



WATER SANITATION AND HYGIENE ATLAS OF BANGLADESH

**Research and Evaluation Division
BRAC**



Draft

WATER SANITATION AND
HYGIENE ATLAS OF
BANGLADESH

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Research and Evaluation Division
BRAC

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Chapter 1: Prelude

Water poverty may happen in the absence of water but that is not a serious concern for Bangladesh since current estimates suggest that 97.4% population of the country are accessing drinking water (BBS 2007). This figure stood at 99% and 97% for urban and rural population respectively for the year 2003 (Earth Trend 2003). Worries take place when the word 'safe' is prefixed with the word 'water access'. Supplied water may be contaminated with different types of pathogens in different phases of its supply process/chain, sometimes polluted at its source/origin. Ground water arsenic contamination has added as another dimension to the crisis. Therefore water poverty may still persist within the prevalence of water when quality issues are put in the context. Efforts to supply contamination free or safe water and public awareness building on improved sanitation and hygiene issues, therefore, received more attention at this moment in the Government and non-governmental initiatives than commissioning new infrastructure of water supply.

The impact of water contamination on health is connected with the level of awareness of people on personal hygiene and the state of sanitation facilities being used by the community. According to Bangladesh Bureau of statistics, 53% of the population in Bangladesh access to safe toilet. This figure conceals rural-urban, poor-rich disparity in accessing sanitation facilities. For example 70.7% urban population enjoys safe toilet facilities while this figure stands for only 48.2% in the rural areas of Bangladesh (check). The factors like poverty, illiteracy, lack of information, individually or as a combined effect contribute to this low access to toilet facilities. For instance, it is evident that people

in northern Bangladesh who used to use toilet facilities no longer use those due to the problems associated with post-construction maintenance and costs.

In Bangladesh, one of the main causes of water borne disease is faecal-oral transmission routes. The people have poor understanding about the link between poor hygiene and disease. Only 39.3% of the people wash their hands with water, soap or ashes after defecation (only 19.3% use soap), 40.6 % wash their hands with soil and water and the rest 20% use only water (NGO Forum).

The illustrations above indicates that water supply, sanitation and hygiene issues are linked together and these need to be addressed holistically if a sustained WASH (Water, Sanitation and Hygiene) system is expected to be functioned. The Millennium Development Goal (MDG) envisioned the sustainability of environment-sanitation issues in terms of three target areas (Box 1). Bangladesh government has been working along with the MDGs including target 9, 10 and 11. BRAC, the largest non-governmental organization of the world, also believes that sustained growth of the community is interlinked with health condition of the family/community members. BRAC, in this regard, implementing safe water supply, improved sanitation facilities and proper hygiene practice programme (the programme called WASH) with the support of donor agencies in 150 selected *upazilas* of Bangladesh in order to ensure a disease free community as far as possible. BRAC also envisage that a good health condition may increase the resilience of the grassroots people that, in turn, may help them to take

Box: 1

Millennium Development Goal (Goal 7) for Ensuring Environmental Sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the losses of environmental resources.

Target 10: Halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation.

Target 11: Have achieved by 2020 a significant improvement in the lives of at least 100 million slum dwellers.

their stakes in economic activities and in areas related to ensure their social well-being.

2. BARC Water, Sanitation and Hygiene (WASH) Programme

Despite a number of efforts from different GO/NGO sectors, the situation in water, sanitation and hygiene regime of Bangladesh still depicts a delicate picture. According to the joint Monitoring Report of WHO and UNICEF, the latrine coverage in the country stands for only 33 percent (in 2003), while 75 percent people do access safe drinking water (Figure 1). The personal hygiene condition of the people also shows similar picture as it is a combined product of some other delicate social variables like illiteracy and poverty. Millennium Development Goal (MDG), in this regard, called for improving health condition especially for the unprivileged groups in the society. Responding to these issues, BRAC has undertaken Water, Sanitation and Hygiene (WASH) program spreading over 150 upazilas of Bangladesh. Figure 2 shows that the upazilas selected for the project represents the areas which are economically depressed and geographically delicate for disaster proneness.

Box-2

Objectives of WASH Programme.

Objective 1: Provide sustainable and integrated WASH services in the rural areas of Bangladesh.

Objective 2: Induce safe hygienic behaviour to break the contamination cycle of unsanitary latrines, contaminated water, and unsafe hygienic behaviour.

Objective 3: Ensure sustainability and scaling-up WASH services.

BRAC envisioned the impacts of this program in terms of hooking up additional sanitation coverage for 17.6 million people, hygiene education for 37.5 million people and additional water coverage for 8.5 million people. Conceiving the fact that latrine coverage stood in the range from 31% to 33%, the proportion of the population with access to safe water is about 75% (Joint Monitoring Report, WHO & UNICEF 2003) and poor hygiene condition prevails specially in rural Bangladesh, BRAC undertook Water,

Box - 3

Areas	Indicators to be achieved
Latrine	<ul style="list-style-type: none">• All households have their own or a shared sanitary latrine.• Use of sanitary latrines by all, irrespective of age.• Dispose infant/child excreta in latrine.• Maintain latrines: pit not filled up, no visible faecal matter, and so on.• Water for personal cleaning is in or near latrine.• Everybody wears sandal in latrines.
Water	<ul style="list-style-type: none">• Safe water sources are used for all cooking and drinking.• Safe water storage.• Maintain water source.• For piped water, the quality and quantity produced will meet agreed standards.
Hand washing and personal hygiene	<ul style="list-style-type: none">• Practiced by everybody after defecation and before taking food. Also after cleaning child/baby excreta.• Strengthen Public Private and Community Partnership (PPCP) with national soap producers to make low cost soap available in households and all schools.

Sanitation, and Hygiene (WASH) Programme in 2005 in order to improve the condition in these sectors. The programme is also aiming to attain the MDG 2015 Target on water and sanitation for Bangladesh. This five-year (January 2006 - December 2010) programme

mainly supported by the Netherlands Government is currently underway. BRAC took on some key themes while implementing its WASH programme; these are sustainability, integration (of water, sanitation and hygiene), strong gender

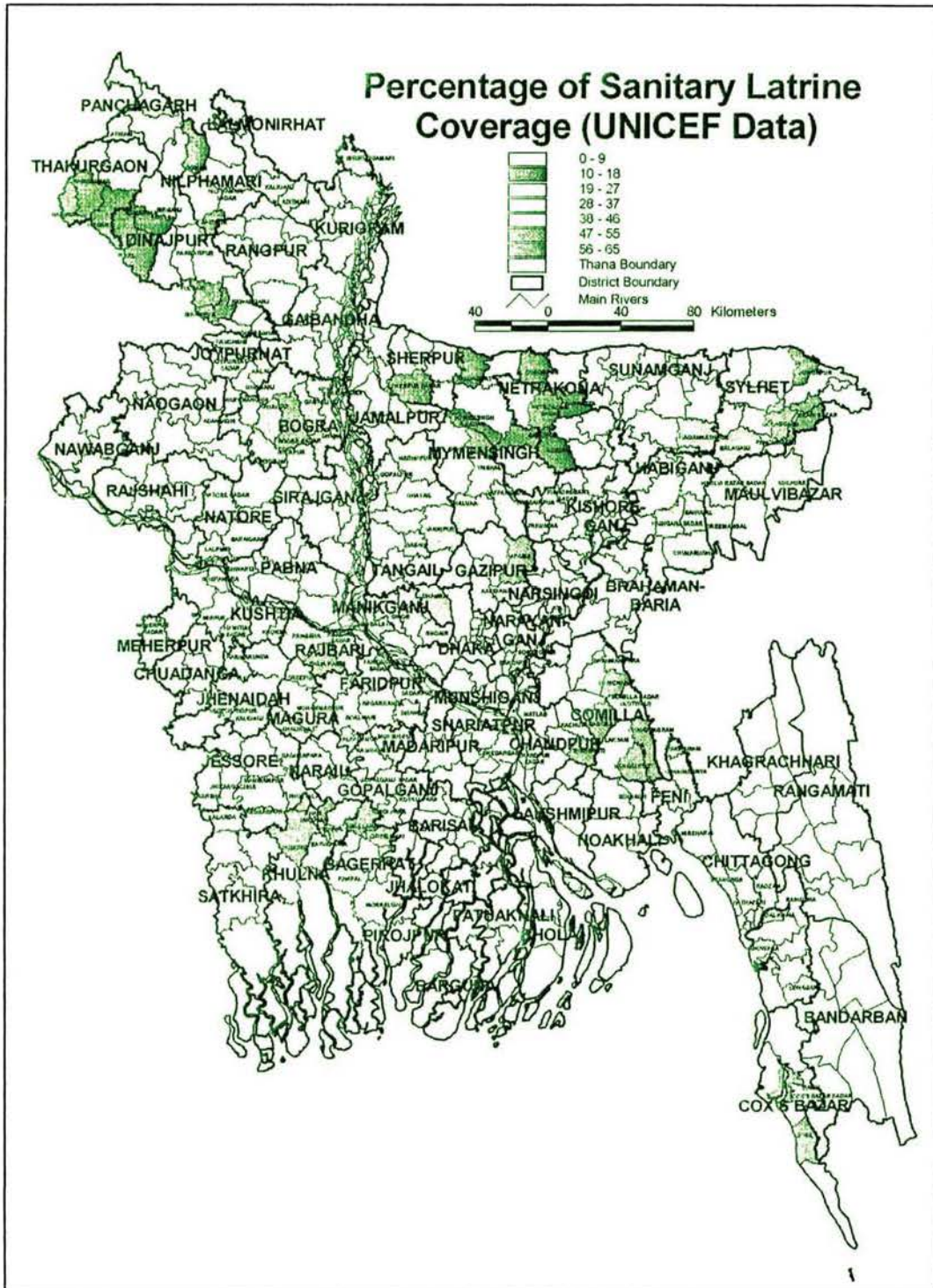


Figure 1: Percentage of sanitary latrine coverage (after UNICEF data).

and poverty orientation, relevant technologies/designs, private sector collaboration, coordination and capacity building of key-stakeholders.

simultaneously. The programme unit is responsible for project implementation while research activities are supervised by BRAC

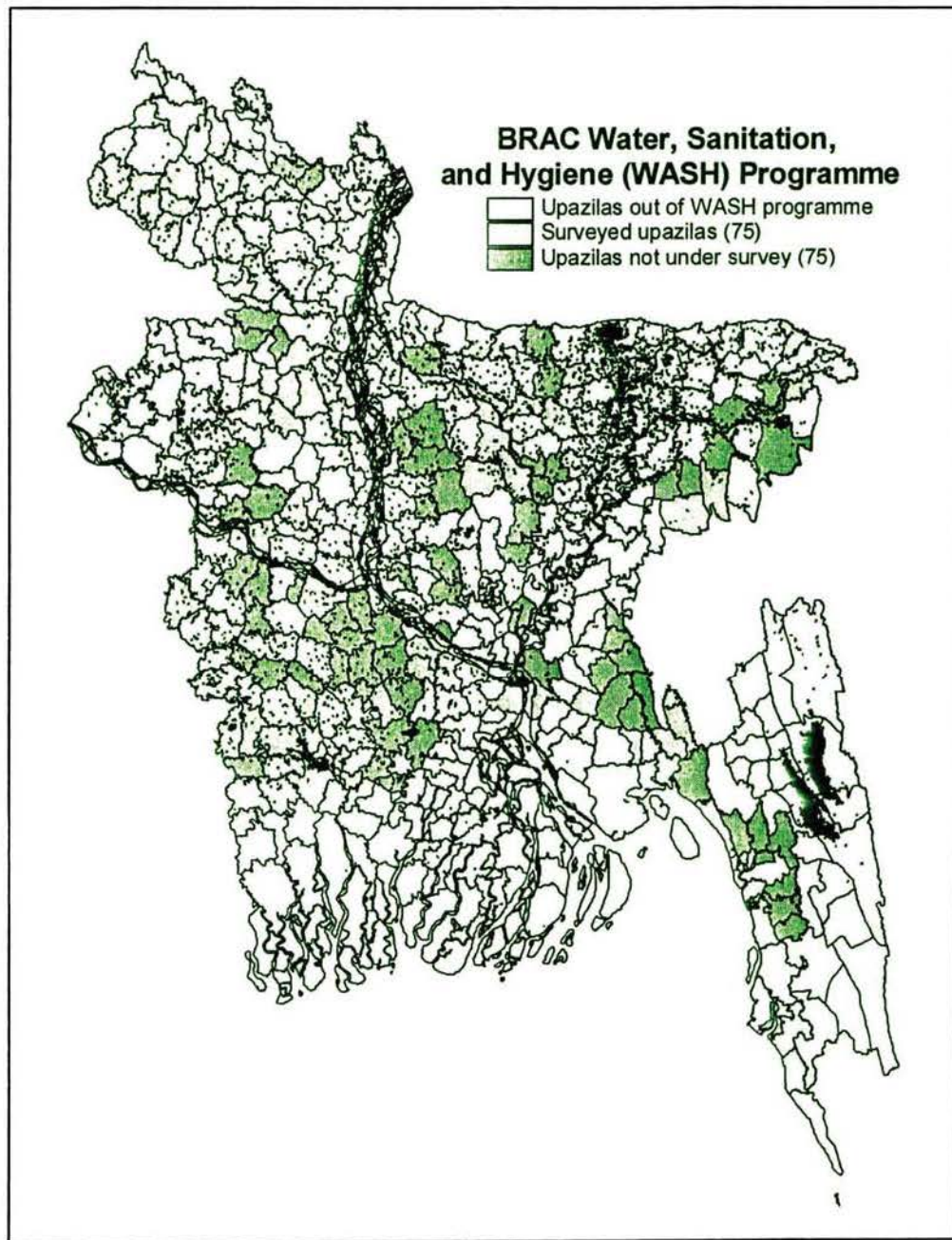


Figure 2: Programme coverage of WASH.

3. The atlas

WASH programme has already got its momentum since its launch in June 2006. Two facets of the programme i.e. (i) implementation phase and (ii) research phase function

Research and Evaluation Division (BRAC RED). Recently programme unit has completed a thorough census survey, covering all 150 upazilas, to receive information on different variables on safe water supply, sanitation and hygiene practice, household composition, educational institution and on social religious institutions of the community.

In parallel, environment wing of RED has conducted a baseline survey in 75 upazilas (Figure 2) so that success indicators of the programme can be assessed at the end of the programme or during the programme implementation phase if necessary. These initiatives has produced a large amount

to locate areas that deserves special attention for certain types of interventions; (ii) the atlas is also aimed to those working outside BRAC to give them general information about the water, sanitation and Hygiene status of the country since this kind of atlas is absent in



Figure 3: Using PRA method (social mapping technique) rural people describes the water and sanitation condition in their area.

of data which is difficult to read unless these are thematically clustered and portrayed on maps. This initiative is a kind of effort where some secondary source information has also been used to make the atlas a

Bangladesh; (iii) the atlas can be used as on job project monitoring by the donor bodies and as a reporting tool for BRAC. Since the main elements of the atlas (i.e. the maps) has produced in GIS, the atlas can be updated on a regular basis without investing major resources what can be considered as an off shoot benefit of the effort.

Table 1: Some primary indicators of Bangladesh.

Issues	2001	1991	1981	
Population	130522*	111455*	89912*	
Population growth rate	1.58	2.01	2.88	
Population density	843	720	590	
Literacy rate	37.7	24.9	19.7	
Toilet facilities	(Sanitary)	37.38	12.46	NA
	(Others)	41.17	53.24	NA
	(None)	21.45	34.20	NA
Sources of drinking water	Tap	6.18	4.30	3.61
	Tubewell/ Deep Tubewell	84.60	85.20	53.12
	Pond/Dighi	3.32	7.88	37.50
	Others	5.90	2.62	5.77

Source: UNICEF and BBS 2003.

The atlas is divided into five chapters; chapter 2 is dedicated to introducing variables considered for mapping activities. It also portrays some basic household level information. Chapter 3 as titled 'safe water status' illustrates the condition of water supply of the community. It also focused on the condition of tube well as water supply source. State of sanitation is covered in chapter 4 while chapter 5 focused on personal hygiene situation. Some general health and hygiene awareness information is presented in chapter 5.

comprehensive one. Geographical Information system (GIS) has been used to input, analyse and prepare final map outputs for this purpose. Only selected variables, rather than considering all the variables are portrayed in the atlas. The purpose of this attempt is three fold, (i) to aware the programme people about the progress of the project. It also may serve as

Chapter 2: Introducing Some Basic Variables

The chapter will introduce some basic socio-economic indicators like population density, literacy rate, poverty scenario of Bangladesh which have a strong relevance to water, sanitation and hygiene issues.

2.1 Population and poverty: matching each other or mutually exclusive?

Bangladesh has achieved a significant progress in population control in recent decades. The current population growth rate is 1.58 which gradually dropped from 2.88 in 1981. But the absolute number of population when compared with its total land area shows disappointing picture and this sheer number undermines the success of development efforts undertaken by GO or NGO bodies. Despite these setbacks the indicators like literacy rate, life expectancy, provisions of water, sanitation and hygiene have improved significantly in recent times.

The population density map (Figure 4) shows that the highest concentration of people takes place in the central region of Bangladesh, specially in greater Dhaka (i.e. Dhaka and Narayangong). People from 1600 to 5800 per square kilometre live in this region. Number of people 975 to 1662 are concentrated in the middle and eastern districts of Bangladesh, mainly in Mymensingh, Comilla, Chandpur, Noakhali and in Chittagong region. The geographically delicate areas like north-eastern haor basin, south-western coastal areas specially the Sundarbans and Chittagong Hill

Tracts areas are less dense when compared to the prior categories (Figure 4).

It was calculated from baseline survey conducted in 75 *upazilas* that 17.93 percent of the population are ultra poor, 26.56 and 55.52 percent people are poor and non poor respectively. Poverty scenario of the country (Figure 5, 6, 7 and 8) is well matched with population density map when the absolute number of people is used while mapping population below poverty line. The main concentration of poor people occurs in the Northern parts of Bangladesh in mainly along the coast of Brahmaputra-Jamuna rivers. The second cluster is situated in the low lying depression areas in the district of Mymensingh and Netrokona.

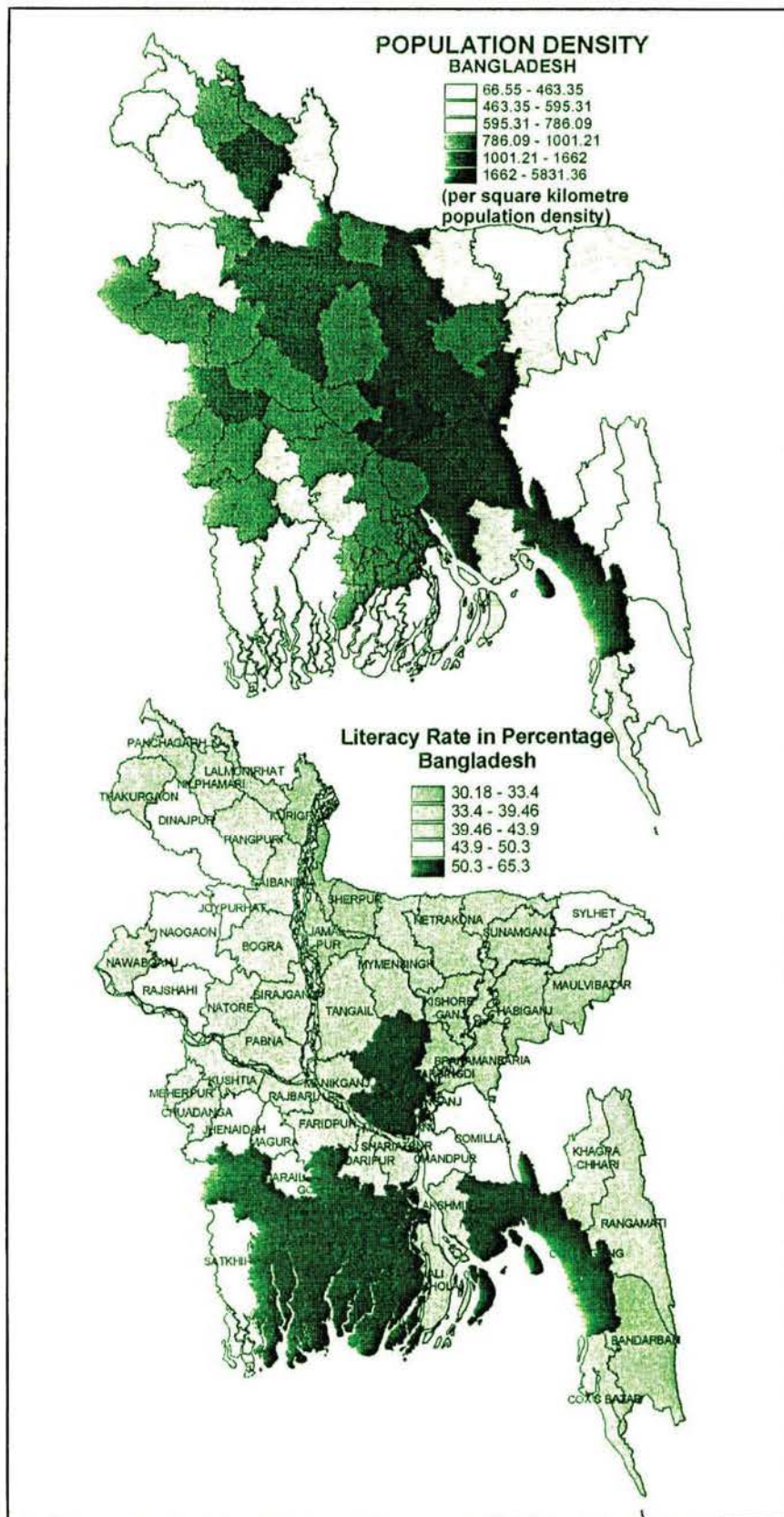


Figure 4.5: Maps showing population density (upper left), literacy (upper right) based on BBS census data 2001. Maps in the bottom shows the scenario of the people with disabilities based on census data carried out by WASH programme (50 upazilas represented).

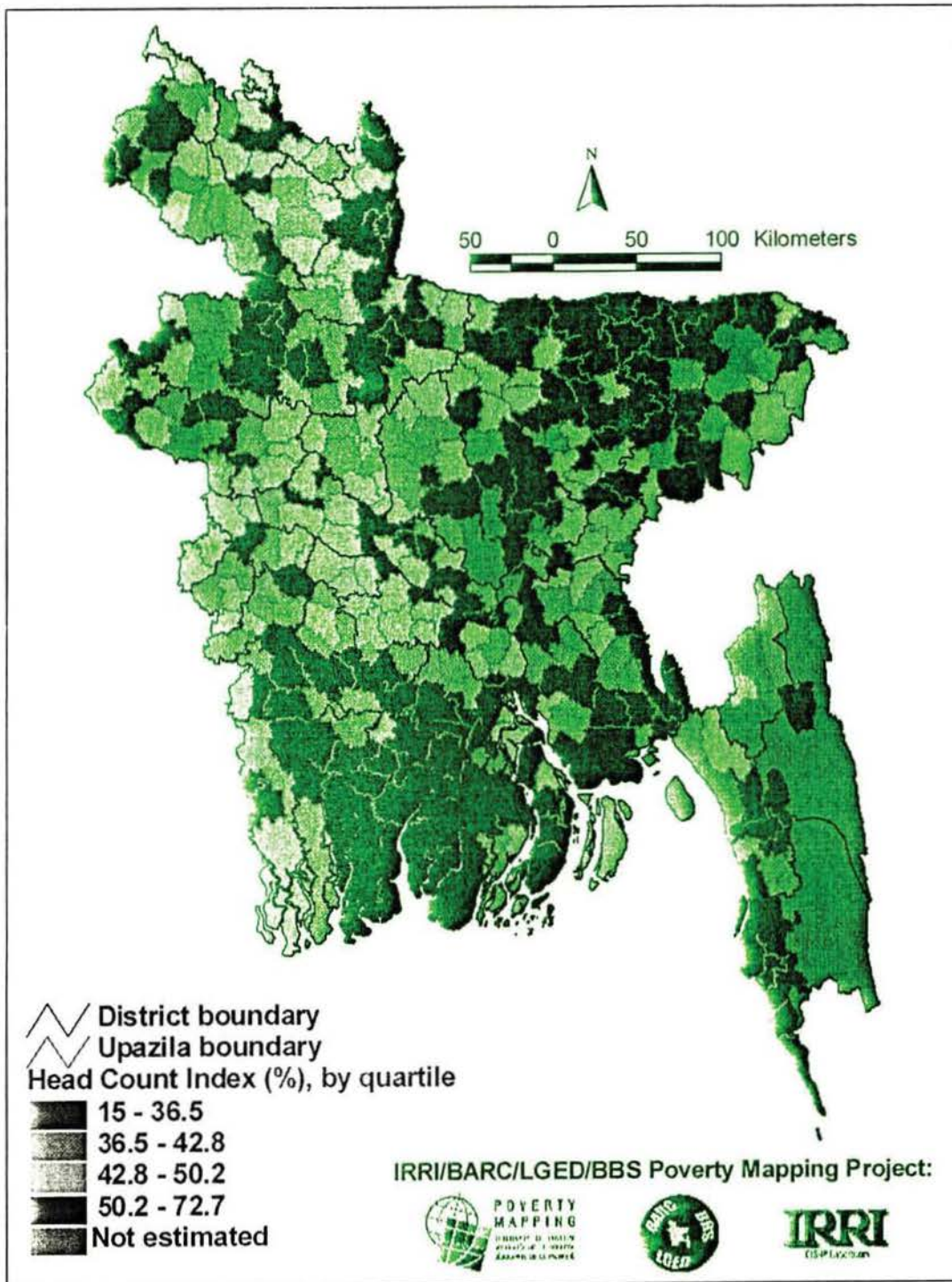


Figure 6: Poverty situation map of Bangladesh.

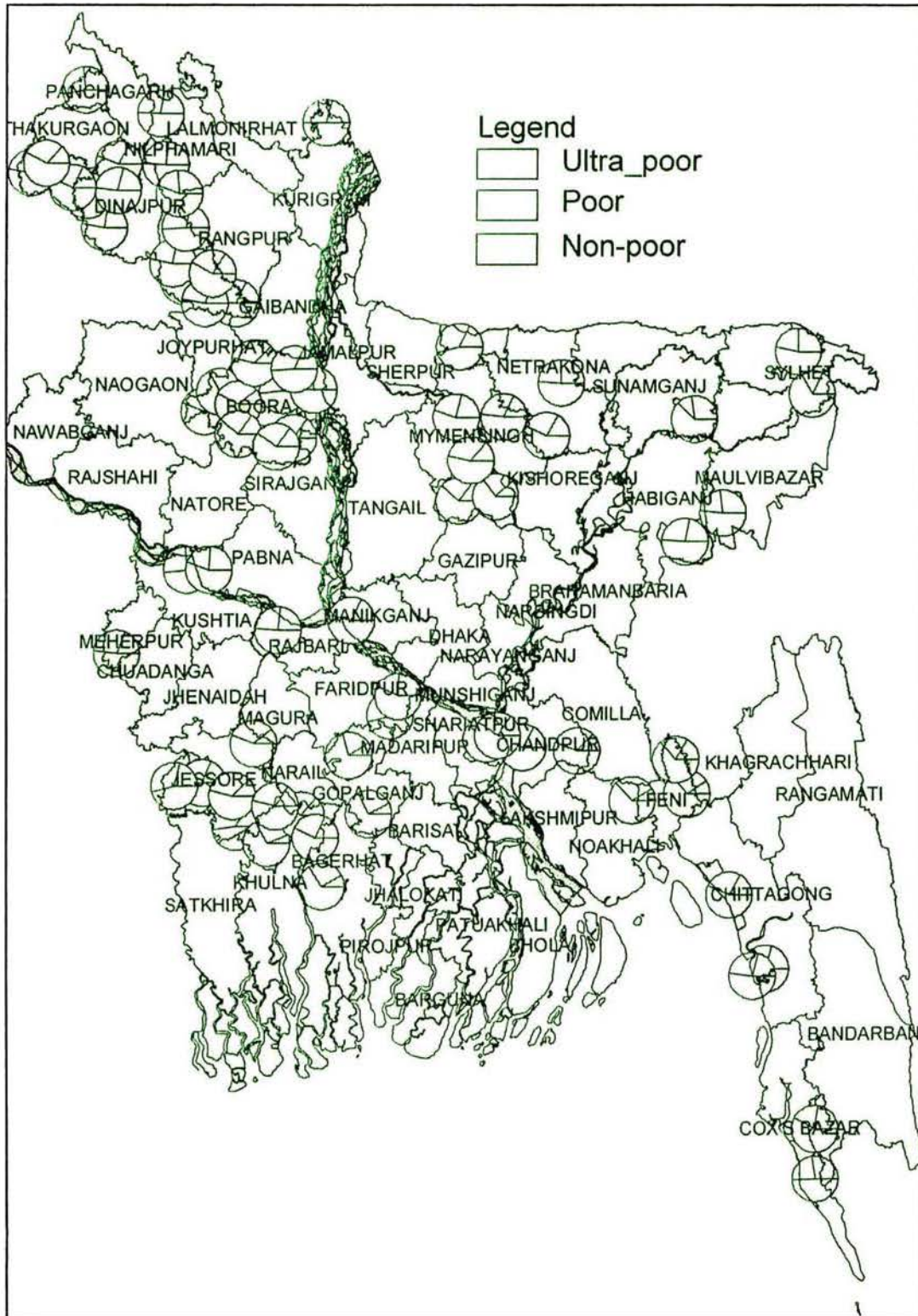


Figure 7: Map showing the poverty situation in WASH intervention areas based on baseline survey undertaken by BRAC RED for 75 thanas.

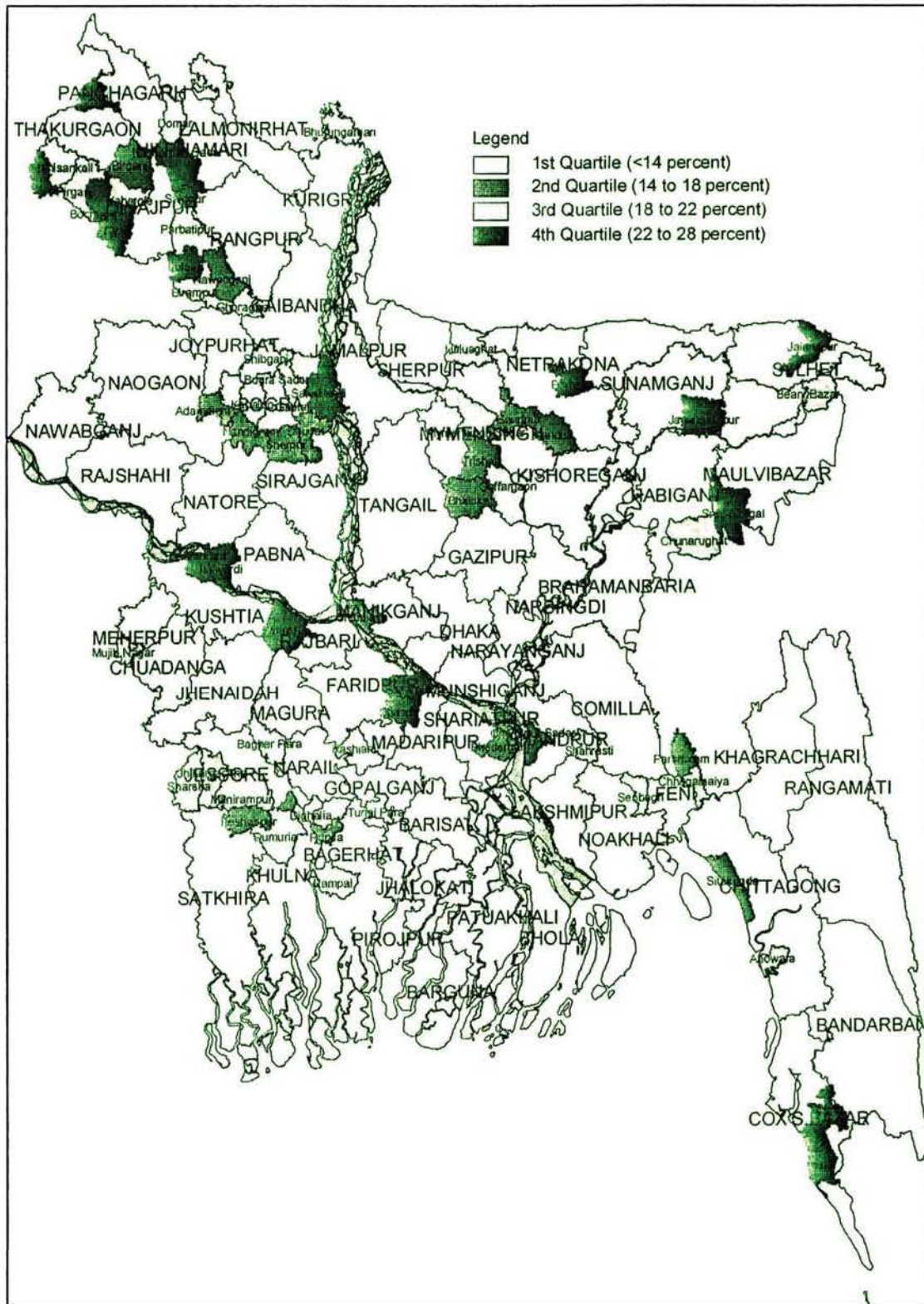


Figure 8: Classification of ultra poor groups. [The criteria for selecting ultra poor is based on several criteria; i.e. (i) landless household, (ii) homeless household, (iii) day-labor household head, (iv) less than 10 decimal of agricultural land, (v) no fixed income source and (vi) disabled or 65+ years old female headed household.]

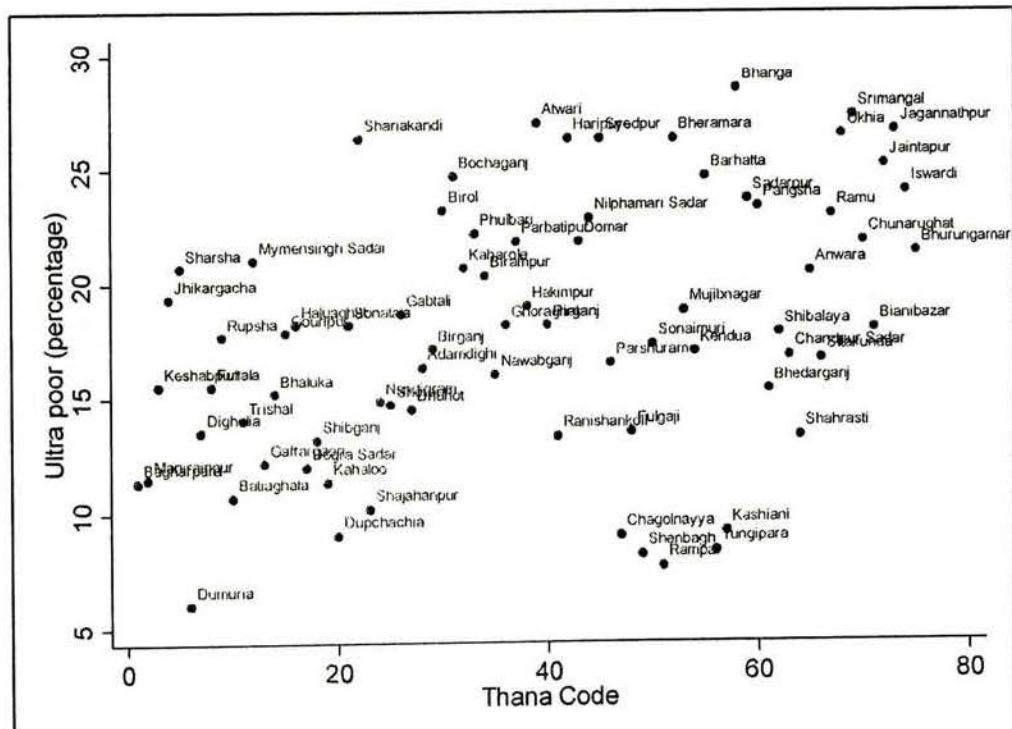
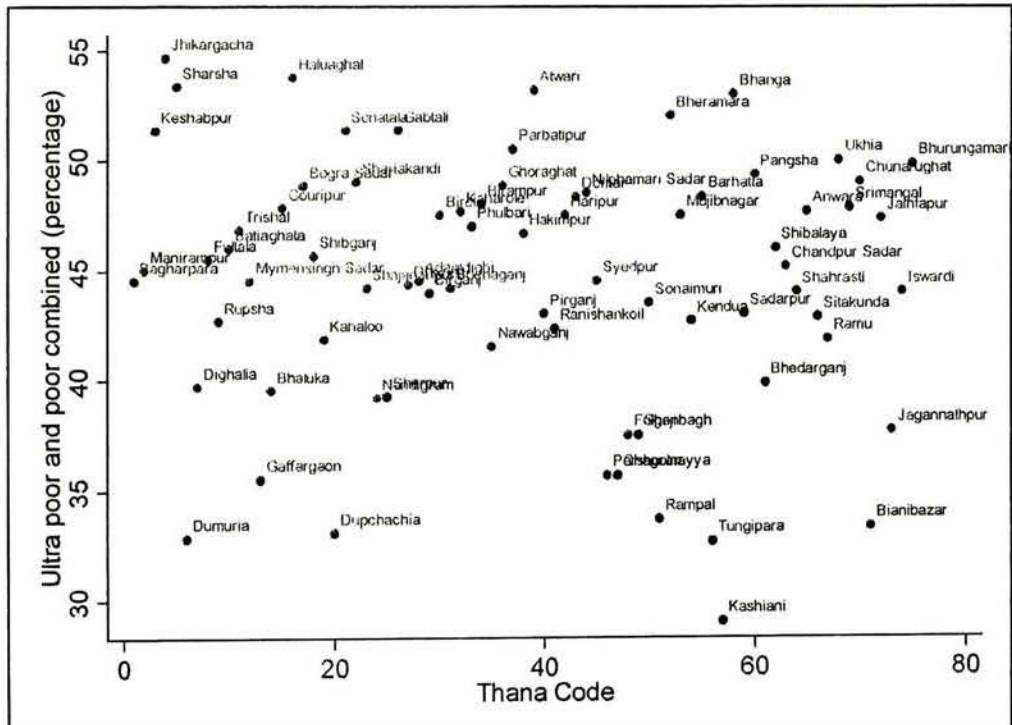


Figure 9: Diagrams show the percentage of poor (combined poor and ultra poor in upper diagram and only ultra poor in the bottom) people in different thanas.

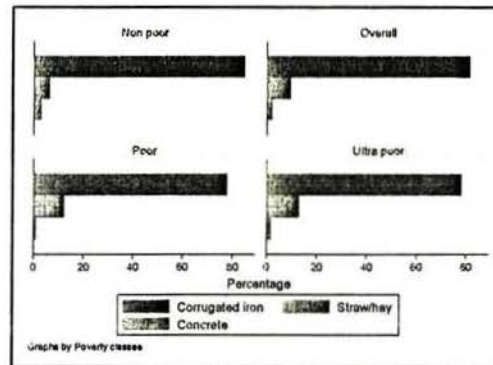
2.2 Household economic status

Household economic status is difficult to measure since direct variables were not collected in the questionnaire survey. But information on land ownership and asset holding, their primary occupation and household head's educational status may help to determine the socio-economic status of the respondents. It is interesting to note that sometimes it is hard to presume the socio-economic condition of people by assessing the information about the condition of shelter/house they live. For example, almost similar percentage of ultra poor people live in houses whose roofs framed with corrugated iron (Figure 10). Figure 10 also depicts, percentage for poor people is high than the ultra poor who used clay for making walls for their shelter. However, field survey experience suggests that the ultra poor people, in many instances, live in shelters owned by others/affluent people in the community. Therefore, their living condition may not always correspond to the status they belong to.

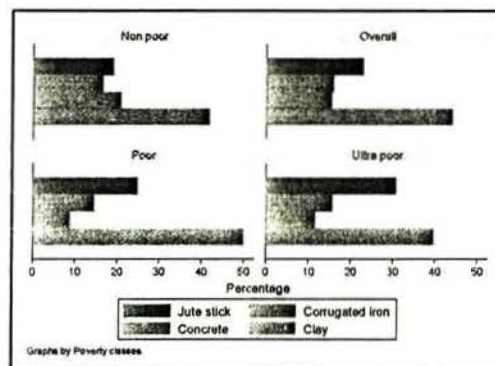
2.3 Distribution of people who needs special attention

Disabled people in addition to the children specially who are under five (Figure 11) may need special attention in programme design and implementation phase. Information in these regard would be cardinal to get responsive decision to bring about change in their lives. The WASH programme of BRAC has paid special attention on disabled people and on the children under five so that safe water, sanitation facilities and hygiene information can be provided to them. The baseline survey carried out by RED and census survey undertaken by the programme unit have gathered information on these issues. Map presented in Figure 11 shows the spatial distribution of children under five. It depicts high percentage of under five children occurred in the economically and ecologically fragile areas of Bangladesh (e.g. drought prone north western Bangladesh and in the wetland basin in greater Mymensingh district).

Roof condition



Wall condition



Floor condition

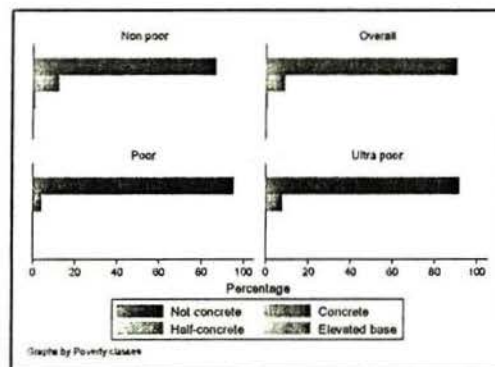


Figure 10: Roof, wall and floor condition of the surveyed households.

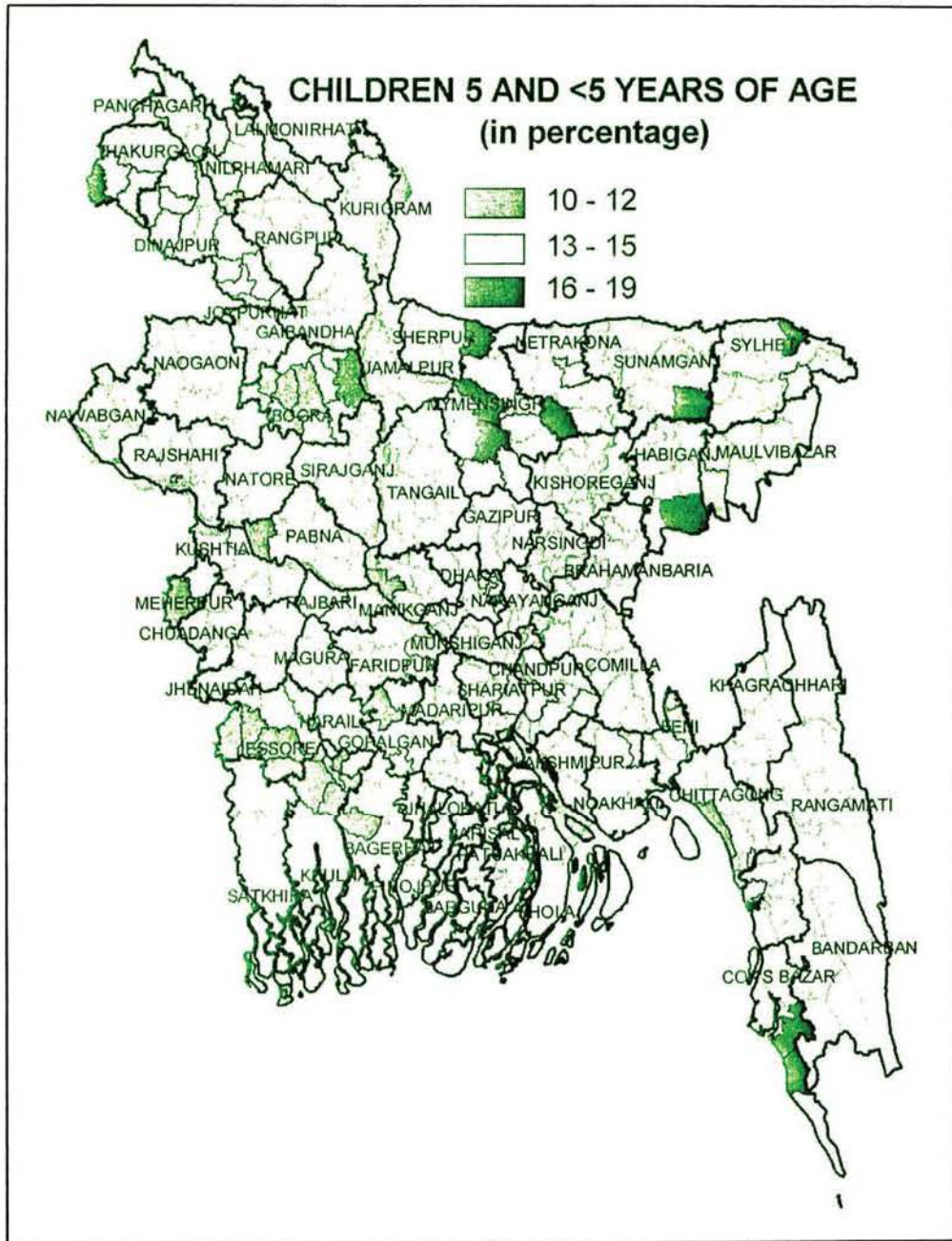


Figure 11: Map depicts the percentage of children in programme intervention area.

Chapter 3: Safe Water Status

This chapter gives an overview on the state of safety condition of water in the programme areas. Condition of the tubewell, state the platform whether it is katcha or concrete made, cleanliness of the tubewell premises determine the safety in water that are used for household purposes. Arsenic contamination added another dimension to this issue.

3.1 Sources of household safe water (Dry season)

People collect water both from own tube wells and also from shared sources. The highest number of own tube well was reported in Nilphamari district in Northern Bangladesh. The second highest category of this type also occurred in North-Western districts, mainly in Bogra, Dinajpur district. In contrast, in Mymensingh district people use shared/other's tube wells as the source of water. Khulna and Jessore districts followed Mymensingh in this respect. Maximum number of public tube wells is used in Khulna region (mainly in Khulna and Jessore district). The information presented on map depicts that public/government service is efficient in Khulna region than other regions. In Mymensingh people having tube wells allow their neighbours to collect drinking water (Figure 12). In North Bengal tube wells are generally privately installed.

3.2 Condition of tube well

Bangladesh Bureau of Statistics reports that 97% of the population have access to tube wells (hand pumps), taps or ring wells. It indicates that Bangladesh has achieved a remarkable degree of success in the water supply sector. Water supply and sanitation activities started in Bangladesh mainly under the supervision of DPHE. In the initial stages urban/town centres were in focus. The activities in these sectors are now shared with different NGOs and in many cases with local communities. In the past decades, Bangladesh has made notable success in providing its rural population with access to household water supply with the help of government and donor investments but in most of the cases it happened by household's own investments.

But recent detection of arsenic contamination in underground water undermined much of this success. It is estimated that around 30 million people are exposed to water with contamination levels exceeding 50 parts per billion and 49 million people are exposed to water with contamination levels exceeding 10 parts per billion. Although arsenic contamination is a major water quality problem, microbial contamination is also a serious issue. This microbial contamination may happen if tube wells are not properly installed and if tube well platforms are katcha (not concrete built). Figure 13 portrays the distribution of tube wells with katcha or pucca

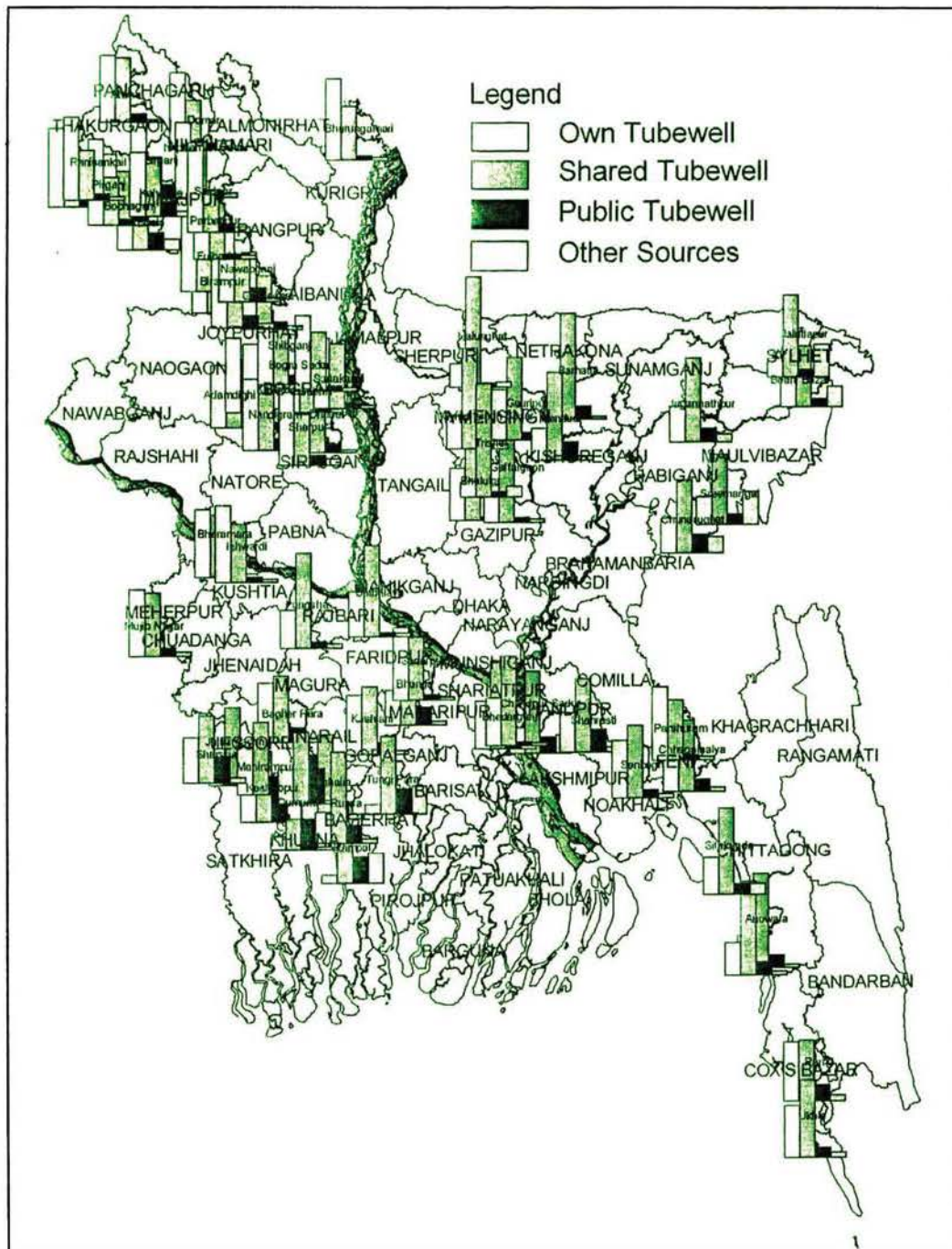


Figure 12: Sources of water in dry season.

platform. The figure shows that tube wells with katcha platform are dominated in the *upazilas* in Northern region, while most of the tube well-platforms in the Southern region are concrete built. This spatial pattern of the tube well condition recommends some kinds of interventions in the Northern areas. Figure 14 depicts the absolute number of tube wells by district. Bogra district dominates in the number of tube wells over other survey

areas, where Bogra sadar *upazila* holds the highest number of tube wells. Mymensingh district shows the lowest number of hand tube wells installed.

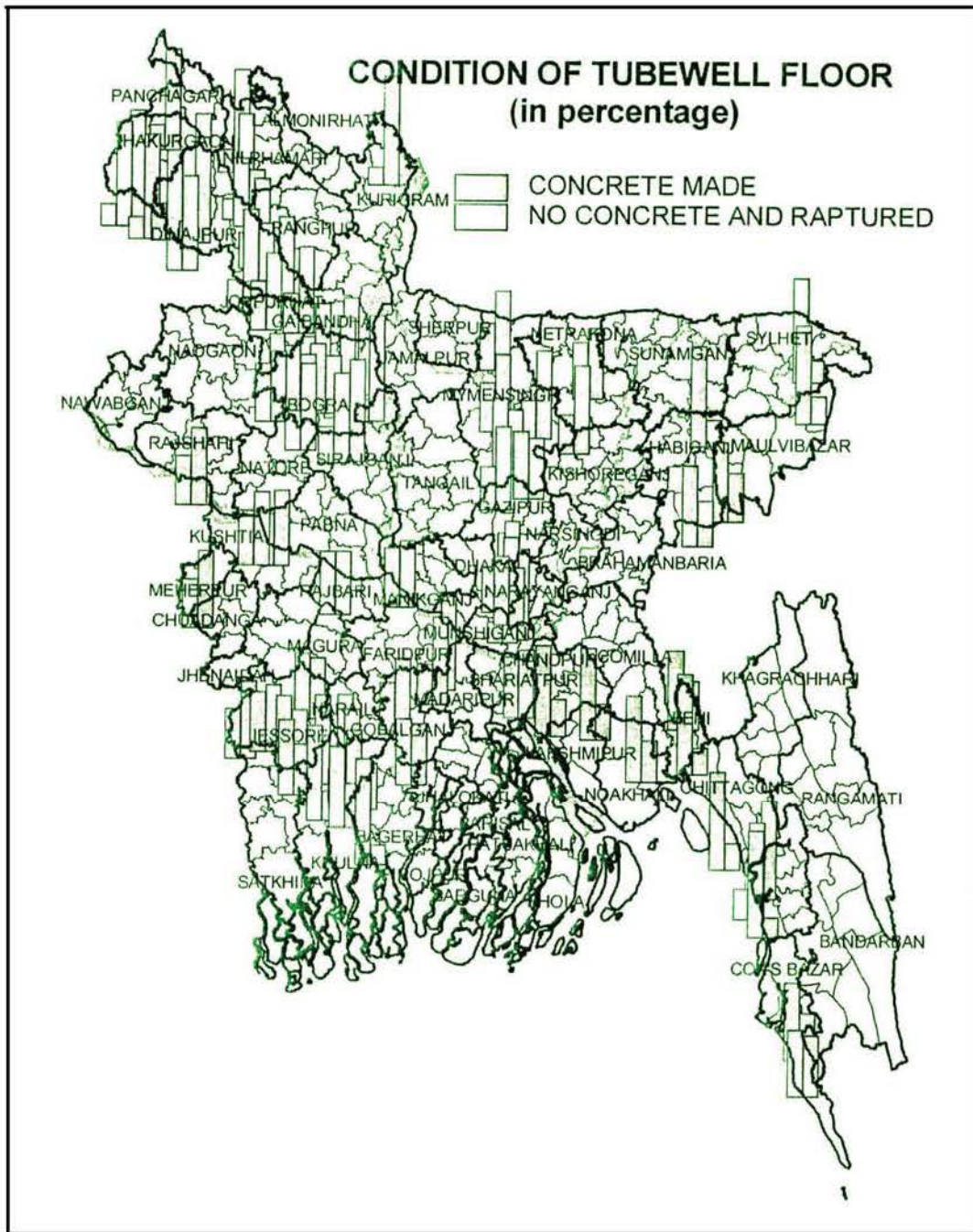


Figure 13: Condition of tube wells.

3.3 Arsenic contamination

Arsenic contamination in the ground water in Bangladesh becomes a major environmental concern since its presence is reported in ground water in the late 1990s. It is widely accepted that arsenic prone tube wells are mainly located in the Ganges floodplain areas (Figure 14). However, the *upazilas* selected for WASH programme is, in majority cases, located out of the arsenic affected areas. Overall 68.30 percent of the tube wells (for all cases e.g. own, shared) were reported arsenic free during questionnaire survey, the rest are affected with arsenic (i.e. 31.7%, table 2).

It is interesting to note that among three strata (i.e. ultra poor, poor and non-poor) of the people, the non-poor group suffers the most from arsenic contamination in the tube well water. The ultra poor group got the highest coverage (about 75 percent) of arsenic safe water used for drinking and cooking, where this percentage stands for 67 and 66 for poor and non-poor groups respectively. This highest safe water coverage enjoyed by the ultra poor people might happen because they

are extensively covered, compared to other two groups, by the different GO/NGO programmes aimed for supplying safe water.

It is mentioned earlier that people collect water mainly from two different sources, (i) from own tube well. (ii) from shared tube well. Table 2 illustrates that only 14.7 percent of people (6602 out of total 44993 in 75 survey *upazilas*) having own tube well for collecting water responded 'yes' on arsenic test results question. It means, 85.3 percent people did not respond or said 'no' to this question. Among them 76.37 percent (i.e. 5042 out of 6602) claimed that their tube well were tested positive for arsenic contamination. In contrast, 84.33 percent of the respondents (9218 out of 10930) who collect water from shared tube wells answered 'yes' to the same kind of question.

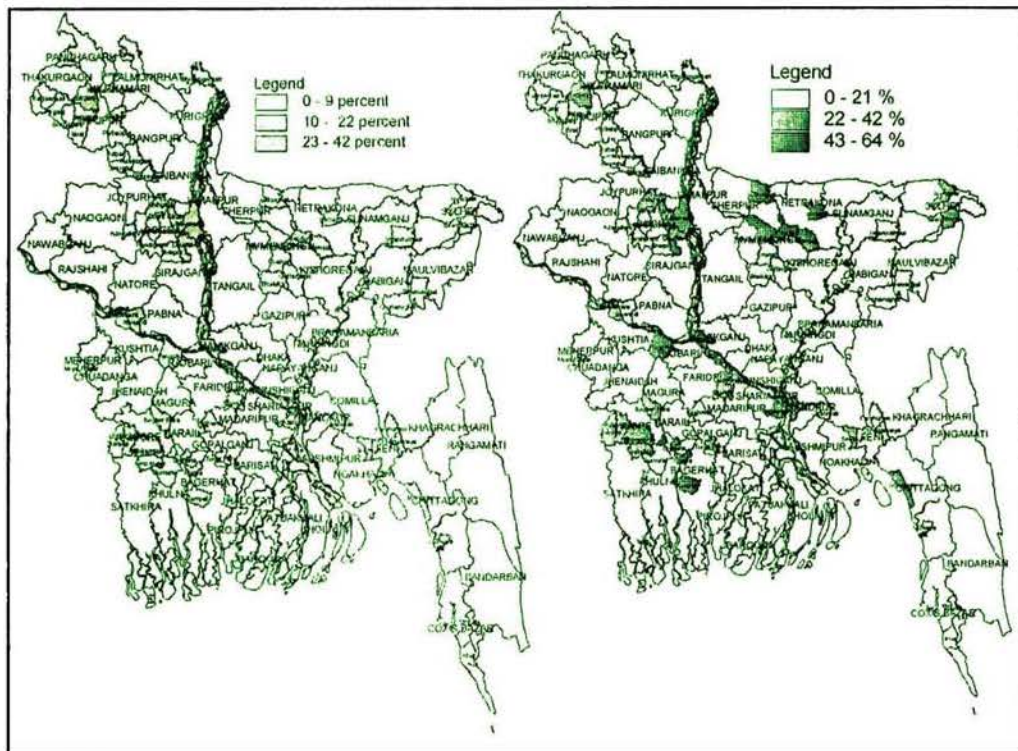


Figure 14: Arsenic positive in own tube wells (left), in shared tube wells (right).

It is noteworthy that almost 100 percent of the respondents reported that they have heard about arsenic contamination in the ground water. It indicates that they are aware of the danger of drinking arsenic contaminated water. About seventy percent of the people

Table 2: Status of arsenic contamination in own and shared tube wells.

Total household interviewed	People responded on arsenic related questions			
	Own tube well		Shared tube well	
	6602 (14.7%)		10930 (24.30%)	
44993 (in 75 survey upazilas for collecting baseline info)	Arsenic positive	No arsenic	Arsenic positive	No arsenic
	5042 (76.37%)	1560 (23.62%)	9218 (84.33%)	1635 (15.66%)

claimed that they know what types of diseases they are likely to be affected with due to this arsenic poisoning.

The respondents were also asked whether they know how to remove arsenic from tube well water or not. In most of the cases they 47 percent mentioned that they don't know the remedy and 30.37 percent did not answered the question.

Chapter 4: State of Sanitation

This chapter introduces the state of sanitation in Bangladesh. Maps and diagrams are produced based on census data gathered by WASH programme unit.

4.1 State of sanitation

The state of sanitation in Bangladesh is still poor compared to the success in water supply sector. BBS reported that the national average of sanitation facilities has improved from 21 percent in 1990 to 53 percent in 2003 (Figure 16). Although World Bank statistics suggest a different scenario as they claim that only 39 percent of the total population of Bangladesh access to improved sanitation facilities (<http://ddp.worldbank.org>, accessed in June 2007). Despite the difference in statistics, it is certain that the percentage of population is low who access better sanitation facilities. In the SAARC region Bangladesh is far behind of other countries who have shown remarkable success in this sector like Sri Lanka (Table 3).

Figures 16 also depicts the rural urban discrepancy in accessing sanitation facilities. Illiteracy, poverty, lack of awareness are the major contributing factors responsible for poor sanitation condition in the rural areas. Field information suggest that the people are not well aware of the benefits of using safe toilet facilities. In many instances it is reported that toilets established by different NGOs for the rural community are left out due to the burden of post establishment maintenance.

Poor sanitation is integral to infectious pathogen exposure. It is a real threat in the rural areas because flies, domestic poultry birds wander around open toilets (Figure 17) and thus transferring diseases. Ashbolt 2004 mentioned that poor water quality, sanitation and hygiene account for some 1.7 million deaths a year worldwide mainly by infectious diarrhoea. In Bangladesh it is also a cause of many infectious diseases.

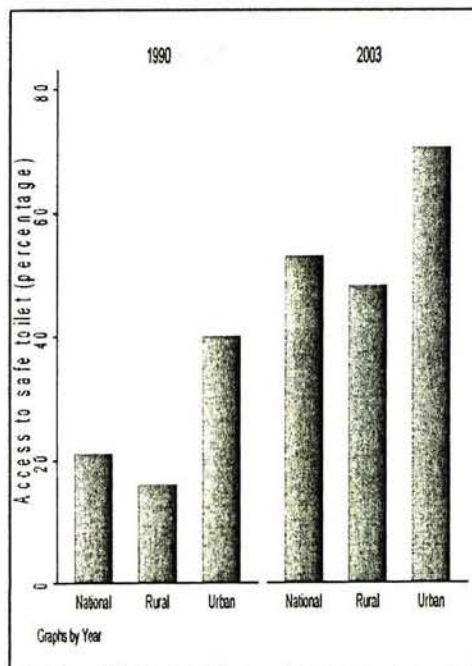


Figure 16: Rural urban disparity in access to sanitation in Bangladesh.

Table 3: Sanitation coverage in SAARC countries.

Country	Improved Sanitation	
	1990	2005
Afghanistan	03	34
Bhutan	-	70
India	14	33
Maldives	-	59
Pakistan	37	59
Sri Lanka	69	91
Bangladesh	20	39
Nepal	11	35

<http://ddp.worldbank.org>



Figure 17: Open toilet in Netrokona.

4.2 Hygienic latrine use and waste disposal

Northern Bangladesh shows a delicate picture in the use of sanitary latrines compared to that of in the Southern regions. Nilphamari, Rangpur, Dinajpur is reported as the lowest percentage area in terms of sanitary latrine use (Figure 19 and 20). It is interesting to note that

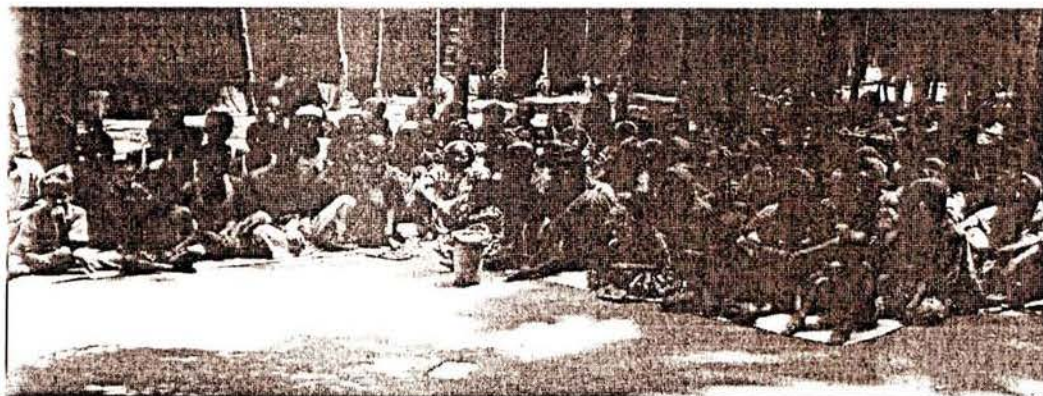


Figure 18: Rural community in WASH meeting in Shambhuganj (Mymensingh).

Bogra district got privilege in receiving water supply installations (see Figure 19) but that kind of success does not reflect in the sanitary latrine coverage, except Bogra Sadar *upazila*. In contrast, *upazilas* in the khulna division got the highest percentage in sanitary latrine coverage. The map (Figure 19) portrays only 50 *upazilas* surveyed by BRAC. This map well corresponds with the country-wide sanitation coverage map based on UNICEF data (Figure 20). Figure 20 also shows that Northern Bangladesh deserves special attention in improving the condition of sanitation facilities.

4.3 Ownership of hygienic latrine

About 75 percent population of Bangladesh live in rural areas and more than 50 percent of them do not have access to improved sanitation facilities. Programme survey data on ownership of hygienic sanitation facilities shows strong contrast between high and low percentage. The average percentage accounted for 28 for all surveyed (i.e. 50 *upazilas*). Batiaghata (61%) *upazila* of Khulna district, Sonaimuri (52) of Noakhali, Bagherpara (45%) of Jessore show the highest percentage in the ownership of sanitation facilities. On the other hand, Haripur *upazila* of Thakurgaon, Dhunot of Bogra presents the lowest percent in this regard. Both of the *upazilas* stands at 16 percent. It is imperative to note that excepting Bogra Sadar *upazila*, all other *upazilas* in Bogra district shows low percentage (Figure 19), what, in turn, indicates that development interventions are generally skewed in the central locations. Figure 19 also depicts that the general pattern of lowest percentage of sanitation occurs in the Northern parts of Bangladesh.

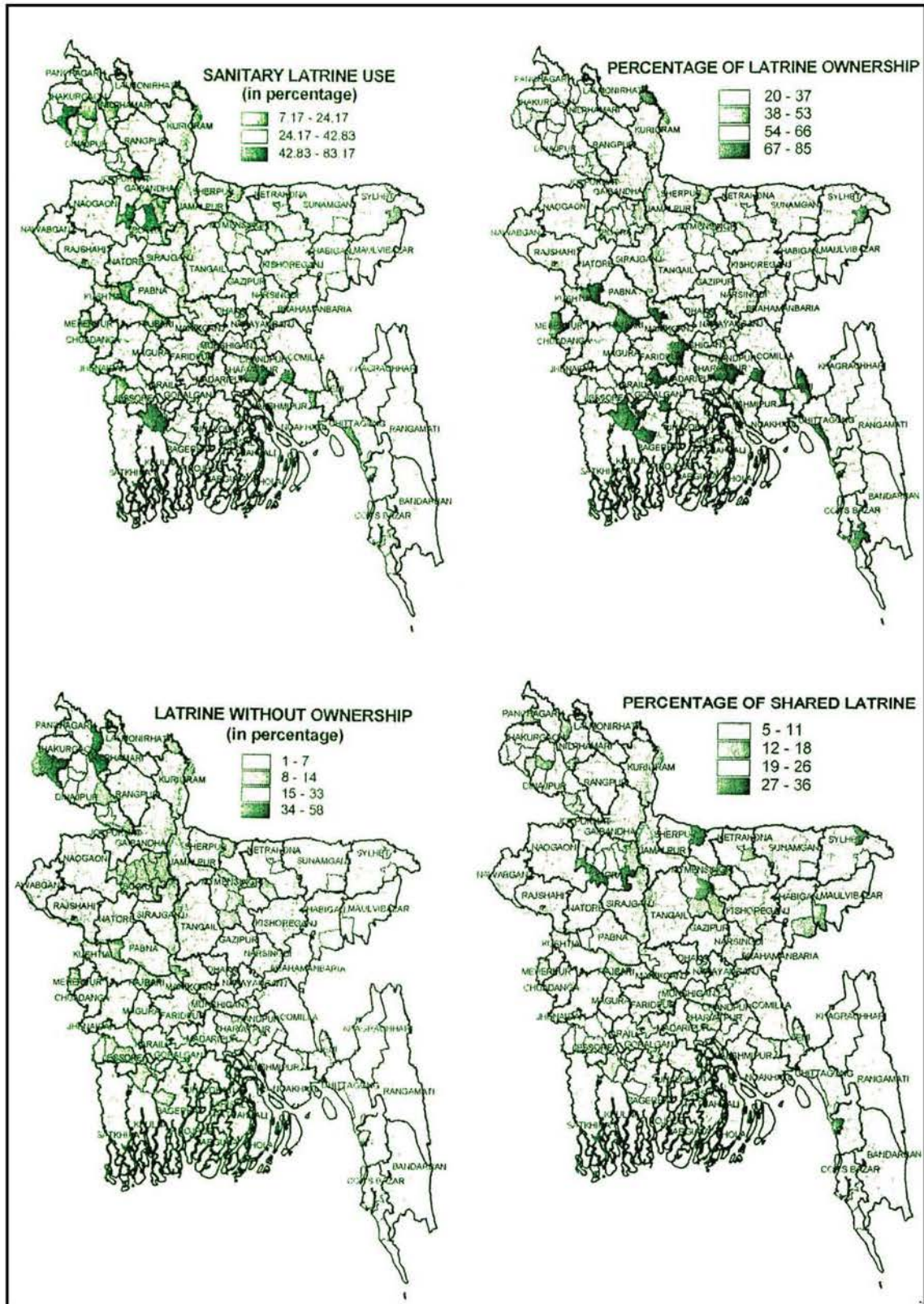


Figure 19: Sanitary latrine coverage and ownership of sanitary latrines

resulted from adding up the percentages of owned and not owned sanitary latrines. Yellow and pink parts represent the owned and not-owned percentages. The total population of the upazila is used to put weight that reflect on the size of the pie.

4.4 Reasons for using hygienic latrines

The reasons for using hygienic latrine are mainly convenience and health (Figure 22), as reflected by the opinion of respondents in 50 survey *upazila*. Only 56.5 percent answered this question while 43.5 percent did not respond. Among the positively responded people, 50 percent of the them mentioned that health issue is the main reason why they use latrine for defecation, while 29 percent pointed out that convenience is the reason and 11 person stated that they use latrine because they do not have any other alternatives for defecation. Other reasons like reliability, social status, cheap etc. were mentioned by rest of the 10 percent of the respondents. The claim of health reason is also supported with the response on the question how regularly do they use sandals when using latrine; 95 percent of the respondents mentioned that they use sandals while using latrine. But the response on how regularly do

they clean their latrine; the answer does not seem that it go with the previous response. The answer indicates that only 55 percent of them regularly clean their latrine and 28.3 percent clean as 'on and off' basis and 17 percent do not clean their latrine at all. In most of the cleaning cases, it is the female members (88 percent) of the households who clean dirty latrines, only in 5 percent cases male members

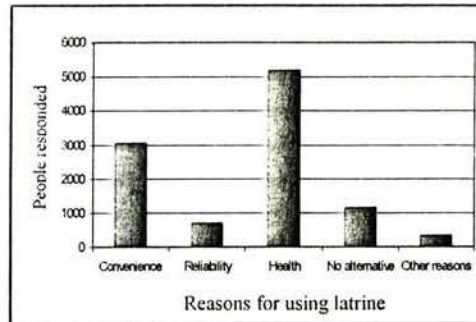


Figure 20: reasons for using latrine.

of the family do this job and 7 percent cases male members help female members in cleaning activities. The use of chemical agents (like Vim, Finyle, Harpic, Calcium Carbonate etc.) in latrine cleaning purposes is poor; most

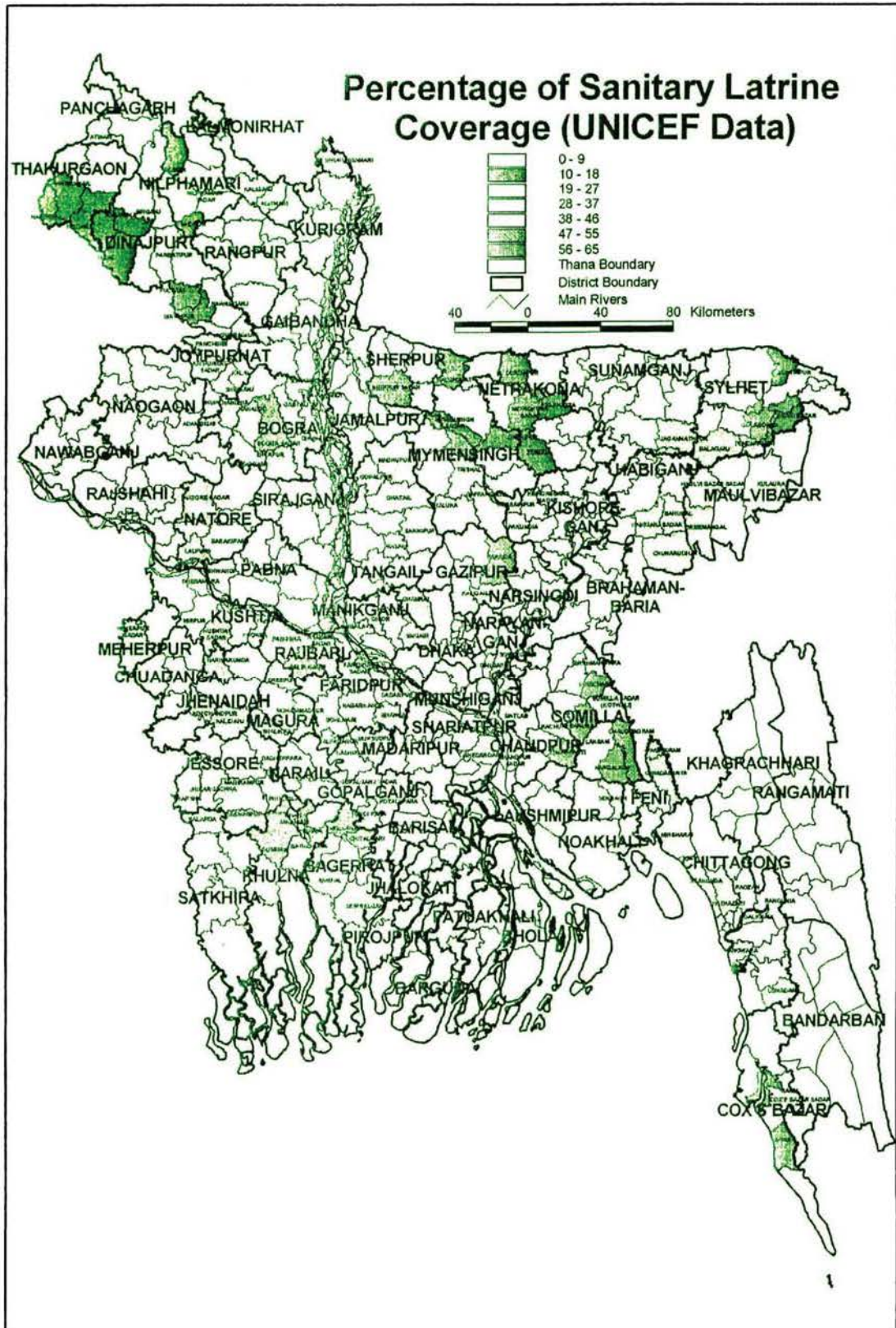


Figure 21: Sanitary latrine coverage in Bangladesh based on UNICEF data.

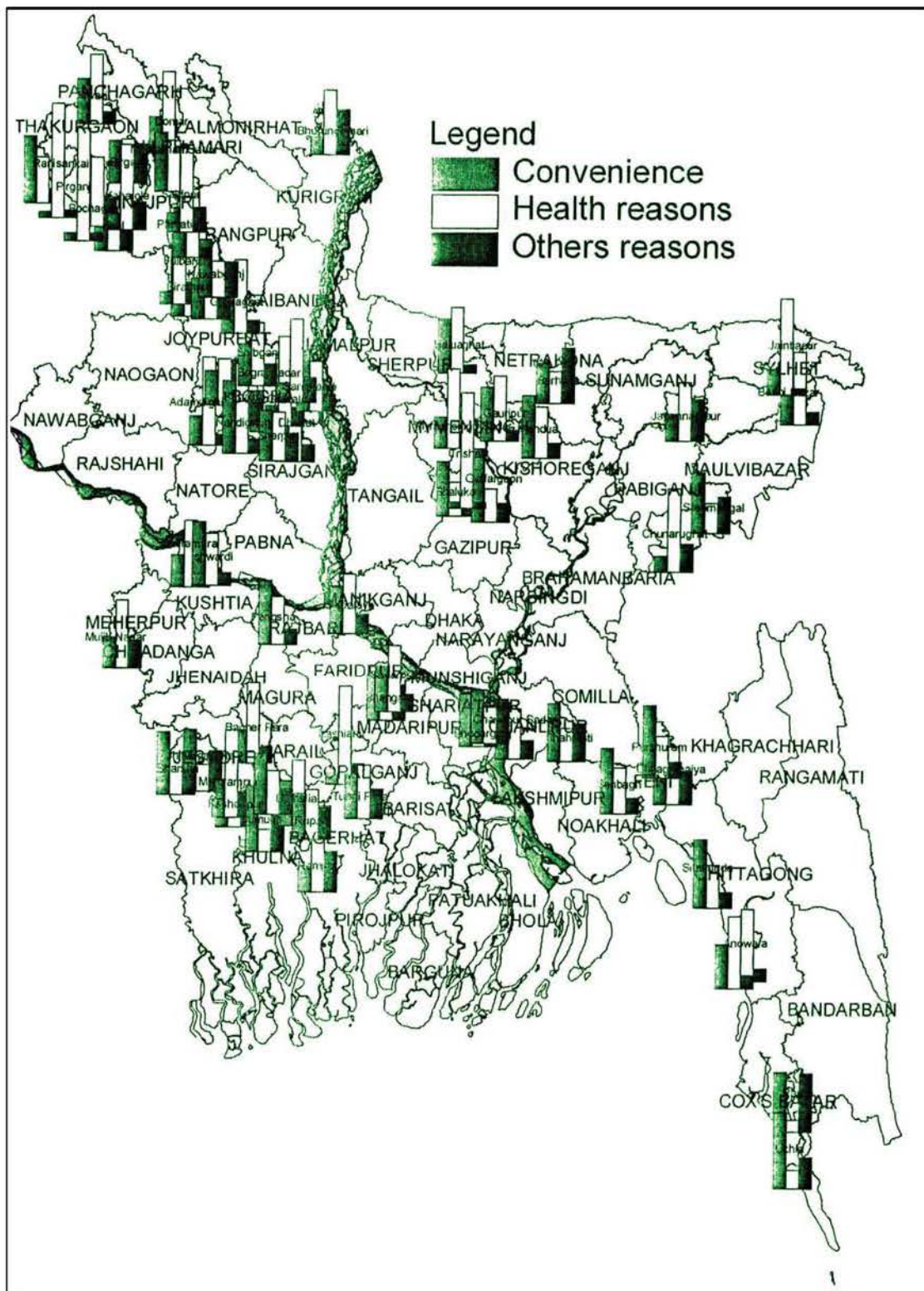


Figure 22: Reasons for using latrines.

of the people (62 percent) use simply brush/broom for cleaning the latrines, 15 percent use only water.

4.5 Establishment of sanitary latrine

People, who use sanitary latrines, generally meet the expenditures for establishing the sanitary latrines from their own resources. About 91 percent people fund by themselves for this establishment. People receive money from NGO and government sources but they hardly use these resources in latrine establishments.

4.6 Latrine use pattern of the children

The children are most vulnerable group of the community to disease exposure. Open yard poultry rearing in the village homesteads is a major source of spreading of different kinds of diseases since poultry fowl roam around the homestead including in the open toilets and come into contact with human faeces. Flies are another important source of disease spreading from the open human faeces from the unsanitary latrines. Table 5 lists a number of diseases that originate from human and animal faeces.

WASH programme put a major emphasis in its activities so that children are covered with the provisions of safe water, sanitation facilities. In order to do this, both programme unit and RED of BRAC gathered information on children relating to water, sanitation and hygiene. The census survey results from 50 *upazila* suggest that in 63 percent of the households children under five defecate 'in the premises' or 'here and there' and only 19 percent use latrine for children's defecation. The parent consider that their children are too young to use the latrine as this statement is claimed by 63 percent of the respondents. Seventeen percent reported that their children are not using latrine because the family does not have any latrine facility. It is interesting to note, the parents are not careful in disposing their children's waste as well. They reported that they dispose the waste of the children 'here and there' (17 percent), 'open holes' (27 percent), sometimes 'hanging' (25 percent). It

Table 4: Reasons for not using latrines by the children

Reasons for not using the latrine by the children	Percent
Too young to use	63
Scared to use	15
Not suitable for use	4
No need	01
Not having latrine	17
Other	0.3

is observed during the field visits that sometimes the adult members of the family are careful about safe latrine use, but reluctant about their children.

Table 5: Waterborne pathogens of concern in developing regions

Name of microorganisms	Major diseases	Major reservoirs and primary sources
Bacteria <i>Salmonella typhi</i> <i>Salmonella paratyphi</i> <i>Shigella spp.</i> <i>Vibrio cholera</i> Enteropathogenic E. coli <i>Yersinia enterocolitica</i>	Typhoid fever Paratyphoid fever Bacillary dysentery Cholera Gastroenteritis Gastroenteritis	Human Faeces Human Faeces Human Faeces Human Faeces, water zooplankton Human Faeces Human and animal faeces
Enteric viruses Polio viruses Coxsackie viruses A Coxsackie viruses B Echo viruses Other enteroviruses Rotaviruses Adenoviruses Hepatitis A Virus Hepatitis E Virus Norovirus	Poliomyelitis Aseptic meningitis Aseptic meningitis Aseptic meningitis Encephalities Gastroenteritis Upper respiratory illness Infectious hepatitis Infect. Hepatitis, miscarriage Gastroenteritis	Human Faeces Human Faeces Human Faeces Human Faeces Human Faeces Human Faeces Human Faeces Human Faeces Human Faeces Fomites and water
Protozoa <i>Acanthamoeba castellanii</i> <i>Balantidium coli</i> <i>Cryptosporidium parvum</i> <i>Entamoeba histolytica</i> <i>Giardia lamblia</i> <i>Naegleria fowleri</i>	Amoebic meningoencephalitis Dysentery Gastroenteritis Amoebic dysentery Gastroenteritis Amoebic meningoencephalitis	Human faeces Human and animal faeces Water, human and animal faeces Human and animal faeces Water and animal faeces Warm water
Helminths <i>Ascaris lumbricoides</i>	Ascariasis	Animal and human faeces

Source: Ashbolt, N. J. (2004).

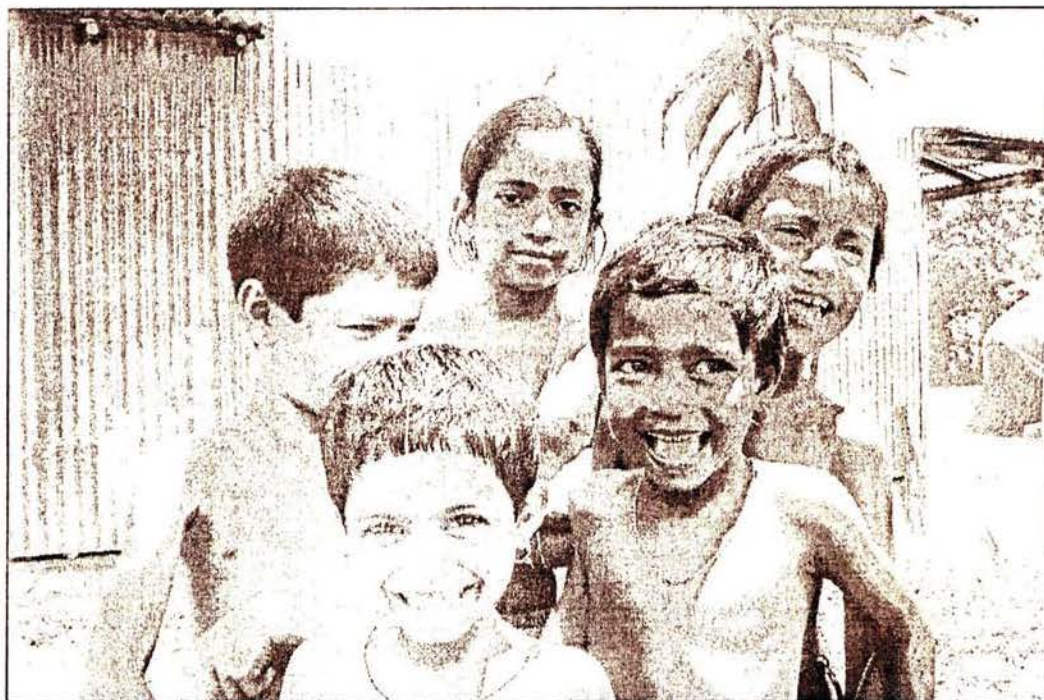


Figure 23: WASH programme of BRAC has been working for ensuring a long-lasting smile to these rural children of Bangladesh.

Chapter 5: Hygiene Situation

Awareness of people about overall health and hygiene is reported in this chapter. Data and information both may give insights about the level of familiarity/knowledge of people on healthy practices in rural Bangladesh.

5.1 Overall hygiene situation

Safe water supply and improved sanitation may not bring change in curbing disease prevalence in the community if they are not aware of the relationship between disease occurrence and unhygienic practice in everyday life. In Bangladesh one of the main causes of water borne disease are faecal-oral transmission routes. Table 5, in previous chapter lists a number of diseases that originate mainly from human faeces; animal faeces also contribute to that. Watsan Information booklet of NGO Forum informed that only 24.7 percent of people in Bangladesh wash their hands with water, soap or ashes after defecation (only 7 percent use soap), 3 percent wash their hands with soap and water before having a meal, feeding children and preparing food. This indicates that people, despite having sanitary latrine, may still be exposed to a number of microbial (e.g. bacteria, virus and protozoa related) diseases through different processes and due to the lack of personal hygiene. Water is another source for many types of diseases (Table 6). They include waterborne, water related, water based and water washed. Luby *et al.* (2005) showed that only hand washing intervention may help to reduce a considerable level of water contamination. They also claimed that hand washing may contribute in reducing the

incidences of acute respiratory infections, diarrhoea and impetigo.

The WASH programme of BRAC put a major emphasis in improving personal hygiene of the community. The programme envisions the success in this sector in the attainment of two objectives i.e. (i) hygiene is practised by everybody after defecation and before taking food. Also after cleaning child/baby excreta and (ii) strengthen public private and community partnership with national soap producers to make low cost soap for households and for all schools.

5.2 Water Collection Devices/pots

People generally collect drinking water with kolosh (pot made of soil), balti, jala/motka. About 39 percent reported that they use kolosh for collecting water, while 20 percent mentioned balti (bucket) to use for the same purpose. It is interesting to note that 40 percent of the people claimed that they do not collect water at all from the source rather they collect it on *as and when required* basis. This might happen since it is estimated from baseline survey that about 64.60 percent people having closer access (within 50 meters) to hand held tube wells in their neighbourhood. It is imperative to mention that the people who collect water from the source generally do not cover (78 percent claimed) the top of the container, while 22 percent mentioned that they do it. Contrasting response was received on the question whether the water get hand contacts or not during water collection

Table 6: Water supply related diseases

Group	Diseases
<i>Water-borne disease:</i> diseases spread through water in which water acts as a passive carrier for the infecting pathogens. These diseases depend also on sanitation.	Cholera, Typhoid, Bacillary dysentery, Infectious hepatitis, Leptospirosis, Giardiasis, Gastroenteritis etc.
<i>Water-related diseases:</i> diseases spread by vectors and insects that live in or close to water. Stagnant ponds of water provides the breeding place for the disease spreading vectors such as mosquitoes, flies and insects.	Yellow fever, Dengue fever, Encephalitis, Malaria, Filariasis (all by mosquitoes), Sleeping sickness (Tsetse fly), Onchocerciasis (Simulium fly), etc.
<i>Water-based diseases:</i> diseases caused by infecting agents spread by, contact with or ingestion of water. Water supports an essential part of the life cycle of infecting agents such as aquatic snails.	Schistosomiasis, Dracunculosis, Bilharziosis, Philariasis, Oncholersosis, Treadworm and other helminths.
<i>Water-washed diseases:</i> diseases caused by the lack of adequate quantity of water for proper maintenance or personal hygiene. Some are also depended on poor sanitation.	Scabis, Trachoma (eye infection), Leprosy, Conjunctivitis, Salmonellosis, Ascariasis, Trichuriasis, Hookworm, Amoebic dysentery, Paratyphoid fever etc.

Source: White, G.F (1972) and Ashbolt, N.J. (2004).

processes. In 95 percent cases they said that they do not have any hand contacts with water during collection.

About half (49 percent) of the population in 50 survey *upazilas* reported that they do not store water at residence. About 39 percent people mentioned that they do not collect water from the source as well. It is worth of explaining the difference in the number of people with regards to water collection and water storage practice in the community. There are some people who collect water but not interested to store it, sometimes they collect and store it in glass/mug that they do not consider as water storage.

5.3 State of Washing Utensils

People reported that they (91 percent) collect water from water sources for washing utensils and the collection device they use is 'jug'. They mainly collect water only when they need it. Sometimes they go to the water source for using water for utensils' cleaning purposes. Ninety one percent reported, they do hand contacts with water while doing cleaning jobs of cooking gears. People reported, they also do not bother about covering up the water

container that is being collected for the purpose of washing cooking tools and pots. Similarly 97 percent mentioned that they do not store water for this purpose.

5.4 State of Cooking water

A reverse picture has turned out in case of collecting water for cooking purposes when compared to the collection for drinking and washing utensils as reported in the earlier sections. About 80 percent of the survey people reported that they collect water for cooking job by using kolosh (48 percent), and balti (31 percent). Almost the similar percentage (79 percent) mentioned that they do not cover water that is being collected for cooking purposes as the water finishes as they finish their cooking job. Among the people 64 percent mentioned that do not store this water. Thirty percent among the rest store water in kolosh for cooking.

5.5 Hand Washing Information

The response of the people regarding hand washing is mixed. They were asked about their hand washing practices in terms of 'after certain actions'. These actions are grouped into eight categories (Figure 24). According to their response it is evidenced that before eating food

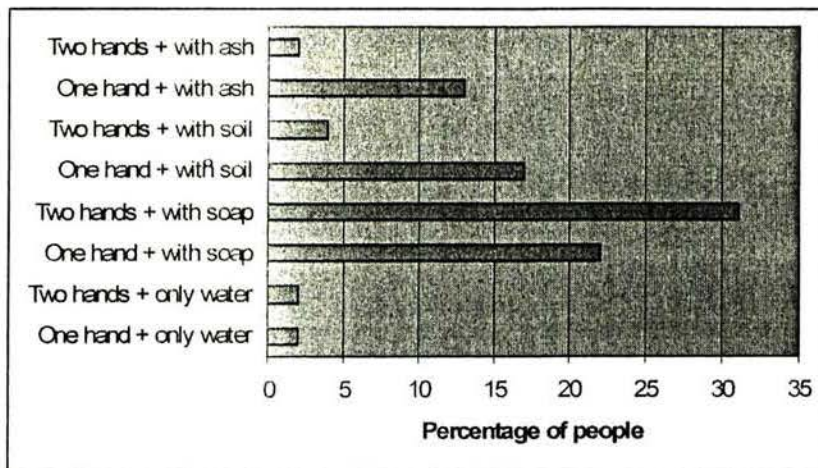


Figure 24: Hand washing options.

and after defecation most of them wash their hands (Figure 25). In the case of defecation, 31 percent mentioned that they use soap and employ both of their hands for washing, while 22 and 17 percent mentioned that they use one

hand plus soap and ash respectively for washing up their hands. On the other hand, 70 and 65 percent respondents stated, they simply use water for washing hands before and after eating foods respectively. The most alarming

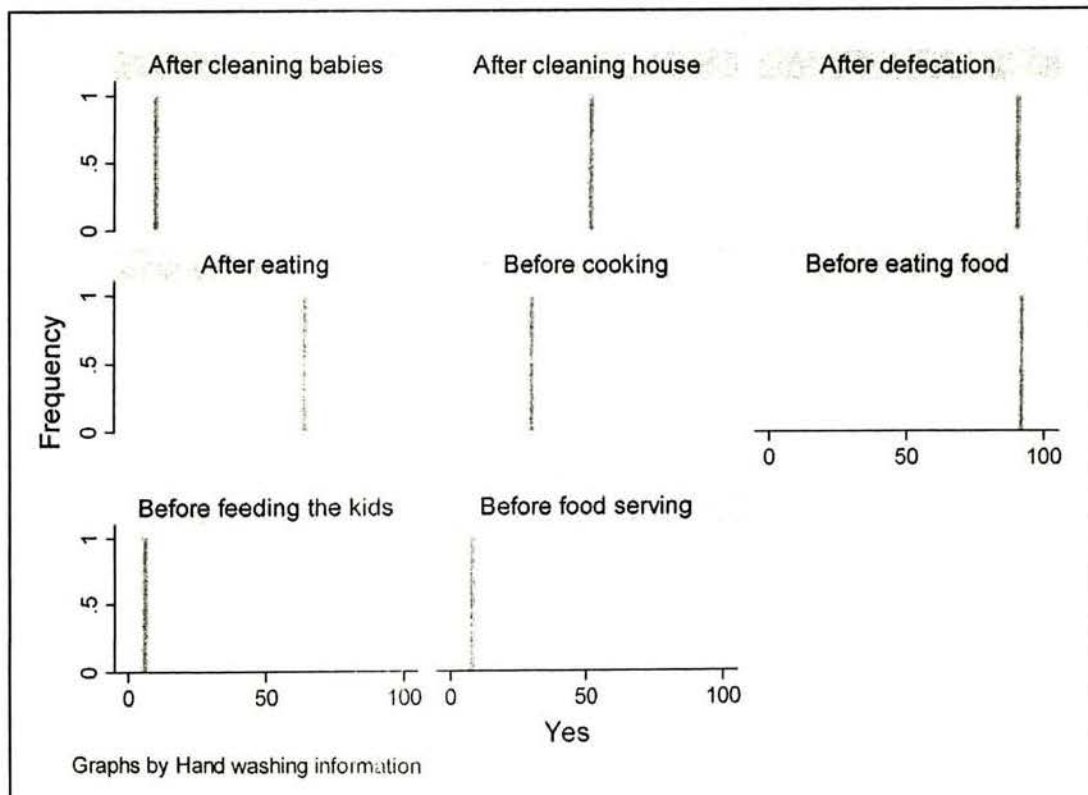


Figure 25: Hand washing practice after different actions (frequency weighted graph).

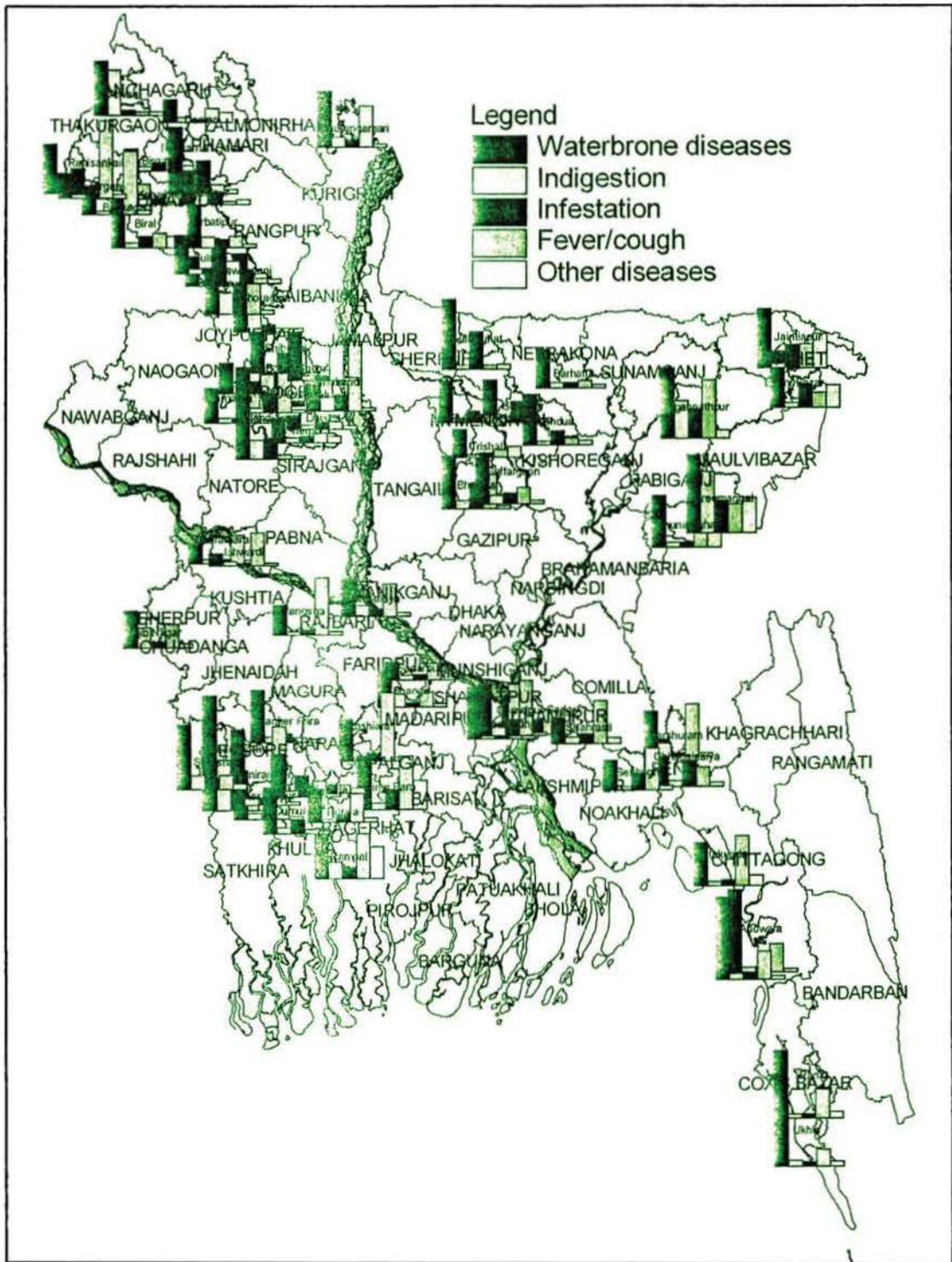


Figure 26: Disease prevalence map.

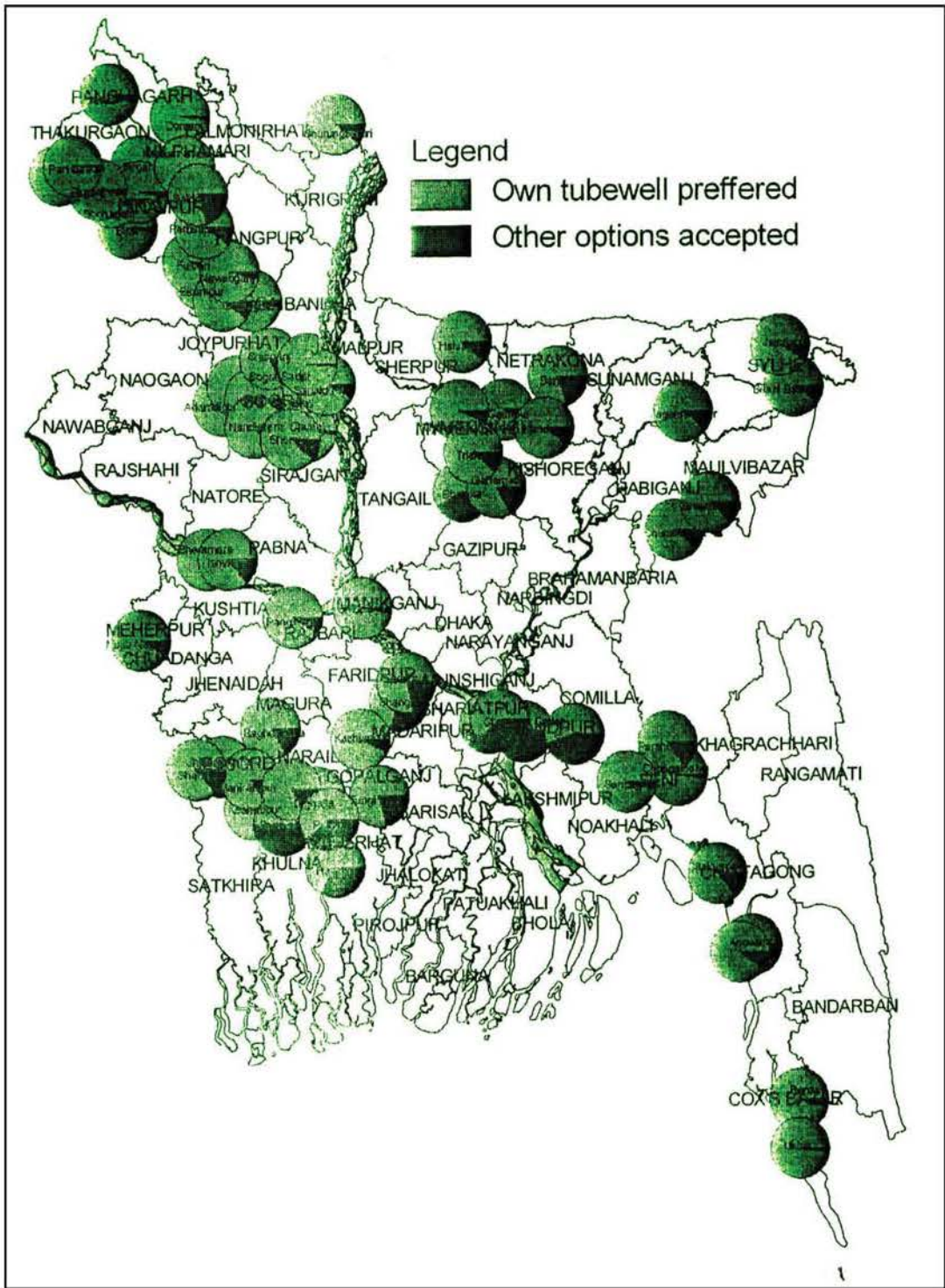


Figure 27: Preference of having tube wells.

case is reported by about 89 percent respondents that they do not wash their hands after cleaning babies (Figure 25); even they (94 percent) do not feel it necessary to wash their hands before feeding their babies or before serving food to the family members. About half of the respondents, i.e. 52 percent mentioned that they wash their hands after cleaning or sweeping their house. Among these 52 percent people, about 63 percent said that they use only water after house cleaning and 28 percent use soap to wash both of their hands after these jobs. These accounts give a delicate picture about the personal hygiene status of the people living mainly in the rural areas of Bangladesh. Poor hygiene practice of the parents or guardians might be the main cause of diarrhoea related diseases or deaths to the children aged under 5 in the country. Figure 26 and 30 depicts the disease prevalence scenario for the whole population. These figures shows that waterborne diseases take the major stakes in disease prevalence in Bangladesh.

5.6 General Health and Hygiene Awareness of the People

General awareness of the people about health and hygiene indicate that people are aware of

the issues necessary to maintain a good and healthy life. In most of the cases (resulted from the survey conducted by the programme) they responded in a way that usually is expected, but in some areas they were confused in indicating the correct choices. Eighty nine percent of the respondents mentioned that they will be affected by diarrhoea if they use polluted water and only 6.38 percent indicated, they don't know the outcome of using polluted water. The meaning of polluted water is more or less clear to them. According to the majority of the respondents (about 79 percent), water pollutes with the disposal of waste into water. About 16 percent mentioned that water may get polluted if it comes in contact with dirty hands and if it is uncovered. They figured out 'boiling' as the option for water purification. They mentioned that they prefer drinking treated water (48 percent) or water collected from the tube well (26 percent) and they like to have their own tube well (Figure 27). The response illustrates that the majority of the population in the survey areas have basic hygiene information but translating this information into practice is not very promising. Although in some areas the information they have is not up to the mark. For instance, the respondents were found not well aware of the rules of using latrines.

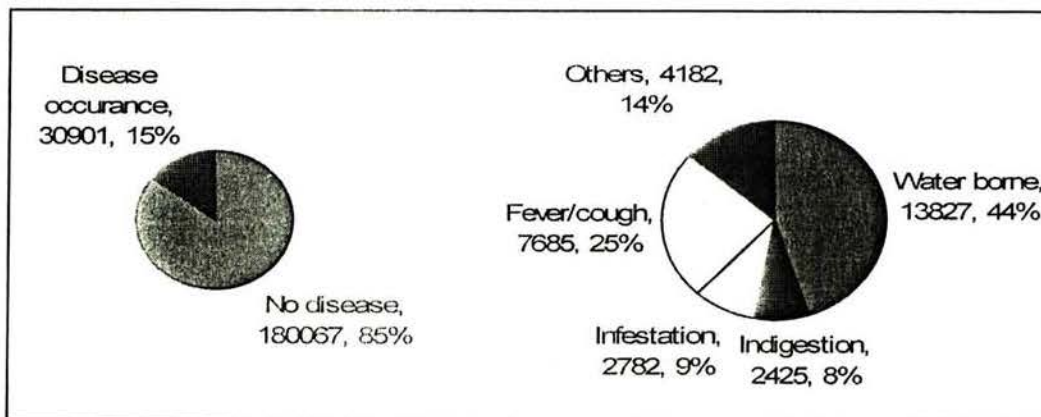


Figure 28: Disease prevalence in 75 baseline survey thanas.