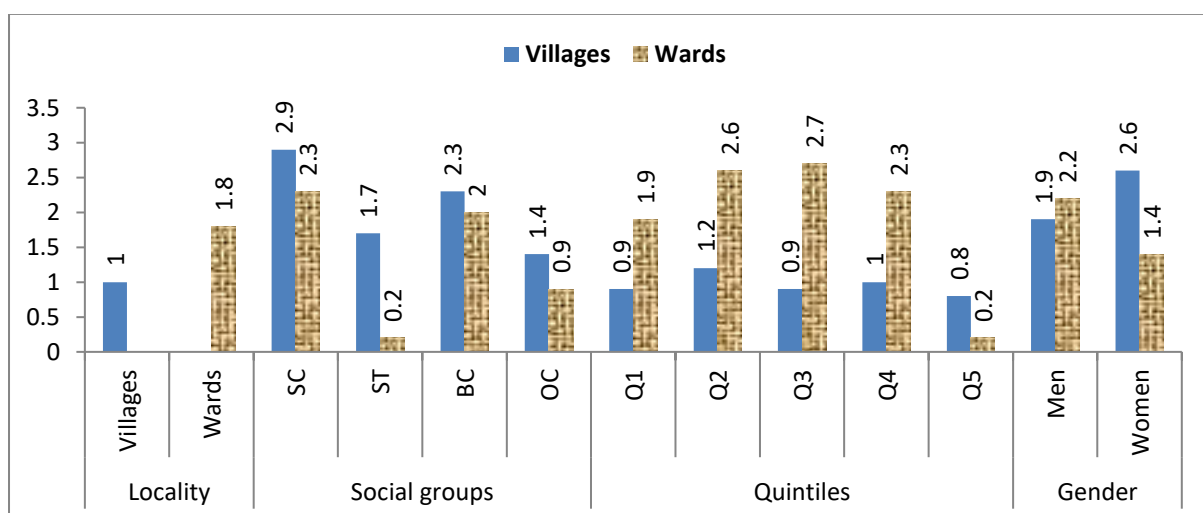
Impact on Sanitation and Hygiene Services

It is also evident from the analysis that the inequalities in water services have led to inequalities in the sanitation and hygiene services. Hence the reduction in inequities in water services is a must to improve sanitation and hygiene services across households. Around 92 per cent of households in semi-urban areas and 60 per cent of households in rural areas have toilets in the household premises. However, all the members of these households have not used the toilets. Proper drainage system to connect to public sewerage, guaranteeing adequate water especially through PWS in the household premises with running water in the toilets, improving toilet structure in terms of ensuring privacy especially for women and sensitive to the needs of the children and aged, and building awareness among the people about the benefits of the toilet-use can lead to considerable reduction in open defecation. Thus availability of water services in all dimensions is also one of the influential factors that encourage people to opt for the use of toilets.

Households with piped water connection in the household premises have faced less difficulty in following hygiene practices like bathing. Further, water shortage has constrained the practice of using soap for hand washing practices like washing hands before feeding child, after handling baby's diaper/faeces, after handling animals. But key practices like washing hands before eating, before food preparation, after defecation after handling rubbish were not affected due to shortage of water. Households with piped water connection in the premises have adopted safe method of disposal of garbage especially children faeces, compared to those who did not have piped water in the premises. Households with piped water connection in the household premises have adopted safe methods of wastewater disposal. Smaller percentage of households has obtained water services in all the dimensions considered for the analysis. This has also constrained the households in attaining sanitation and hygiene services in all dimensions considered. It is equally important that awareness should be built among the people on hygiene practices to ensure safe public health through Information, Education and Communication (IEC) activities. It is also clear that the piped water connection along with the infrastructure required for toilets and facilities for hygiene practices at community level (sewerage pipes, garbage collection, solid waste disposal) and household level (soap stand, towel near the toilets and the bathrooms) and awareness about hygiene practices in the households should go together. Hence, piped water connection in the premises and availability of related infrastructure brings behavioral changes in regard to sanitation and hygiene practices.

## B. Deficits in Water Services and Their Consequences on Community
Deficits in Water Services

Water services index varies considerably across institutions located in rural and semi-urban areas. It also varied considerably across SC/ST concentrated villages and type of wards (Figures 21 to 24). The determining factors of water services index vary widely resulting in wide variations in water services index.

Public institutions of health and education also gain in terms of enhancement of water services index if such constraints in determining factors are addressed. The inequities in delivery of water services across these institutions could be rectified by addressing the

deficits in infrastructure, inadequate flow of funds from concerned departments, deficits in management practices and functioning of bodies like Water and Sanitation Committees. Each of these factors contributes to improvement in water services index in the public institutions of health and education which improves delivery of water services and ultimately benefits the users.

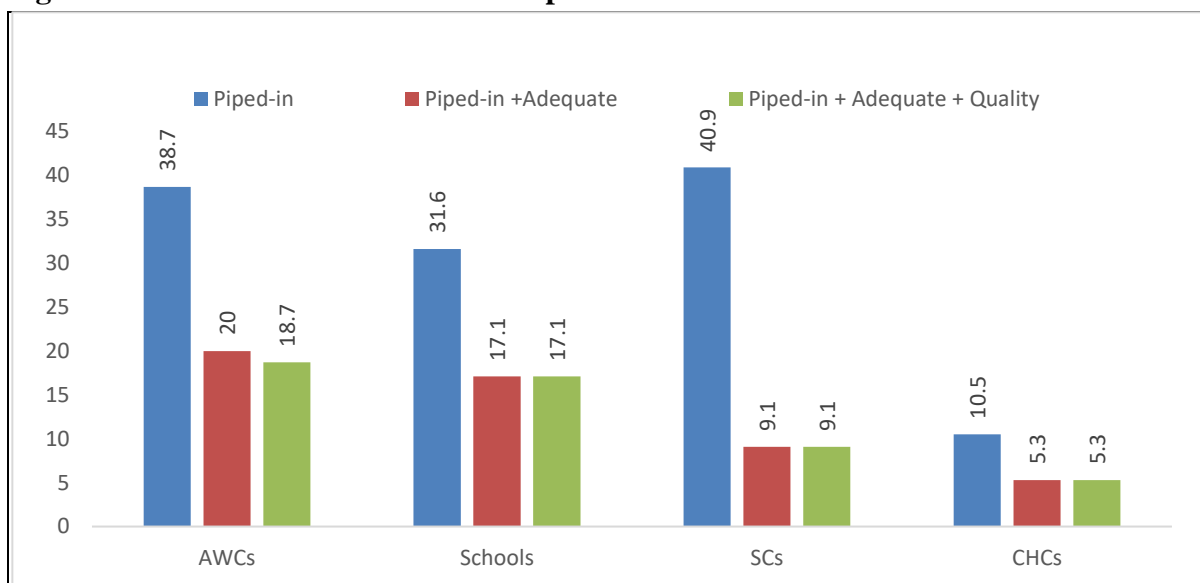**Figure 21 Water services ladder across public institutions-rural**
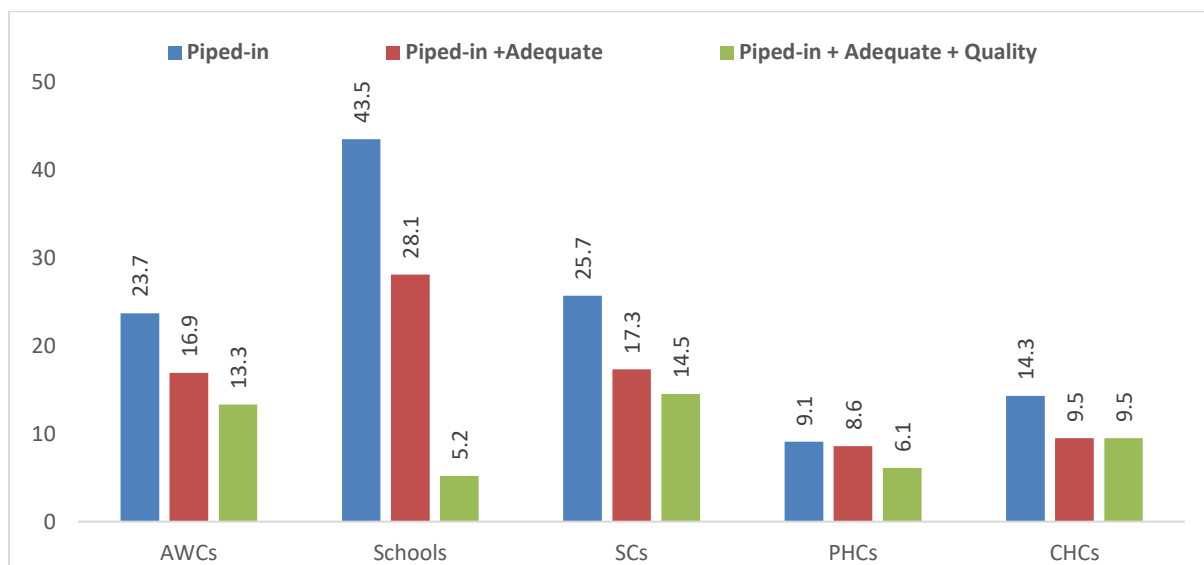
Note: AWC=Anganwadi Centre, SC=Sub-centre, PHC= Primary Health Centre, CHC= Community Health Centre

Figure 22 Water services ladder across public institutions by caste concentration of villages-rural
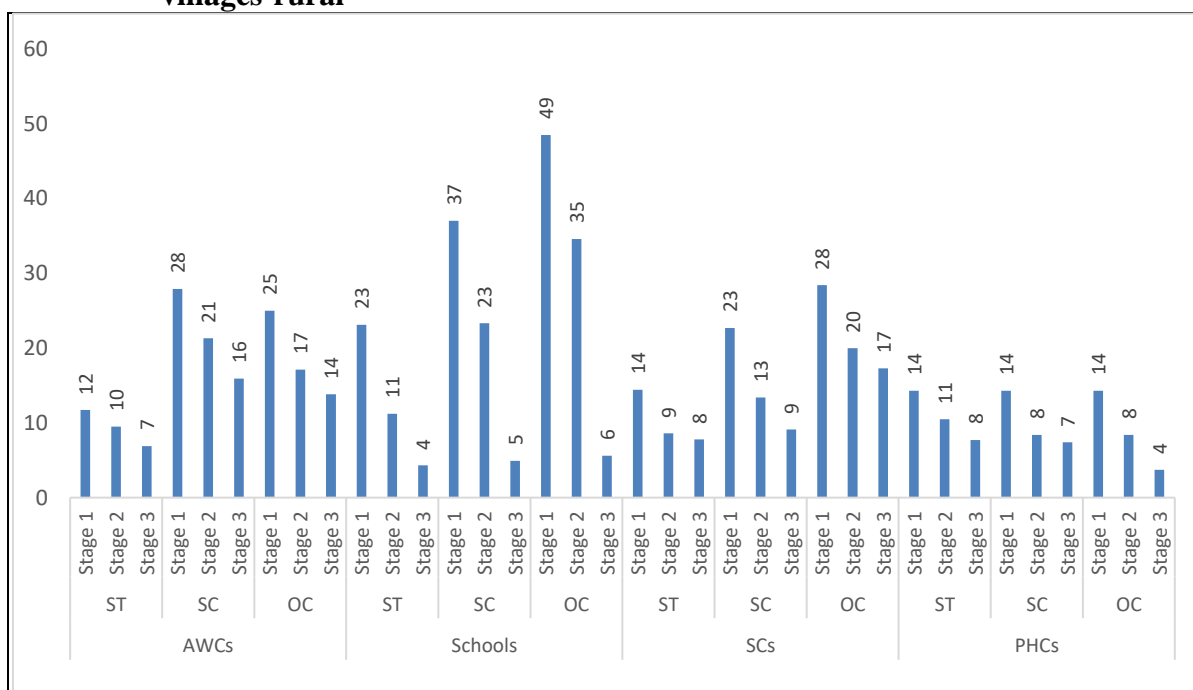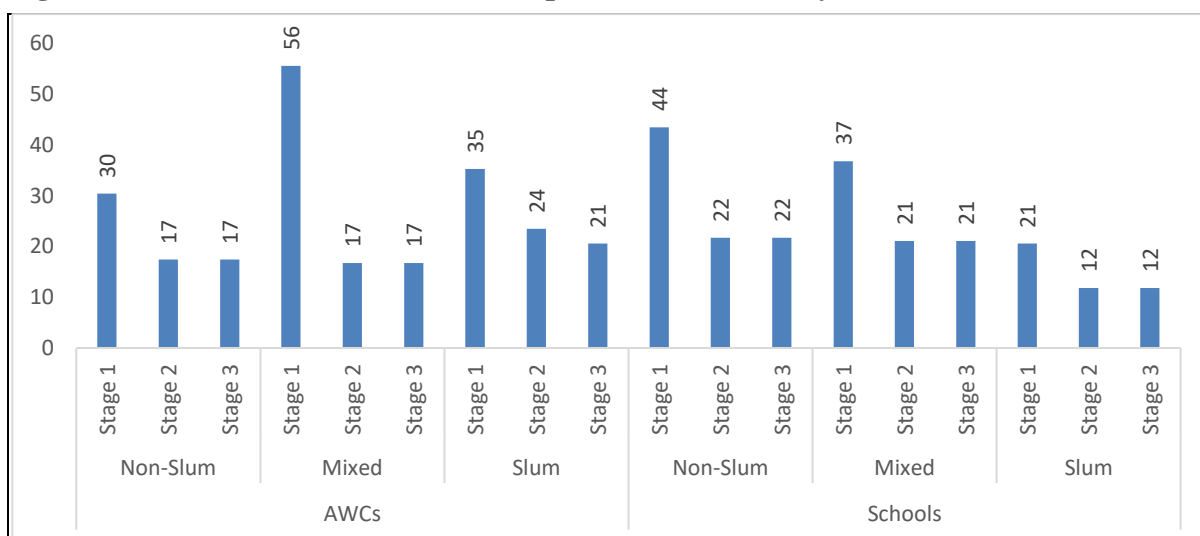

Note: Stage 1= Piped-in
Stage 2= Piped-in + Adequate
Stage 3= Piped-in + Adequate + Quality

Figure 23 Water services ladder across public institutions-semi-urban

**Figure 24 Water services ladder across public institutions by semi-urban locations**

Stage 1= Piped-in
Stage 2= Piped-in + Adequate
Stage 3= Piped-in + Adequate + Quality

Impact on sanitation and hygiene services

The analysis conducted to analyse the linkages between water services and sanitation and hygiene services has revealed that there is strong influence of water services in determining the sanitation and hygiene services across all the public institutions of education and health (Figure 25).

Figure 25 Relationship between water services index and sanitation and hygiene index across public institutions in rural areas
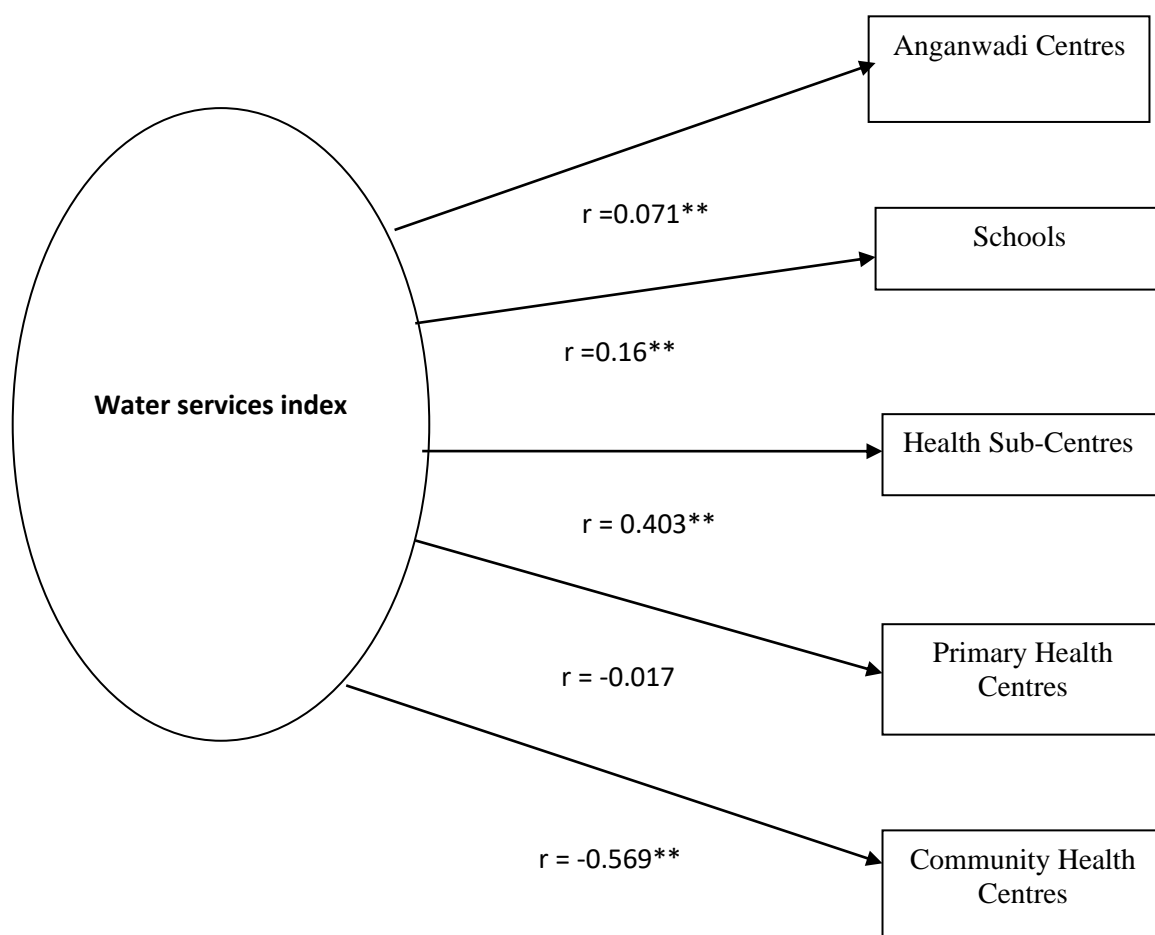
Note 1**Significant at one percent level
*   2: r is the value of rank correlation coefficient*
*   3: Availability, adequacy and quality of water are the components considered for the construction of*
*   water index*
*   4: Toilet facility, drainage and solid waste disposal systems are considered for construction of*
*   sanitation and hygiene index*
*   5: Number of observation in case of CHCs is less hence the relationship may be interpreted cautiously*

The estimation of WASH index has clearly demonstrated that it is lower where both water services as well as sanitation and hygiene services are at low level across the public institutions. WASH index is lower in ST concentrated villages vis-à-vis others in the public institutions of AWC and schools, while health sub-centres located in SC concentrated villages have better WASH index (Figure 26).

Figure 26 WASH index across public institutions by caste concentration of villages
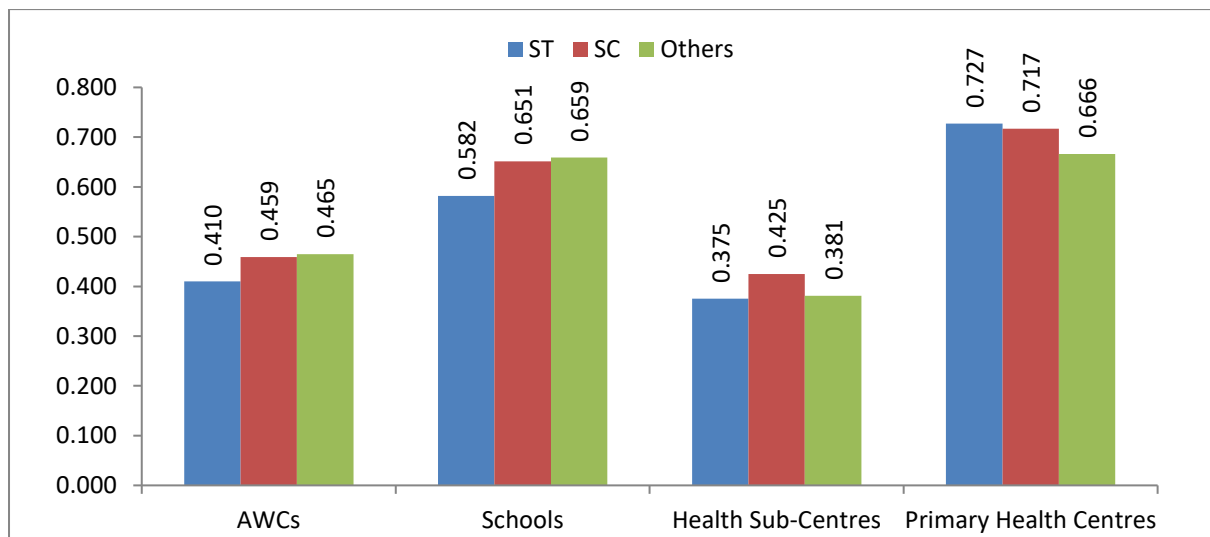
Impact on economy

The MB also has huge potential in enhancing industrial growth in rural areas and thereby economic growth through inter-linkages of industry and agriculture. Gains to the economy due to MB project would emanate from enhanced productivity of labour due to improvement in incomes, schooling and health. Increased labour productivity contributes to economic growth through interlinkages between human development and economic growth. A direct pathway is providing adequate water to the rural industries. The enterprises surveyed in the BLS are mostly small manufacturing units of which about 2/3rds depend on public water systems. Around 17 percent of the units have faced water scarcity for industrial use due to which there is a fall in employment to the extent of 3.9 percent and output by 5 percent. This indicates that rural industrial growth is at lower level and hence resulting in lower economic growth due to water inadequacy.

IV Removal of Deficits in Water Services through Mission Bhagiratha and Likely Gains to Households, Community and Economy of Telangana State

A. Likely Gains to Households

The MB has greater potential in improving the employment (income), health and schooling of the households, especially the marginalized social groups. There are two types of likely benefits accruing to households viz. income gains due to provision of PWS on premises and health and income gains due to provision of adequate and safe water

Likely Gains in Income Due to Provision of Water to the households in their Household Premises

The time involved in fetching water is more compared to the distance travelled. Around 30 percent of women are involved in fetching water in rural scenario and spend around 40 minutes each time. Having PWS on premises has a potential to save much of this time. Nearly a third of workers and 38 percent of casual labour in rural areas; and 18 and 27 percent respectively in semi-urban areas are involved in fetching water. Of this around 10 percent of casual labour has missed work due to fetching water in rural areas. This is 14

percent for the poorest households and casual labour among the poorest lost nearly 6.5 lakh employment days annually. Scheduled Caste households have lost 4.6 lakh days. The estimated annual loss is Rs 4253 lakh for all rural households in the state. Poorest and Scheduled Caste casual labour households stand to gain between 2000 to 3000 lakh rupees annually if PWS is provided within premises.

Likely Gains in Income due to Provision of Safe and Adequate Water to the Households in their Household Premises

The potential benefits due to provision of safe and adequate water are assessed under three scenarios. Under scenario I, it is assumed that all the households have met their total water demand from piped water of MB. It is assumed under scenario II, that the household will have 100 liters of water per capita with good quality as assessed by H2S test through piped water connection in the household premises. Further, it is assumed that the community level sanitation factors viz., ODF free community and garbage collection systems are in place along with the provisions made under scenario II. The incidence of illness is higher for the lower age groups and this does not show clear inverse relation with income groups, as is generally believed. This is one of the weaknesses of the self-reporting morbidity. Among all the scenarios, the percentage reduction in the incidence of illness declines from scenario I to scenario III. Further, the reduction in incidence of illness is substantial under the scenario of providing sanitation at community level. It has declined from 3.4 percent to 3.2 percent if all the households have been provided access to piped water. It will reduce to 3.0 percent if quantity is increased and quality is assured. In addition to these, if the community is made ODF free with garbage collection system, along with adequate safe piped water in the households premises, the incidence will come down to 2.2. In case of children in the age group 0-3 years, the incidence of illness comes down from 13.2 to 8.8 among these three scenarios. Further, the percentage reduction in the incidence of illness is higher for the poorer quintiles and STs than other social groups (Figures 27, 28).

Diarrhoea is one of the major determinants of child mortality. The impact of MB on incidence of diarrhoea is assessed using the same methodology as mentioned above for the younger groups, 0-3 year and 4-5 year olds. The baseline (existing) estimates indicate overall 6 percent of 0-3 year olds and 2.4 percent of 4-5 year olds suffered from diarrhoea during the reference period of one month. Provisions of MB will reduce the incidence of diarrhoea among 0-3 year olds from 6.1 percent to 4.9 percent. Further reduction to 3.9 is possible if the sanitation needs of community are taken care of. In both the age groups, the poorest quintile and STs benefit considerably. For 0-3 year olds of poorest quintile, the incidence of diarrhoea reduces by 41 percent as against 36 percent for those in richest quintile. Similarly, ST children of 0-3 years will experience a reduction of 42 percent in diarrhoea compared to 35 percent for children from OC category (Figures29, 30).

An economic benefit that accrues indirectly to households due to reduced illness is the saving in the health expenditure and savings in wage income that would have forgone during the episodes of illness. A total of Rs. 306 crores wage income is lost due to illness in rural areas. The loss in wage income would reduce by Rs. 28 crore by providing adequate quality piped water within the premises. A further reduction of Rs. 70 crores is possible by taking care of the community sanitation needs. Again the poorest quintile and STs experience most

reduction in the loss of wage income. The households in rural areas spent Rs. 125 crores on health during reference year. This would reduce to Rs. 83 crores between scenario I to scenario III. The gains due to reduction in health expenditure increase with wealth quintiles and among the social groups, STs benefit the most (Figures 31, 32, 33, 34).
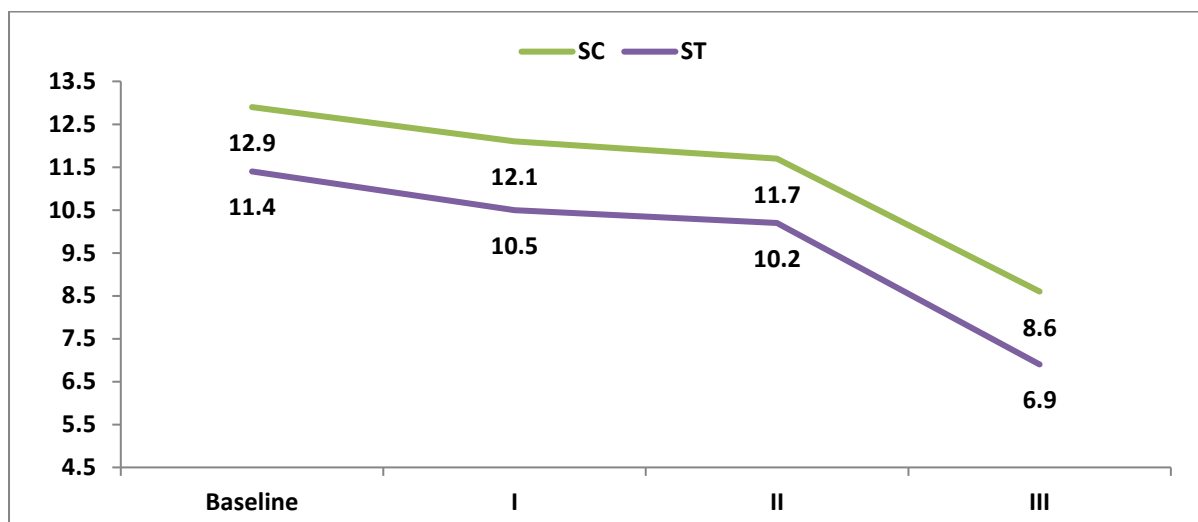
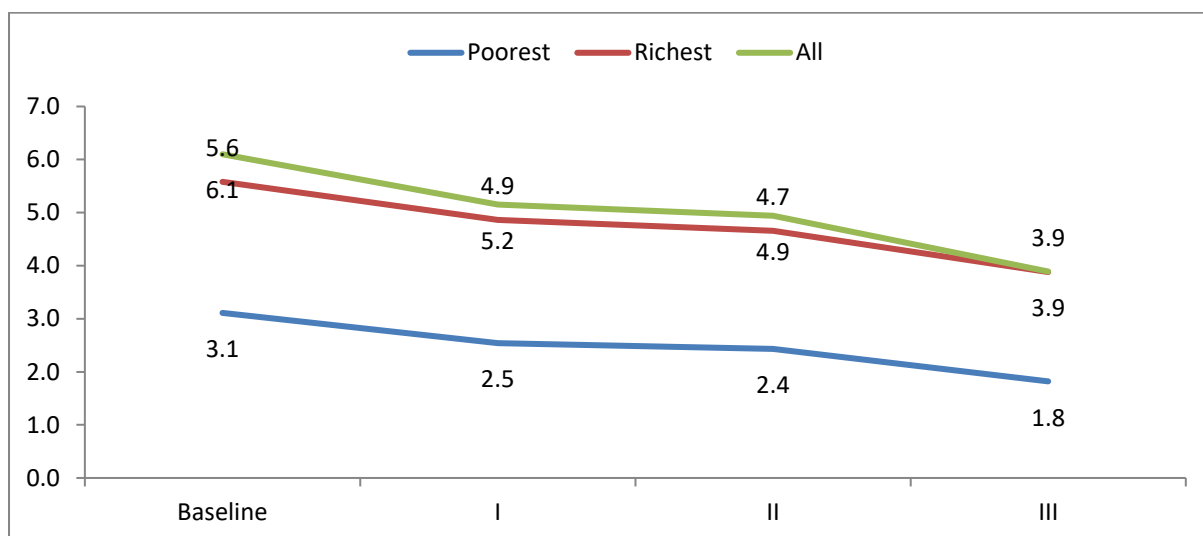**Figure 27 Reduction in overall morbidity due to provision of WASH under three scenarios**
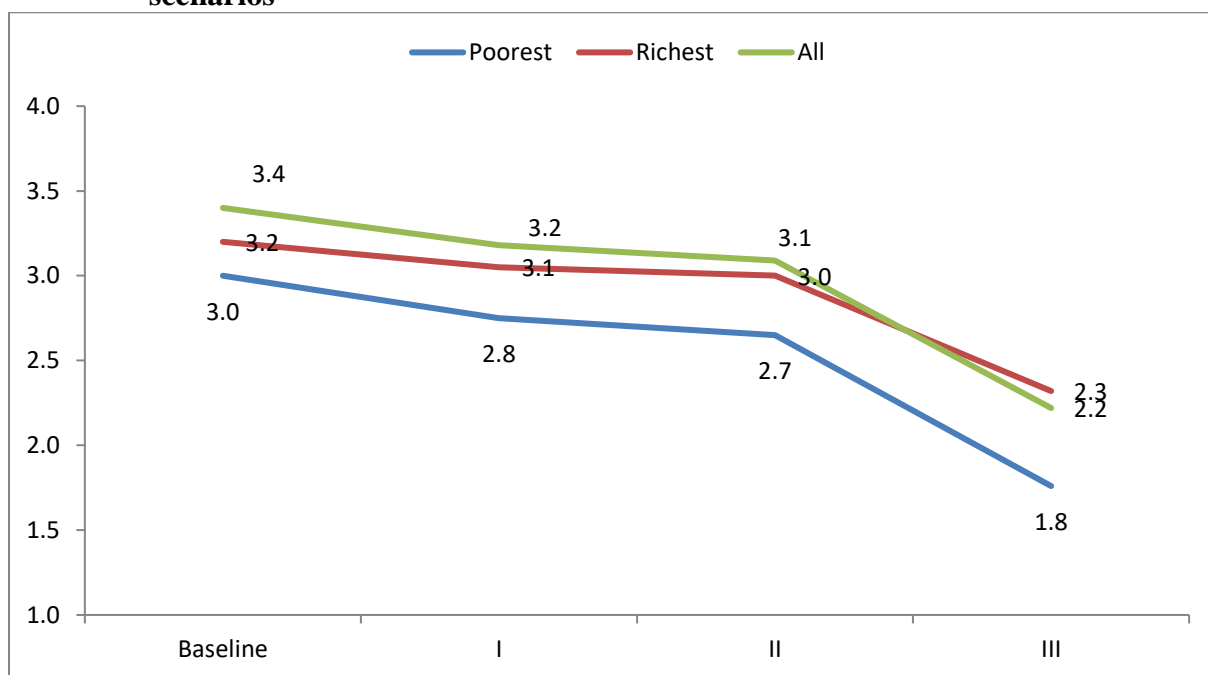
Figure 28 Reduction in morbidity among 0-3 year olds due to provision of WASH under three scenarios
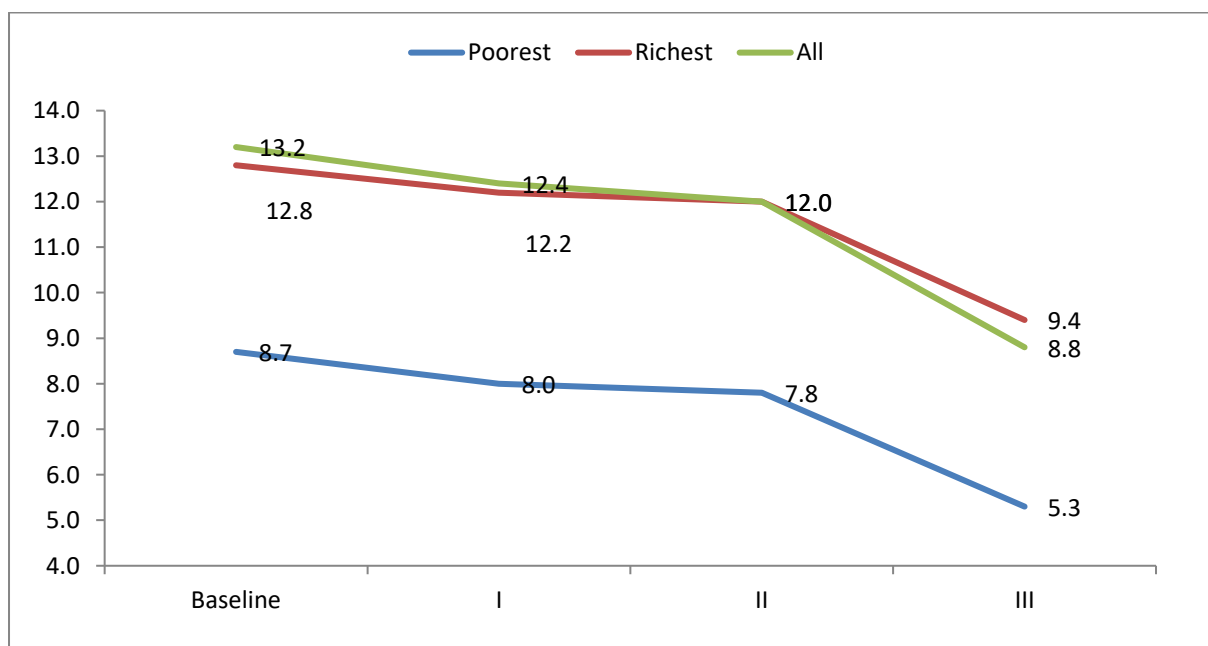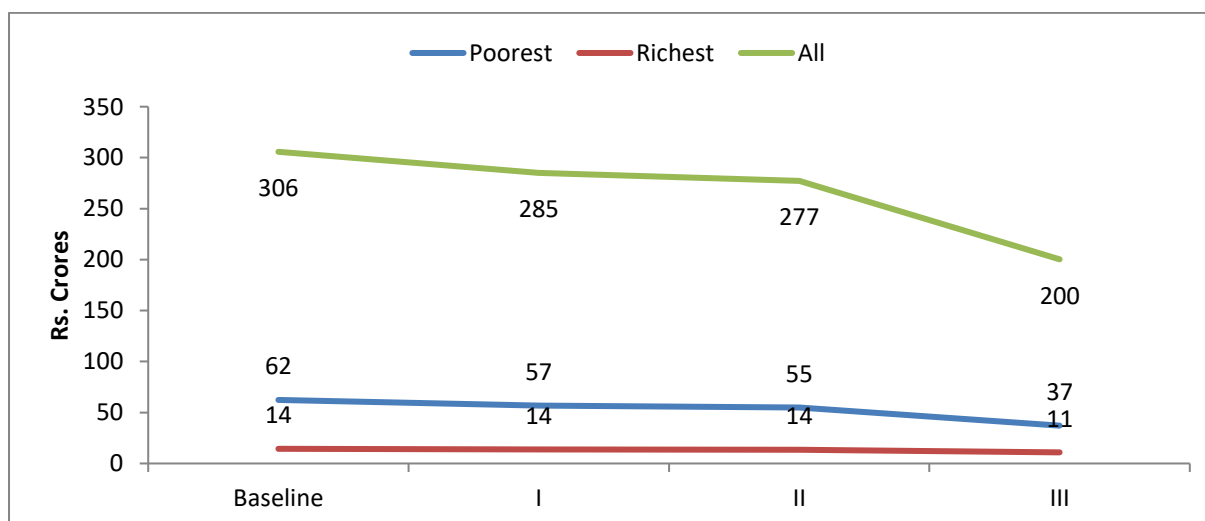
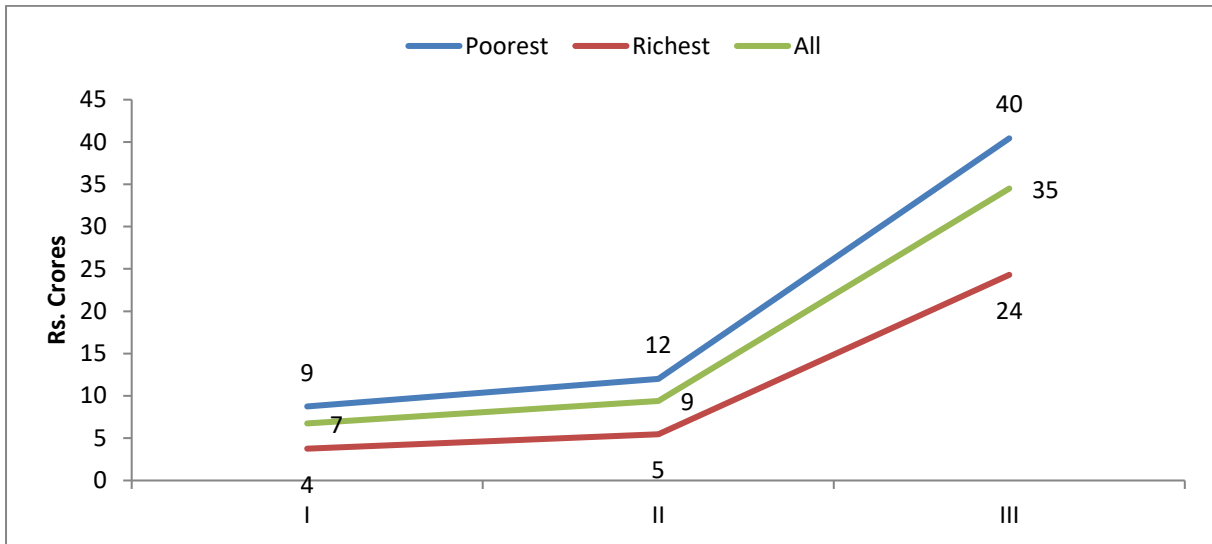**Figure 29 Reduction in overall morbidity for children by social groups under three scenarios**

SC   ST

	Baseline	I	II	III
SC	12.9	12.1	11.7	8.6
ST	11.4	10.5	10.2	6.9

Figure 30 Decline in incidence of diarrhoea among 0-3 year olds

Poorest   Richest   All

	Baseline	I	II	III
All	5.6	4.9	4.7	3.9
Richest	6.1	5.2	4.9	3.9
Poorest	3.1	2.5	2.4	1.8

Figure 31 Reduction in aggregate wage loss due to morbidity

Poorest   Richest   All

Rs. Crores

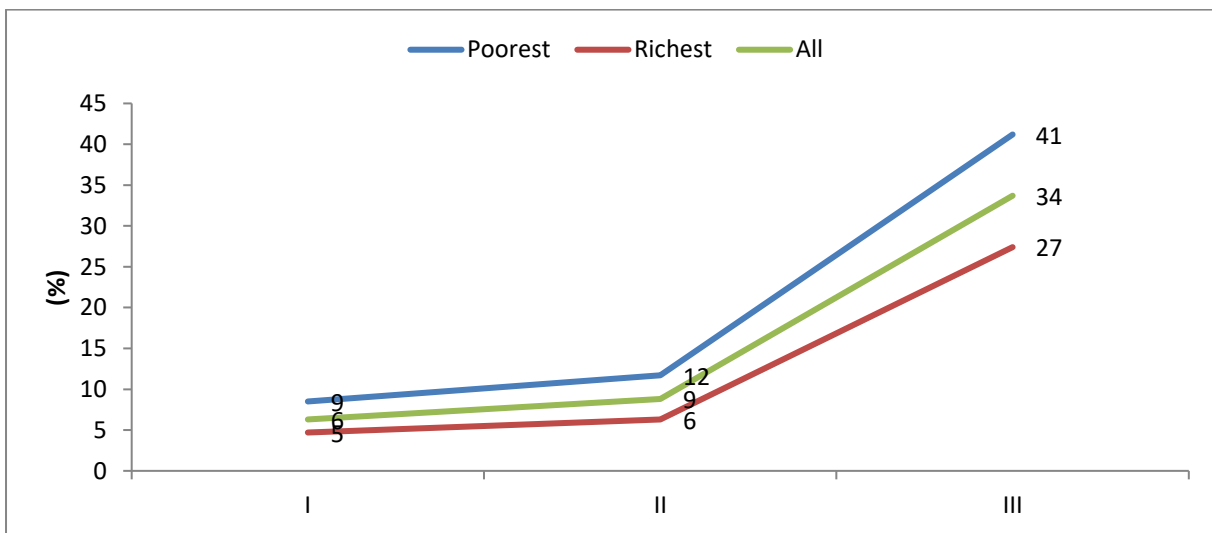|	Baseline	I	II	III
All	306	285	277	200
Poorest	62	57	55	37
Richest	14	14	14	11

Figure 32 Percentage reduction of wage loss due health gains

Figure 33 Health expenditure Rs. crores
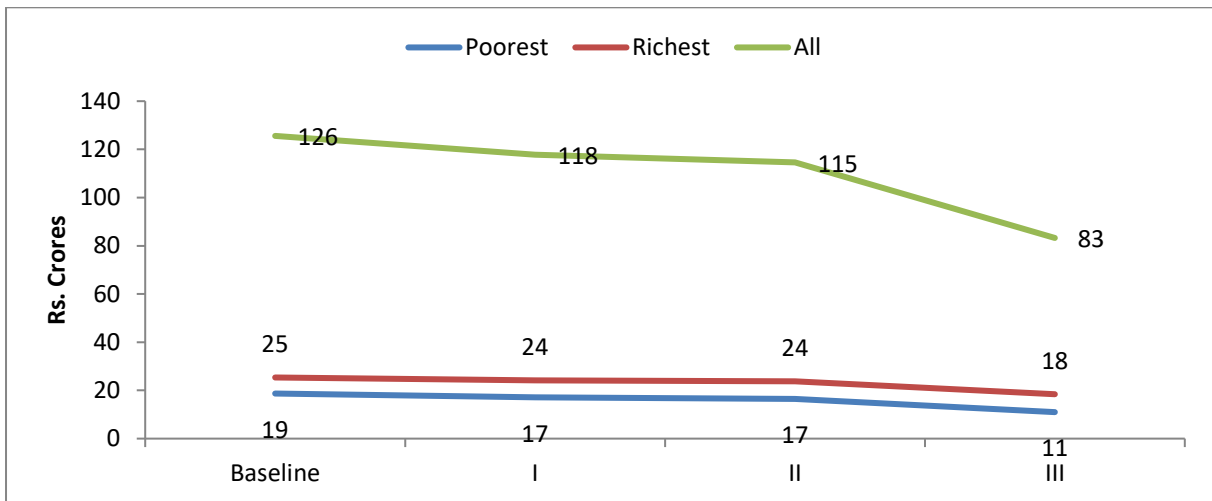
**Figure 34 Percentage reduction of health expenditure**

B. Likely Gains to Community

Improvement in WASH across Public Institutions in Rural Areas

The WASH services in the public institutions determine health conditions of community. Anganwadi centres, schools and health sub-centres are the public educational and health institutions surveyed for the study. It is observed in the earlier chapters on public institutions that the public institutions (with exceptions to PHC) located in the ST concentrated villages have lagged behind in providing water, sanitation and hygiene services compared to SC and all Other castes concentrated villages (Figure 35). It is also stated that inequities in the delivery of these services in the public institutions are due to deficits in infrastructure, inadequate funds flow from respective departments and deficits in management practices. It is clearly evident that the indices of determining factors (factor indices) of WASH services differ widely across institutions in top and bottom quintiles of WASH index. Further, a greater percentage of institutions in ST concentrated villages are distributed across bottom quintiles (Figures36, 37).
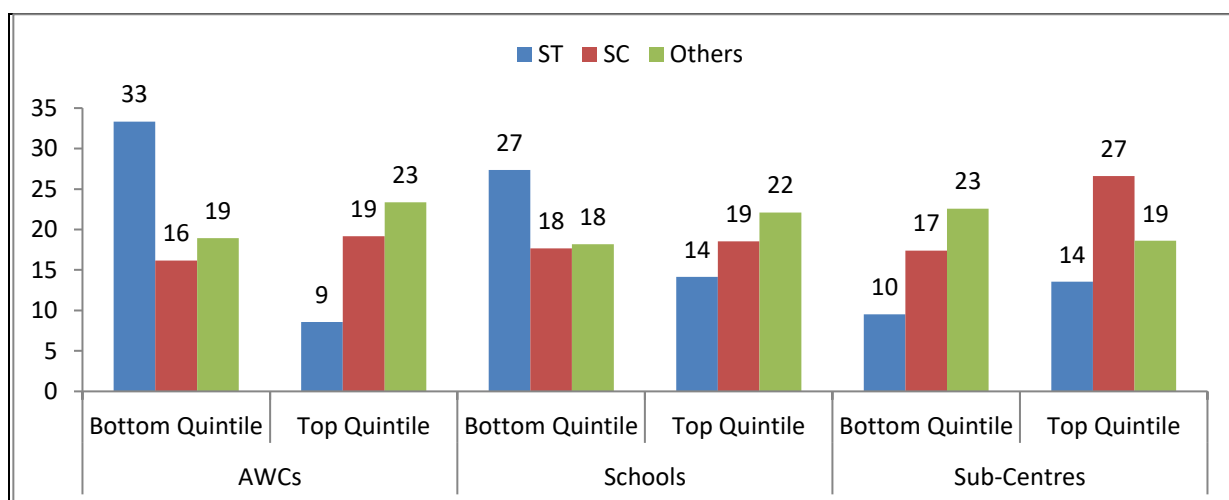
Figure 35 WASH index across public institutions by caste concentration of villages
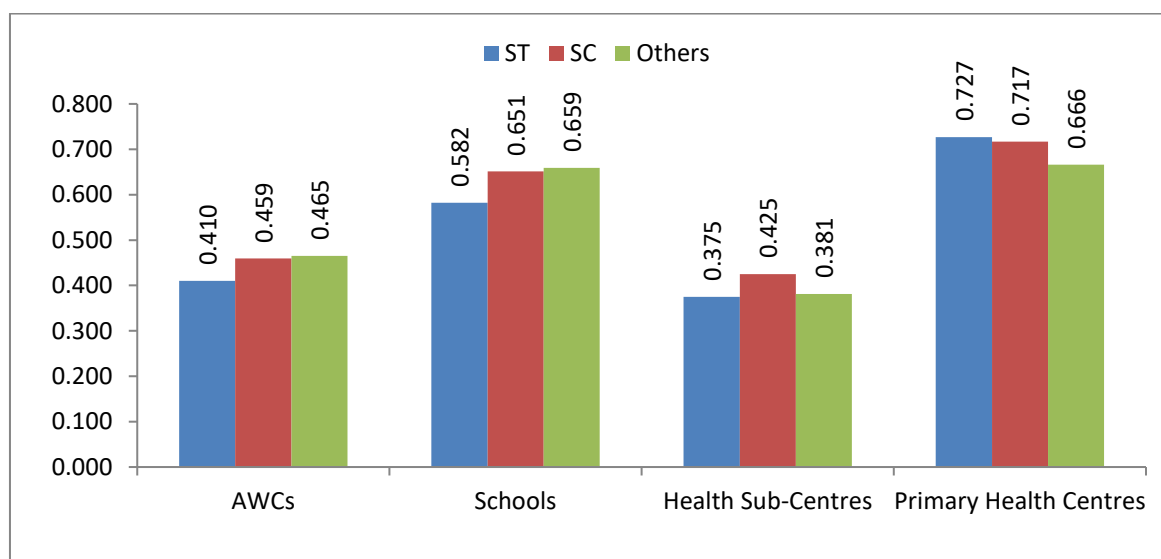
Figure 36 Factor indices across public institutions by bottom and top WASH quintiles
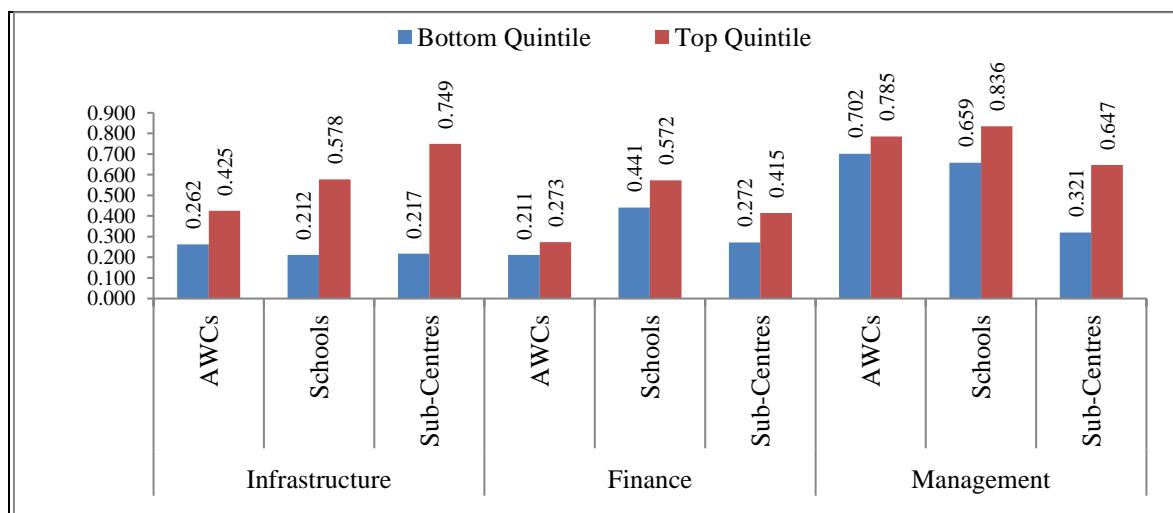
Figure 37 Distribution of bottom and top quintile institutions by caste concentration of villages (% to total institutions)


The issue in question is what would be the situation of WASH services in AWCs and schools if the deficits in present status of infrastructure, finance and crisis management are addressed. Simulation analysis has been conducted to address this issue. The results show that across Anganwadi centres, the contribution of all the factors is more or less equal.

It was found from the field survey that some AWCs are located in premises with PWS and toilet with drainage facilities and better solid waste management (better facilities) and others are located without such facilities in premises. If all the AWCs are located in premises with better facilities then WASH index would be enhanced by 34 percent. Similarly if AWCs located in ST and SC concentrated villages are located in premises with better facilities the WASH index would be higher by 39 and 36 percent respectively. Apart from this, required infrastructure like cooking arrangements, storage arrangements and a separate place for hand wash contribute 34 percent to the improvement of WASH index. The ability to spend on drinking water, purification of water, storage containers for water and transportation by the AWCs contribute around 30 percent to the improvement of WASH index. With enhancement of infrastructure and financial status, AWCs located in ST concentrated villages will benefit more and their WASH index will reach the level of WASH index in the institutions located in SC concentrated villages (Figure 38).

Figure 38 Improvements in WASH services across AWCs
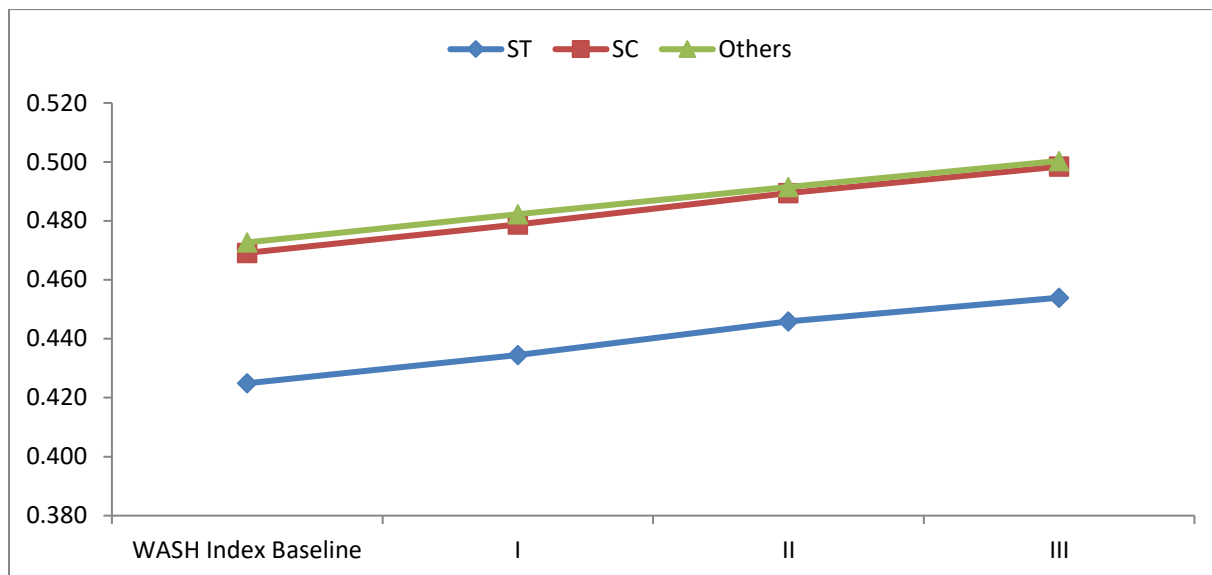
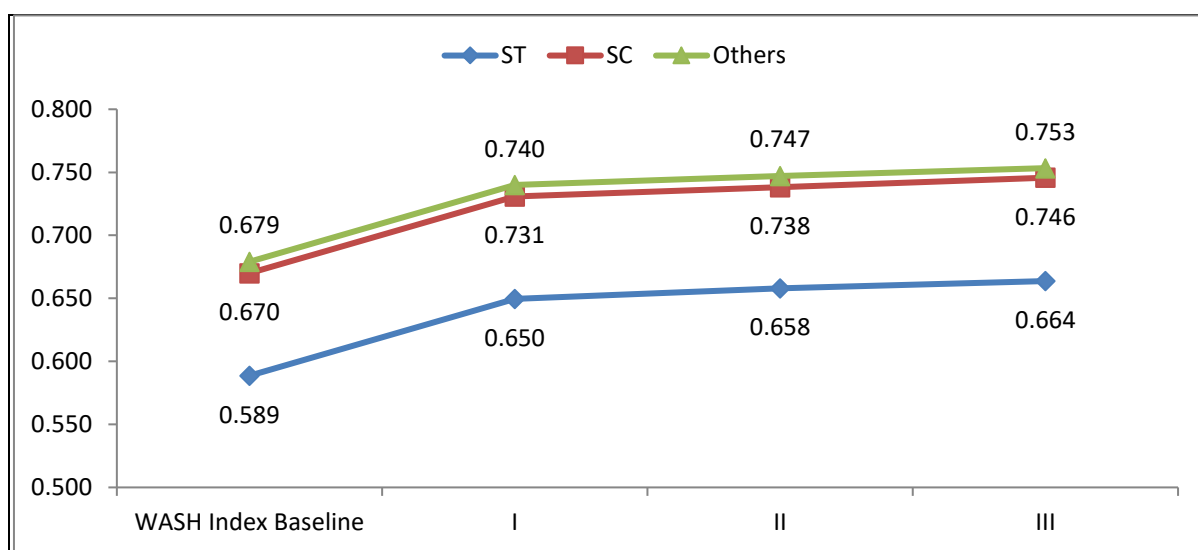Across schools, infrastructure in terms of provision of water storage structure and hand wash facility will bring about 82 percent of improvement in WASH index. Ability to restore breakdown in the water system and status of finance (ability to obtain additional sources of finance) contribute around 9 percent each to the improvement in WASH index. Among the ST concentrated villages, restoration of crisis within a day will have greater impact on WASH index compared to SC and Other Castes concentrated villages (Figure 39).

Figure 39 Improvements in WASH index across schools

C. Gains to the Economy

The MB also has huge potential in enhancing industrial growth in rural areas and thereby economic growth through inter-linkages of industry and agriculture. Gains to the economy due to MB project would emanate from enhanced productivity of labour due to improvement in incomes, schooling and health. Increased labour productivity contributes to economic growth through inter linkages between human development and economic growth. Another and direct pathway is providing adequate water to the rural industries. The enterprises surveyed are small manufacturing units of which about 2/3rds depend on public water systems. Around 17 percent of the units have faced water scarcity for industrial use due to which there was a fall in employment to the extent of 3.9 percent and output by 5 percent. Given the share of unorganized sector in growth of economy a one per cent reduction in its growth brings down the aggregate economy by 0.02 percentage points. If the output of unorganized sector declines by 5 percent due to water scarcity, economy's aggregate growth would go down by 0.1 percentage points. If the scarcity is wide spread, the impact would be much more. Thus providing assured water supply to industrial use has the potential to upkeep not only the industrial production and employment, but also would incentivize new production thus making rural economy vibrant.

D Enabling the Achievement of Universal and Equitable Access to Safe and Affordable Water for All in Telangana State (SDG 6.1)

SDG 6.1 targets at achieving universal and equitable access to safe and affordable water for all by 2030. Safely managed drinking water service is the use of an improved source which is located on premises, available when needed and free of micro biological contamination. The three indicators customized to assess the safely managed drinking water service in the BLS are

  i)   PWS on premises
  ii) Adequacy of water (>40 lpcd of current supply) from improved sources within 30 minutes round trip collection
 iii) Safe water (negative result from H2S test)

Households accessing the least of the three services is said to access safely managed water services. While SDG 6.1 goal is aimed to be fulfilled by 2030 it is contextual to validate the findings from the BLS against the goal for the Telangana State.

In the rural areas 57.3 percent of households have access to safely managed water services. However there are inequities across ST, SC and Other Caste concentrated districts; social groups, economic groups and across slum and non-slum locations in the semi-urban areas in achievement of this indicator. In case of ST concentrated districts in the rural areas 39.6 percent households have safely managed water services while for SC concentrated villages it is higher than State average at 60.4 percent and for 'Other Caste' districts it is 58.8 percent (Figures 40, 41).

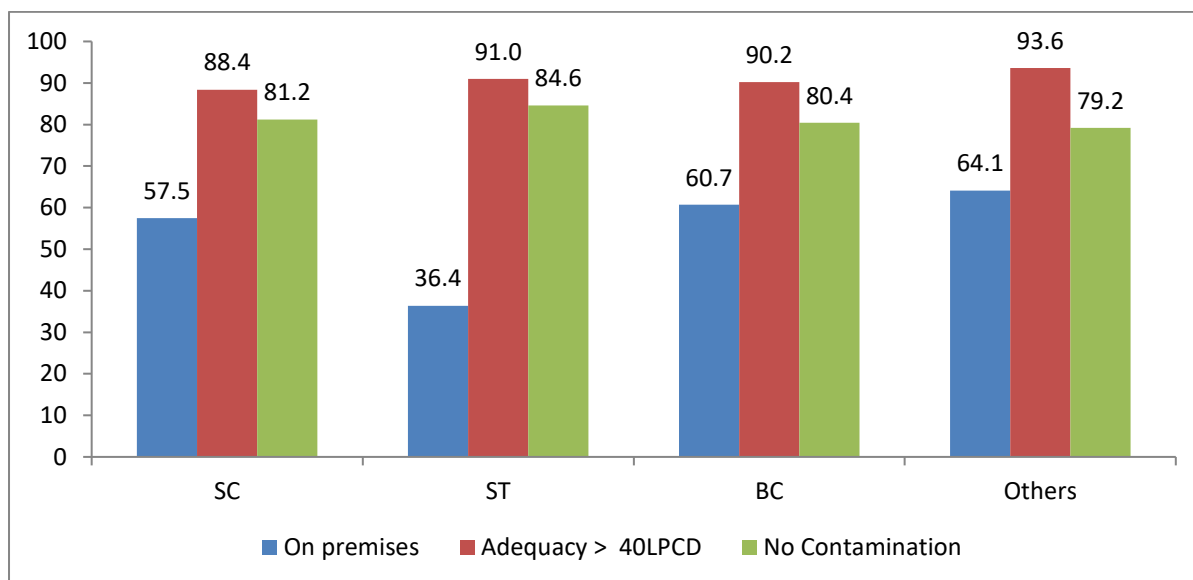**Figure 40 Safely managed water services across rural areas (% HH)**
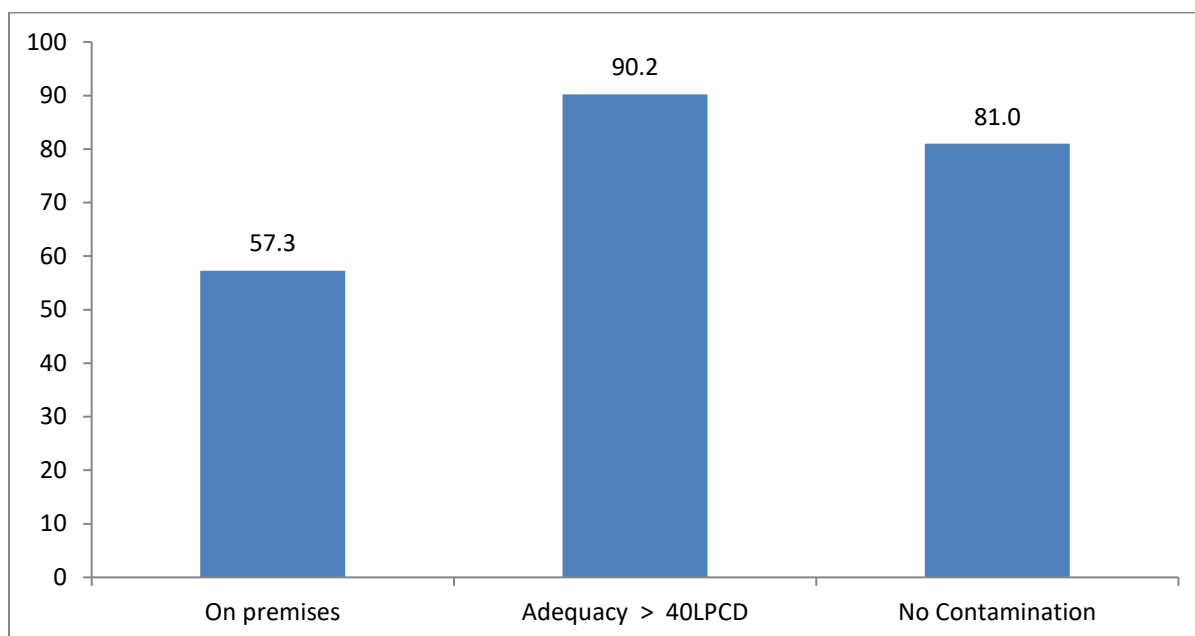
Figure 41 Safely managed water services across type of districts
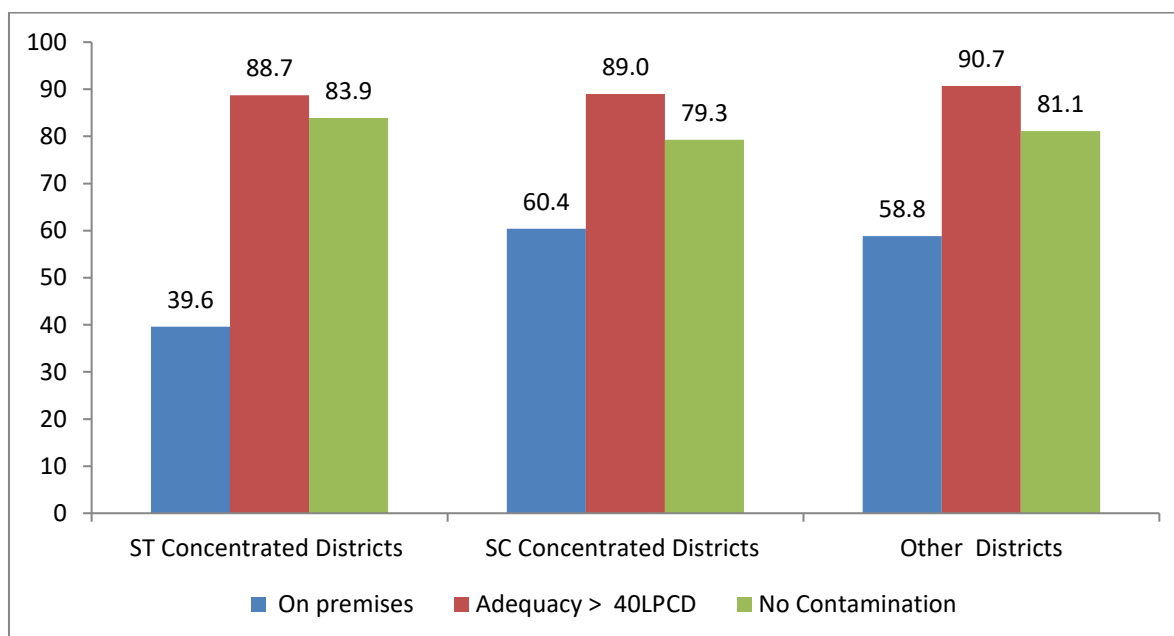
In case of social groups ST households across the rural areas have the least percentage of households accessing safely managed water services at 36.4 percent while it is 57.5 percent for SC households and 60.7 and 64.1 percent respectively for BC and OC households. In case of economic groups in rural areas only 35 percent of poorest quintile have accessed safely managed water services (Figures 42, 43).

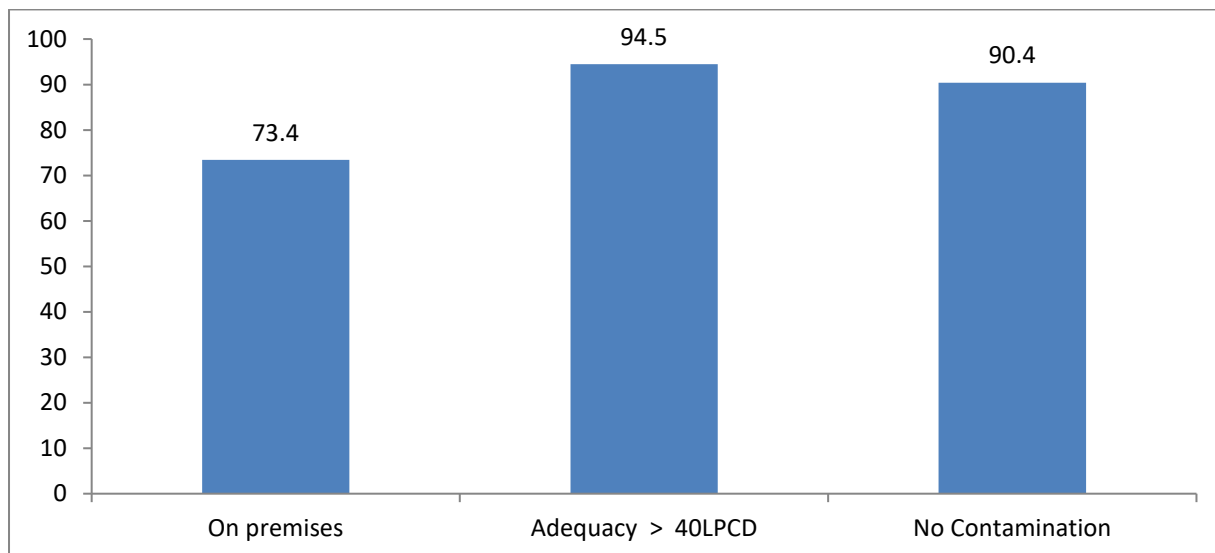**Figure 42 Safely managed water services across social groups**

Figure 43 Safely managed water services across economic groups
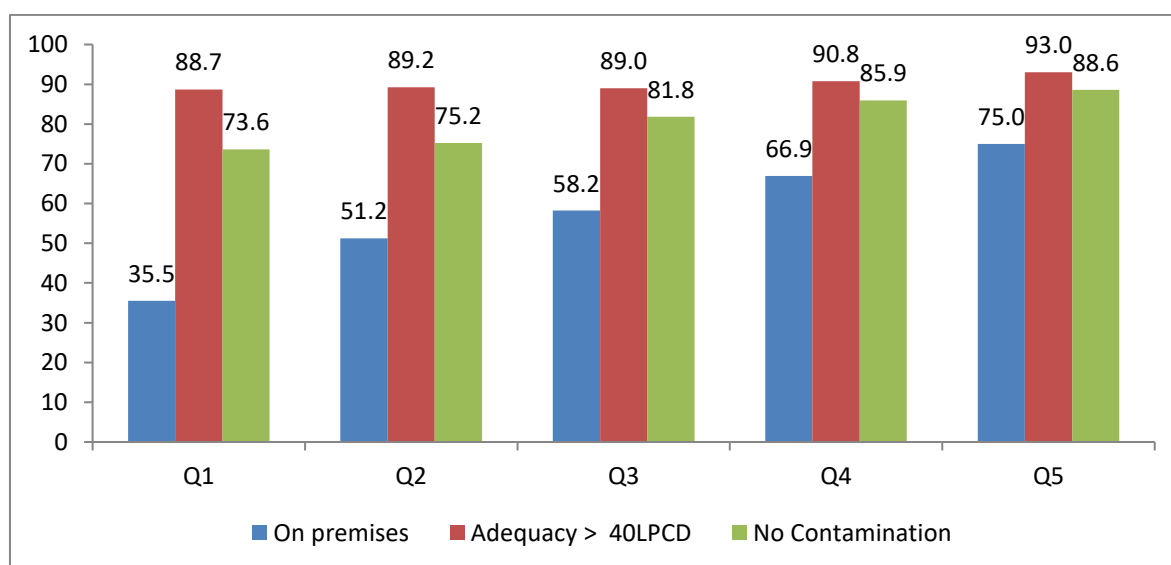
Compared to the rural scenario a higher percentage of households (73.4) in the semi-urban areas have safely managed water services. There are severe inequities here, in slum areas only 58 percent households have such facility while in non-slum areas 85 percent households' accessed this facility. Across socio-economic groups in the semi-urban context ST, BC, SC and Other Caste households in that order have 14, 29, 37, and 43 percent households accessing safely managed water services (Figures 44, 45, 46, 47).

Figure 44 Safely managed water services across semi-urban areas

Figure 45 Safely managed water services across slum/non-slum wards in semi-urban areas

Figure 46 Safely managed water servicesacross social groups in semi-urban areas

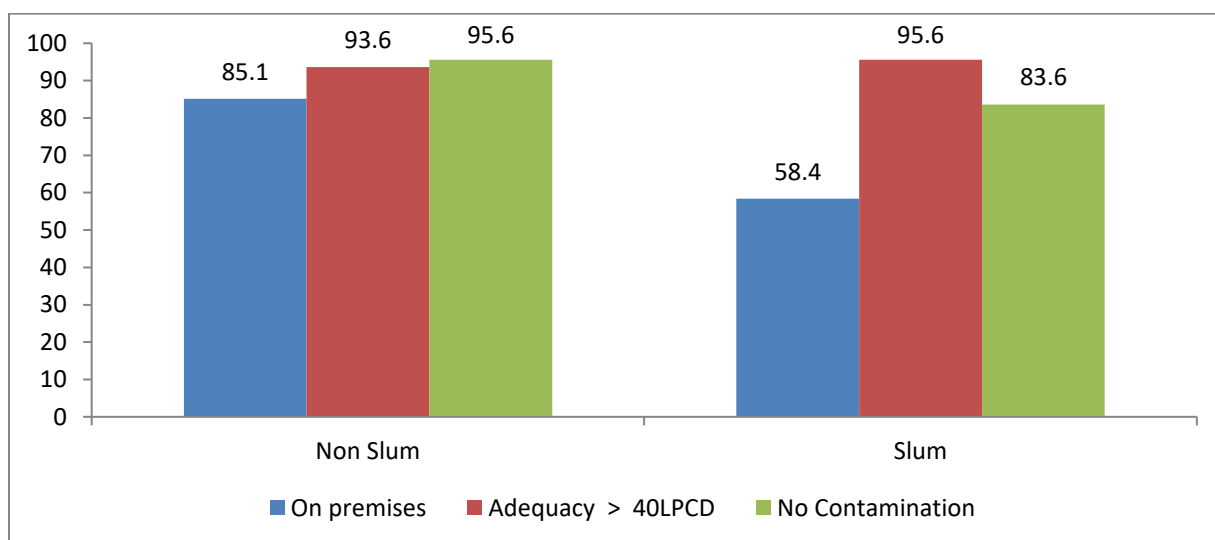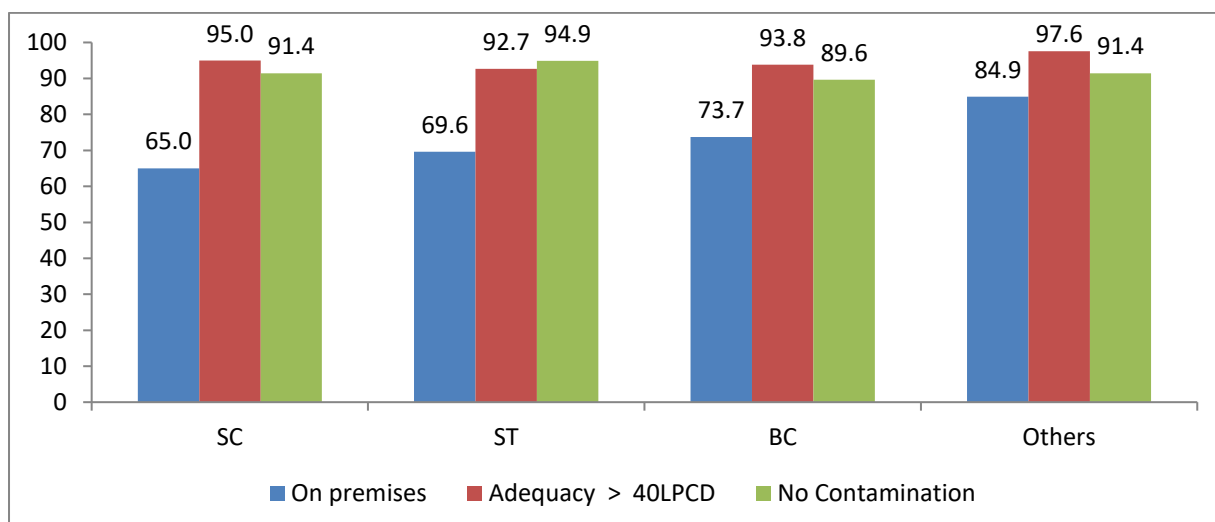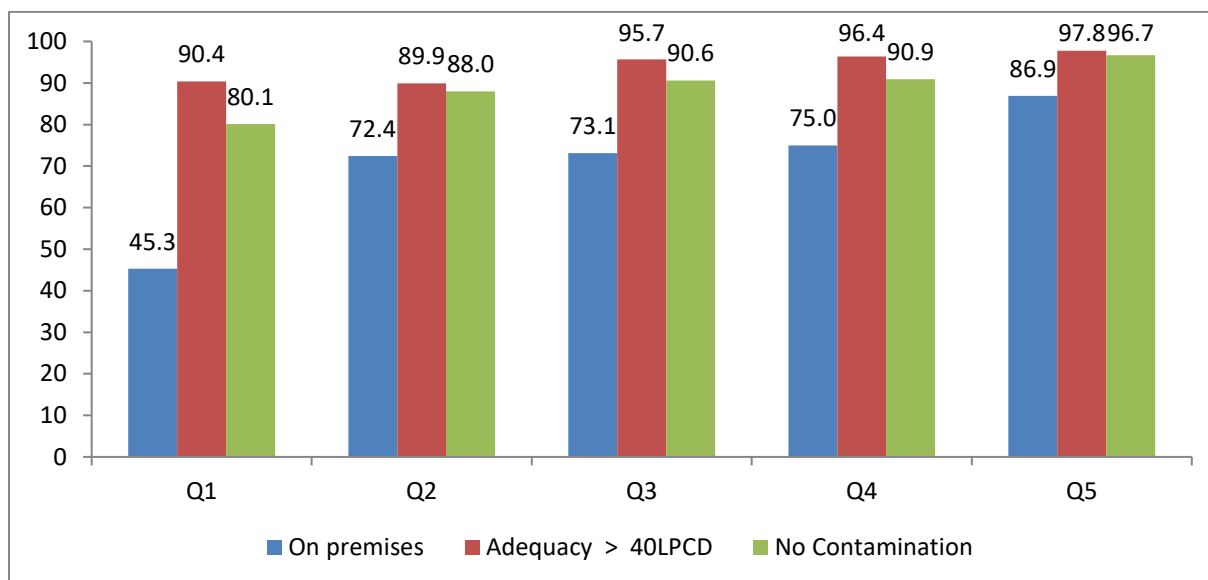**Figure 47 Safely managed water services across economic groups in semi-urban areas**

Among all the three indicators used to assess safely managed drinking water service the indicator of having PWS on premises has the least value and any improvement in this indicator would improve the achievement of SDG goal 6.1. The Mission Bhagiratha project aims at providing safe, adequate PWS on premises to all households or in other words it achieves universal and equitable coverage by 2019, fulfilling SDG goal 6.1.

The piped water connection in the household premises has enabled households to derive all the dimensions of water services. But the evidence has shown that the supply of water under this system is not reliable. This unreliability constrained the flow of benefits of piped water supply in the household premises. The analysis has indicated that the frequency in a week and regularity of timings are poor in case of urban proximate districts possibly due to higher demand for water and lower supplies. Sufficiency of water is poor in all tribal concentrated districts. Thus the supply of piped water in the household premises is not reliable in the villages across all the districts. However, the functioning of this is better in the rural compared to the semi-urban areas across the districts. Therefore, improvement in functioning of the system of PWS in the household premises can address all the dimensions of water services to the people.

There are considerable variations (inequities) in water services delivered by village panchayats in the state. The village panchayats of the STs concentrated villages compared to those of SCs and 'Other Caste' concentrated villages have delivered inadequate water services and also other services of sanitation and hygiene. This is true in providing water, sanitation and hygiene services in all the dimensions considered. The variations in WASH services delivered across the districts are due to the variation in the composition of these three types of villages (Figures 48).

The variations across the villages in water services are due to variations in water related infrastructure, flow of funds and connectivity in terms of all- weather roads and transportation facilities to mandal headquarters, water resources(ground and surface water) at the disposal of village panchayats. Apart from the variations in the physical and financial resources, the variations in the functioning of the village panchayats in terms of management

of water related infrastructure including restoration of the breakdown of water supply system; crisis management like making arrangements in providing adequate water during scarcity season (summer); mobilization of funds from the community to maintain the water system, and negotiating skills with the government departments concerned also have contributed to the variations in the delivery of water and other related services to the communities in the villages. Village panchayats falling in the top quintile are better in handling crisis situations, finances and also with respect to human resources which overall influence the WASH services (Figures 49). It is also clear that high percentage of villages are falling into the bottom quintile regarding the WASH index in the category of districts with high concentration of ST villages while this is not the situation in case of districts with SC concentrated and Other caste concentrated villages (Figure 50). Figure 51 clearly shows that strong physical and human resources, good connectivity (distance to mandal headquarters, good roads, and transport facilities) and financial resources largely determine good WASH services index (Figure 51).

There are variations in the water services delivered by Nagar Palikas, as in the case of villages, across the wards of non-slum, mixed slum and slum. Inadequate water and other related services are present in slums compared to other wards. Variations in the physical and human resources; and functioning of the wards in regard to the management of these resources, as in the case of villages, have influenced the variations in the services provided across the wards in Nagar Palikas.
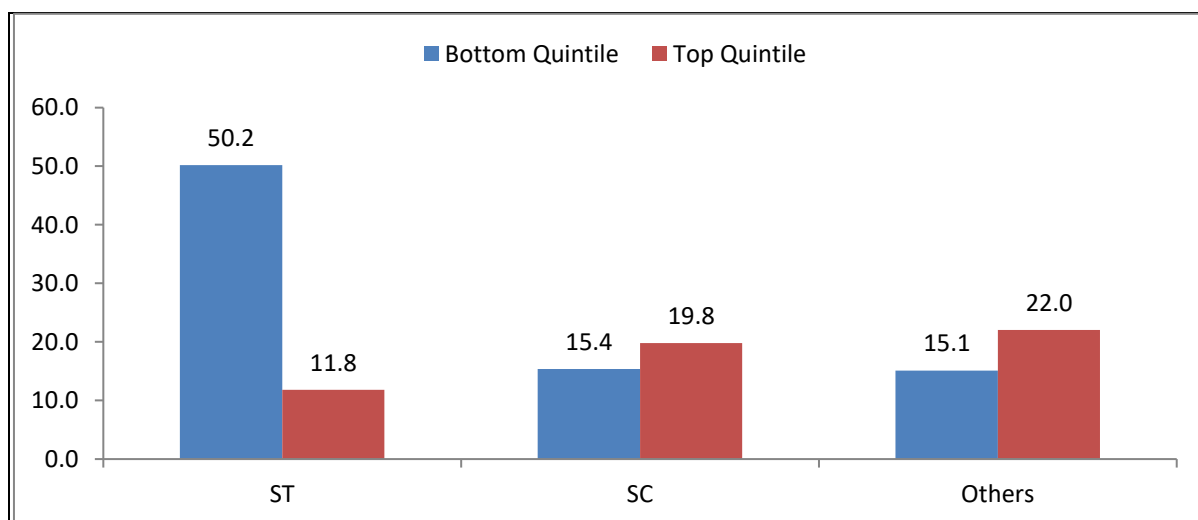
Figure 48 WASH index across ST, SC, Other Caste concentrated and all villages in rural areas
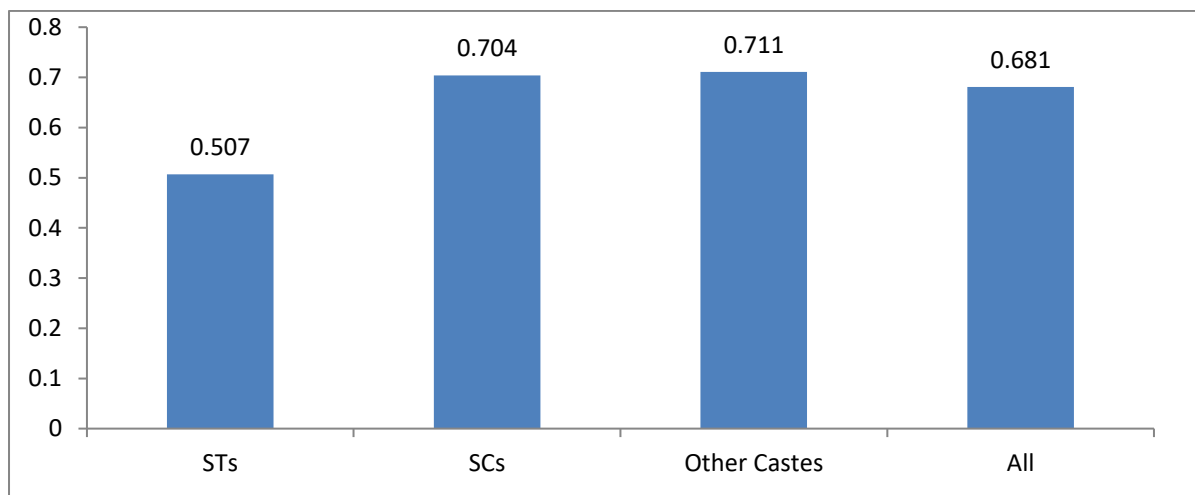
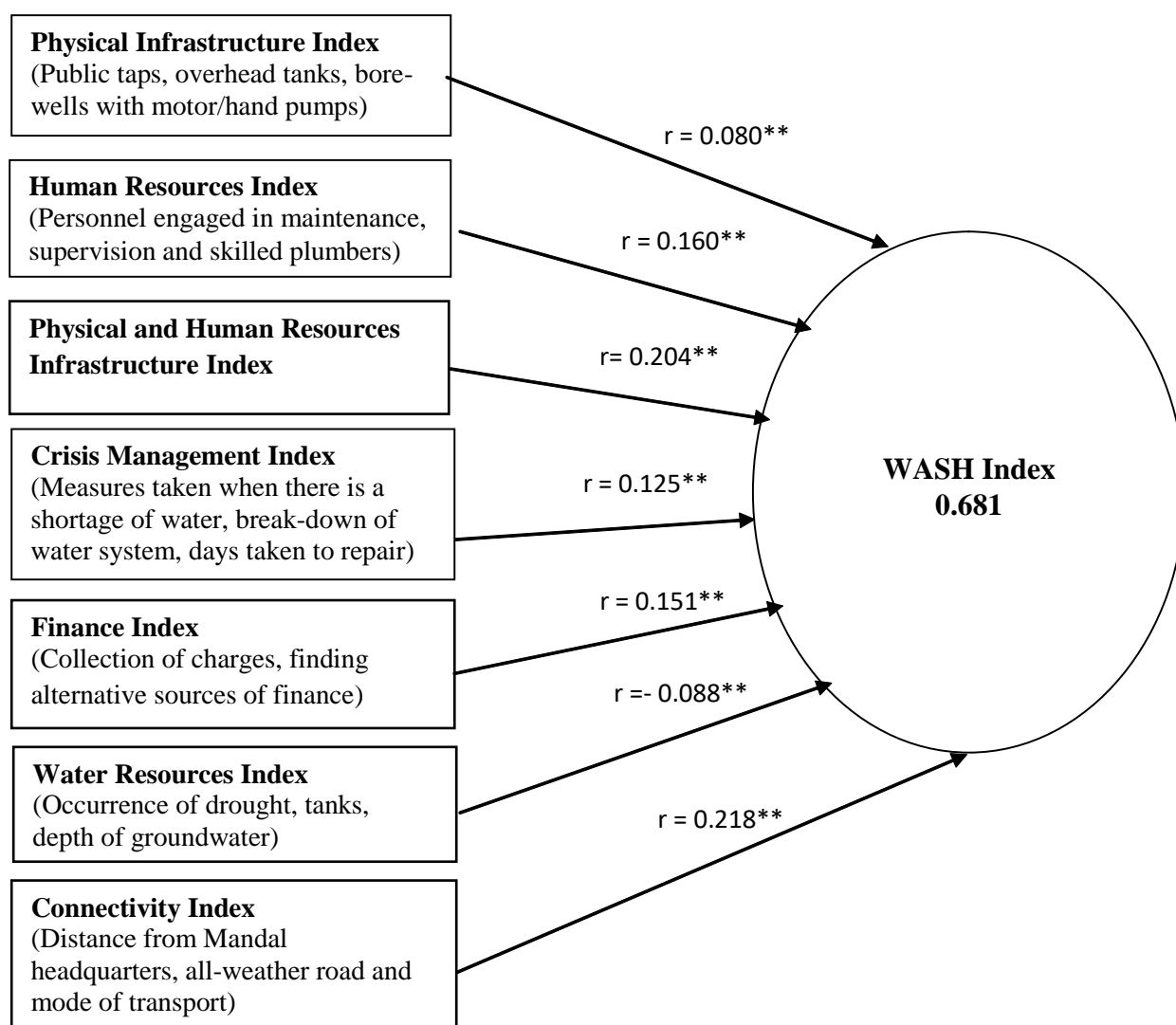**Figure 49 Factor indices across villages in bottom and top quintiles of WASH index in rural areas**
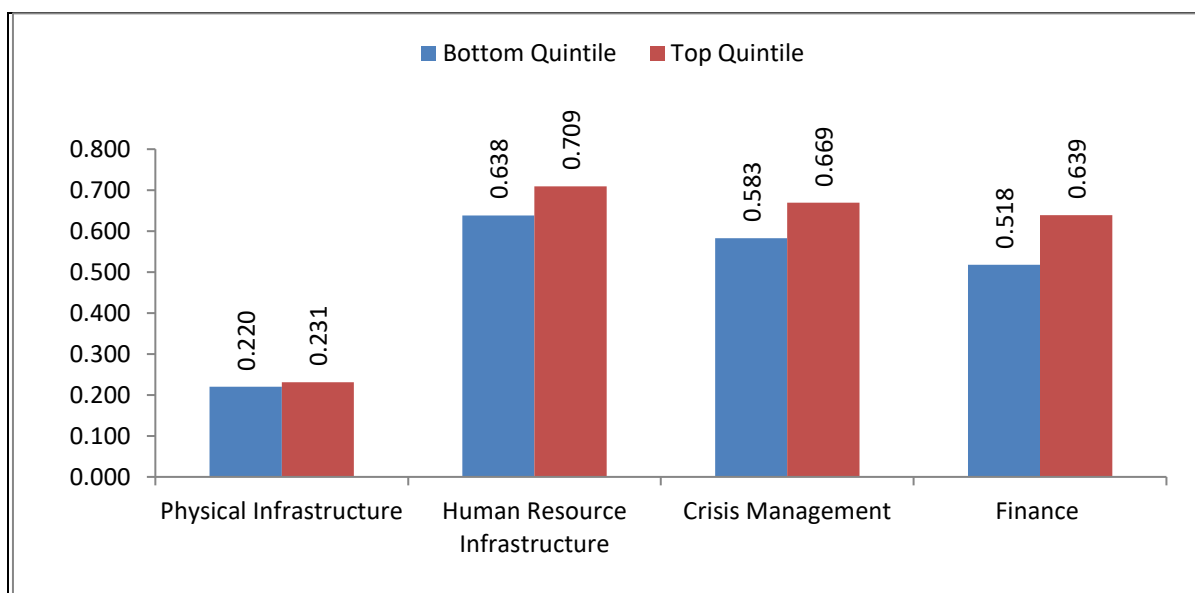
Figure 50 Distribution of villages in bottom and top quintiles of WASH Index by category of districts with caste concentration villages (% to total villages)

Figure 51 Relationship between factor indices and WASH index across villages

Physical Infrastructure Index
(Public taps, overhead tanks, bore-wells with motor/hand pumps)

Human Resources Index
(Personnel engaged in maintenance, supervision and skilled plumbers)

Physical and Human Resources Infrastructure Index

Crisis Management Index
(Measures taken when there is a shortage of water, break-down of water system, days taken to repair)

Finance Index
(Collection of charges, finding alternative sources of finance)

Water Resources Index
(Occurrence of drought, tanks, depth of groundwater)

Connectivity Index
(Distance from Mandal headquarters, all-weather road and mode of transport)

r = 0.080**

r = 0.160**

r = 0.204**

r = 0.125**

r = 0.151**

r = - 0.088**

r = 0.218**

WASH Index 0.681

** Significant at one percent level
Note 1: r: value of rank correlation co-efficient
Note 2: Items in the parentheses are the components considered for the construction of indices
Note 3: Water, toilet facility and drainage system are the components considered for the construction of WASH index

If the deficits in present status of infrastructure, finance and crisis management are addressed, and monitoring mechanisms are in place then the situation of WASH services in villages would improve. Across all categories of villages, monitoring of WASH services by constituting 'Water and Sanitation Committee' will bring more than 50 percent of improvement in WASH index. Crisis management and finance contribute 38 to 40 percent respectively. By upgrading the human resources, the improvement will be ranging between 7 and 9 percent across the villages. With increase in managerial capabilities, finance and infrastructure, ST concentrated villages will benefit more as compared to other categories (Figure 52).

Figure 52 Improvements in WASH index across villages
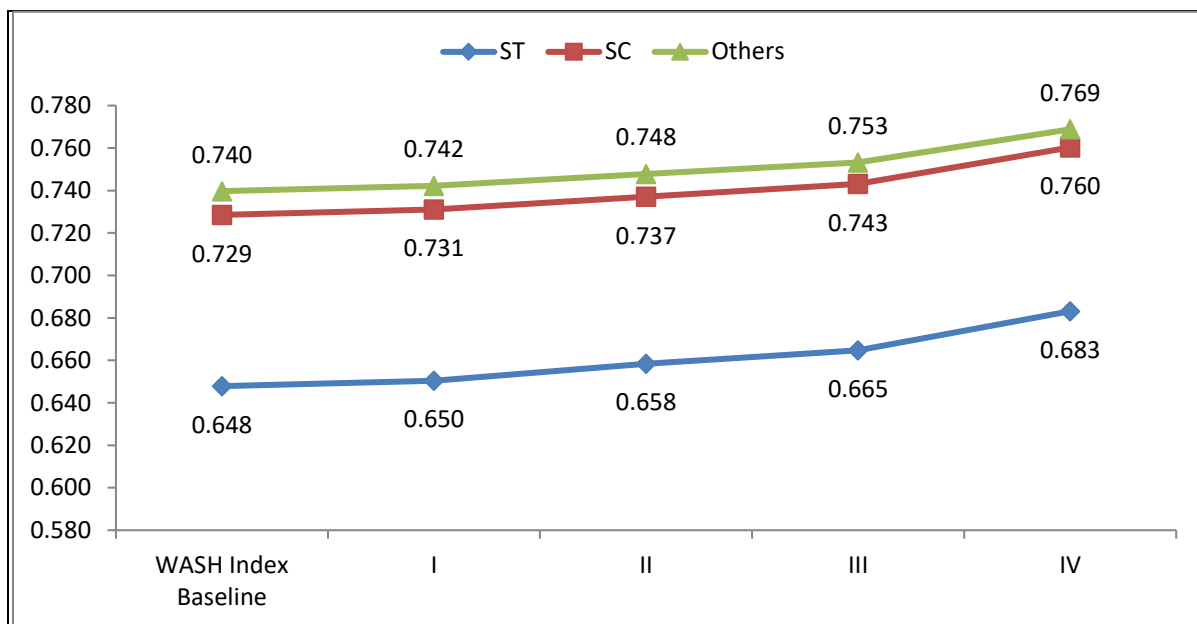
Note: Based on unweighted cases
 *I-Increase in Human Resource Infrastructure Index by the extent of difference in human resources
      infrastructure between bottom and top quintiles*
*II-Increase in Human Resource Infrastructure Index + getting the repairs done within two days in the main as
      well as in SC/ST localities in the village*
*III-Increase in Human Resources Infrastructure Index + getting the repairs done within two days + finding
      other sources in times of inadequate budget*
IV- All of the above + Water and Sanitation Committee

It is evident that Mission Bhagiratha has huge potential in addressing all the challenges of water services in Telangana State. The better functioning of village panchayats in rural areas and Nagar Palikas in semi-urban areas coupled with safe arrangements for wastewater and solid waste disposal and IEC programmes for bringing behavioural changes among the communities in regard to WASH services acts as enabling factor for effective realization of potential benefits from Mission Bhagiratha.