

Study on Health Impact of Water and Sanitation (WS) Activities  
at Banaripara, Gournadi and Agailjhara Thanas of Barisal District

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## Water, Sanitation, Hygiene and Health Impacts of an Integrated Water and Sanitation Programme: A Case Study from Bangladesh

### SUMMARY

Bangladesh has achieved remarkable success towards developing a safe water supply. Approximately 96% of the rural population in Bangladesh now have safe drinking water sources within convenient distances. However, the country is still lacking in sanitation facilities with only 44.2% (8.6% water seal and 35.6% pit) of the rural households having access to sanitary means of excreta disposal. During the period 1989-1991, the Department of Public Health Engineering (DPHE) in collaboration with UNICEF undertook an integrated approach to sanitation improvement in three thanas of Barisal district, namely Gournadi, Banaripara and Agailjhara. In 1994 the Environmental Health Programme (EHP) of ICDDR,B was engaged by UNICEF to study the impacts of the above noted project.

A multi-stage proportionate sampling from quickly-studied 7,200 families was conducted to select 900 families from each thana with one or more children under the age of five years. These selected families were categorized into good, medium and poor sanitation groups based on their excreta disposal practices.

The rates of use of sanitary latrine were 31.2%, 50.7% and 1.7% for home-made, ring-slab pit and septic tank, respectively. Overall, more than 80% were using sanitary latrines. About 30% of the studied families reported that they did not receive any promotion on water and sanitation issues. Of the rest families, more than 50% mentioned about Government workers (Ministry of Health & Family Welfare and DPHE) as the main promoters who discuss the benefits of sanitary latrines in general. School students and teachers played the most influential role as promoters during the project period. More than 80% of the respondents said that promotion followed by legal action against open latrine is useful.

The single most important stated reason for installing and using latrine by the majority families (29%) was to control contact between chicken/poultry and faecal matter. About 5% and 1% mentioned legal pressure and protection of environmental, respectively. Rotten/dirty foods, contact with faecal matter, drinking of contaminated water and flies were stated by 38%, 28%, 10% and 12% studied families as first factor associated with spread of diarrhoeal diseases.

The bacteriological counts of stored water and handwash samples indicated presence of high concentration (unacceptable level) of faecal coliform bacteria.

Poor handwashing practices after defaecation were found to be associated significantly with high prevalence of diarrhoeal diseases in univariate and multivariate analysis, both. Bacteriological tests on stored drinking water handwash samples showed high contamination irrespective of area (thana) or type of sanitation in the households. Moreover, the faeces of majority children were

disposed of indiscriminately/unsanitary way, contaminating the environment. This shows that use of sanitary latrines by adults alone may not be enough to reduce diarrhoeal diseases significantly.

This Impact Study by EHP was faced with various limitations. Firstly, not enough data on WSH or health were available to indicate conditions existing before 1989. Secondly, we could not locate any area suitable for comparison area in Barisal district because the program was implemented in all thanas. The sample size had to be based on data from other parts of the country. Thirdly, the study was undertaken more than three years after the project completion thereby being subject to recall bias. Fourthly, budgetary constraints forced a two-weekly and point prevalence data acquisition on diarrhoeal diseases and that of only a few water and hand-contamination samples. We believe that the findings of the study have programmatic and policy implications, provided that these limitations are considered appropriately.

The project has achieved significant success in selective social mobilization for and coverage of sanitary latrines. It proves that integrated promotional process is possible for sustainable improved latrine coverage but lack of participation by important social groups such as, elected representatives, social leaders, VDP Ansars, clubs, was noticed. The home-made latrines may be a potential alternative option for sanitary latrine, but its high rates of damage, actual cost under properly designed condition, short service life and overall promotional costs should be considered by the programme manager and policy makers. More study is needed on latrine use by children and appropriate latrine technology. The water and hygiene components of the project were found to be poor and probably it contributed towards the continued transmission of diarrhoeal disease pathogens. Operations research on integrated water, sanitation and hygiene interventions is recommended to determine guideline for effective and sustainable programmes.

## Chapter 4

### DISCUSSION

#### The Project:

This report presents findings of the impacts of an integrated water, sanitation and hygiene education (WSH) intervention programme by DPHE-UNICEF (1990-1991) in three thanas of Barisal district. This project was unique because it was one of the first attempts by GOB, with assistance from UNICEF, to improve WSH conditions through integrated GOB, community and NGO participation.

In 1991 the national sanitation coverage in terms of use of sanitary latrines (by adults) was below 20% and in the project areas it was claimed to have changed from about 18% to over 80% (4). The GOB/UNICEF intervention has definitely shown remarkable developmental achievements. During the 1994-95 ICDDR,B evaluation (during this study) we found that more than 80% of the studied families (adults) use some kind of sanitary latrine. It may be, however, pointed out that the study samples were families having < 5 year children. These were randomly selected and if we assume that these families are the risk group, then we may consider the WSH statistics of these families acceptable for the purpose of this study. This clearly indicates significant increases in access to sanitary latrines as well as changes in defecation behavioural practices. Furthermore, these results when compared with earlier documents (4) indicate that the programme is sustainable - use of sanitary latrines by the majority of people has continued 4-5 years after the initial intervention. The other most notable achievements are: the latrines were constructed/installed by the users themselves; the GOB, NGOs and the community worked together as partners to mobilize the programme, and home-made latrines are a potential low cost for rural families, when the soil condition is favourable and it is designed and maintained properly. The major characteristics of the project are discussed in the light of its future implications.

#### The study:

Hardly any data/information were available on WSH or health parameters to indicate conditions before 1989 or conditions during the study in a comparable area. The size of the sample to be studied was estimated from assumptions made based on data in other areas. The sample size was calculated based on assumed sanitation groups, only. There was hardly any information related to water use or hygiene practices. It may be pointed out that the study was undertaken after more than 3 years of the completion of the project and so recall bias may have affected certain factors related to the project process also.

Budgetary constraints further limited the scope of the study. The original plan of collecting information in terms of episodes of diarrhoea per child per year had to be compromised against prevalence measures of diarrhoeal diseases. The data collection was done by NGOs and the cost of their involvement kept in the budget was inadequate to do it as planned. Few samples of water and hand-contamination sample could be collected for objective measurements.

However, the study is regarded important in realizing certain process factors, the existing situations and to contributing towards development of sectoral guidelines. The DPIIE-UNICEF pilot-project was definitely not a research project but a real and pioneering attempt to improve water supply and sanitation in a developing country. Its evaluation will have implications for future programmes, provided the findings are considered appropriately by comparing the limitations and needs for its use. It is expected that the readers will realize the limitations of the study (as mentioned earlier) and consider the issues appropriately.

Here the process and programmatic issues of WSH interventions have been given more importance than health impacts. It is difficult to measure health impacts because health is affected by many factors, some of which are targeted in water/sanitation interventions. Furthermore, WSH issues (implementation/practice and benefits) are multi dimensional and complex. Careful selection of indicators associated with health and its measurement during pre-intervention and post-intervention periods are essential. Health indicators may be very specific for local situations and environmental factors to which the people are exposed to.

In order to evaluate the health impact of a sanitation intervention one would ideally compare health indicators before and after the intervention while controlling for other socioeconomic and environmental factors. Here no pre-intervention health data could be located. Here sanitary latrine use practice among adults was significantly higher than elsewhere (1) but the latrine use by children, and water and hygiene practices were poor and similar as elsewhere. We could not determine how much those were promoted because the respondents did not report it. The measurement of health impacts of the project was clearly difficult. However, limited attempts have been made to study if currently there was variation in terms of diarrhoeal and skin diseases under the existing various sanitation groups.

The short-term and long-term benefits of WSH improvement have been repeatedly shown in regard to health and energy and time savings. The WSH provisions are basic services and included in the strategies for primary health care. To explore lessons on how WSH project activities could be improved and made more effective than in this completed programme, in itself justify the benefits of undertaking this TA.

## Water

Use of tubewell water for drinking purposes is a common practice currently in this country. The study population was no exception with almost all drinking tubewell water but less than 10% families using tubewell water for other domestic purposes. The project objectives was to promote tubewell water for all domestic purposes. One would expect to see much more use of tubewell water for other domestic purposes. It was difficult to assess how much tubewell water use was promoted, but overall awareness of the role of water in disease transmission was poor. The availability of tubewell (based on distance) was similar as in elsewhere (2).

Although, the number of stored drinking water samples tested were low, they indicate that the level of contamination across the various sanitation groups was similar, poor and unacceptable. It is possible that the water management practices among the various types of latrine users were

similar. It has been reported elsewhere that storage hours and type of storage containers (5) may be associated with safe management of water. Overall, lack of appropriate practices related to safe water was observed.

#### **Latrine Use:**

The sanitation coverage in terms of presence of sanitary latrines and its use by adults of more than 80% of studied families is remarkable. The rate of use of sanitary latrines and/or disposal of children faeces in sanitary latrines was about 20% only. In another rural WSH intervention study, rates of sanitary disposal of children faeces have been reported to be about 71% and .8% against 36-59 months and <36 months old children (7).

Although programme managers reported that special attention was given to use of latrine by children, the studied families did not mention it. If this is not intervened appropriately, the environment continue to be polluted and the goal of sanitation will be hindered. It may be argued that this issue should be targeted after achieving sanitary latrine installation and its use by adult coverage. However, in this project the installation and adult use targets were achieved in 1991 (as reported) and so other phases could have been undertaken by the programme as it continues. This may require study on appropriate design and strategies for disposal of children faeces.

#### **Latrine Acceptance: Home-made and Ring-slab latrines**

Most of the people were found to be satisfied with their latrines, irrespective of its type of latrines. The age of latrines indicated that many latrines were installed after the active part of the programme. The continued promotional activities may have contributed to the sustainability in use of the latrines. It is not known that if promotional activities ceased, whether or not the home-made latrine users will continue to rebuild and use these latrines.

It is important to notice that compared to the number of pits of latrines few claimed that they have desludged the latrine. The question remain whether they really did not require the desludging or for some reasons they are reluctant to admit the desludging because they knew that they did it improperly.

Most of the home-made latrines were not lined and had incomplete or inadequate platforms. These latrines allowed contacts between flies, mosquitoes, etc.

Overall, pits of more than 70% of the home-made and 90% of the ring-slab latrines were found in acceptable functioning condition. In this programme the promoters (DPHE and students mainly) took special interest in demonstrating various designs of latrines in schools, and even in houses which requested them. This has probably helped to ensure the adequate design and installation aspects of home-made latrines. In other studies (7) the majority of home-made latrines have been reported to fail functioning at acceptable levels within a few months after the project ceases.

About 30% and 53% of the studied families used home-made and other sanitary latrines respectively. This may indicate that a substantial group of families were required to use home-made latrines probably because they could not afford ring-slab latrine. We do not know how many families had less than 5 RCC rings. The cost of one-ring and a slab should be affordable by more people when compared to the actual cost of properly designed home-made latrines.

When promoting home-made latrines (except for those who do not have *another* choice and it is an immediate solution) one may like to consider carefully before its liberal or universal promotion in a community risk for higher damage of pits during and/or after rainy season; the cost involved in promotional activities (probably similar as for other more stable kind of sanitary latrines) and the quality of overall service provided by this type of latrine (unless the design issues are considered properly).

#### **Procurement of Latrines:**

Sanitary latrines were available from three sources: private producers, NGOs and DPHE. Of these sources, the private producers supplied more than 50% of the latrines while NGOs and DPHE supplied the rest. DPHE and NGOs sold latrines at subsidized rates and in some cases NGOs even distributed latrines free of cost. In contrast, the private producers sold the latrines at profit and still were a major source of supply. From this study it was not possible to know what proportion of people cannot afford sanitary latrines under normal conditions, because in these thana extensive promotional activities were carried out and legal actions were implemented against open latrines. However, subsidy cannot be a universal sustainable option, private producers should be encouraged to flourish for at least those who can afford it. It was also noted that the DPHE supplied much more latrines than they do elsewhere. It may be helpful to find out if it is a replicable option.

#### **Promotional activities:**

DPHE took the main role in spite of their limited manpower at the grass-root level. The Local Government administration gave remarkable support in regard to announcement/distribution of public health responsibilities of the people, encouragement to school participation through competitive incentives toward school funds and district/thana level coordination meetings. The teachers and school students worked voluntarily and under the guidance of DPHE. The NGO activities seemed to have increased in recent years. The Health and Family Welfare workers have been reported to be the second leading promoter but promotion of WSII issues is one of their mandated activities. In other areas the Health and Family Welfare workers are the leading promoters (7, 9). This has implications for coordination between DPHE and Health and Family Welfare.

It was encouraging to observe that promotional activities were being continued. This probably had a positive contribution towards sustainability in the use of sanitary latrines.

Communication materials were rarely used. Use of appropriate communication materials could have helped to increase the level of effectiveness of the WSII practices. Need of development



and use of appropriate communication materials have been mentioned elsewhere (8,9) and it is discouraging that the lack of this important component still exists in the sector.

#### **Knowledge and hygiene practice related to WSH issues:**

The knowledge of water and hygiene related practices was poor and as in other parts of the country. The people mentioned more of what they see - such as, no contact between chicken and faecal matter.

It has been repeatedly found and suggested that water, sanitation and hygiene should be considered together for effective environmental health improvement. Here, after such intensive hygiene education the respondents failed to mention the role of water, handwashing, basic issues, etc. in the spread of diarrhoeal diseases. Similarly, in reasons for installing sanitary latrines few reported that they installed latrines to protect the environment from faecal contamination. These indicate that either the education component was weak and/or neglected.

The use of agents during handwashing practices was similar as in other rural areas (2,10); its effectiveness may be doubtful as indicated by environmental sampling results. Studies have shown that for effective handwashing agent, both hand rubbing at higher frequency and rinsing with adequate volumes of water is needed (10, 11). Here handwashing using an agent could have been an indicator of several hygiene practices.

There is immediate need to consider ways on how to improve knowledge and hygiene practices. Here, we could not determine what type of messages were given during the project period. Printed materials could not be located at household level. Another study by us also showed that the given WSH knowledge to the community did not sustain after about 5 years but the improved WSH practices sustained (12). There the people maintained better WSH practices because they had adequate access to the provisions (latrine and tubewells) and so they thought use of those provisions meant better living conditions.

#### **Legal Aspects**

The documents show that promotion of legal aspects was an important strategy. The people, however, did not mention legal pressure as the main reason for installing sanitary latrines. The majority of people responded in favour of creating awareness of the legal ordinance against open latrines existing in the country, when asked their views about legal action. In an earlier study it was noted that relatively higher socio-economic people were more difficult to bring change in defecation habits (4). Probably, these indicate that legal actions, as a few examples, could have a positive affect, provided it is done after adequate promotion of latrines and laws in the country (as done during this programme).

#### **Health Impacts**

Improvements in water, sanitation and hygiene are clearly important preventive control measures for diseases. Studies in Bangladesh (12, 13) and elsewhere (14, 15) have reported

significant impacts on reduction of diarrhoeal and other water related diseases. Here, due to lack of baseline data, there was no way to compare the rates of diarrhoeal and skin diseases between pre-intervention and post-intervention periods. Moreover, it was observed that practices related to water use, hygiene, latrine use by children and WSH related knowledge of adults were as poor and unacceptable as in other parts of the country. It has been repeatedly suggested that diarrhoeal diseases have multiple and parallel WSH related modes of transmission (16) and barriers in any of those may not show health impacts. Use of sanitary latrines and sanitary disposal of faeces is a primary barrier against environmental contamination but it should be practiced properly by all, adults and children in order to protect the environment. The interruption of other parallel modes are also essential.

The handwashing practice showed more or less association with prevalence of diarrhoeal and skin diseases. It may be pointed out that hands are one of the major vehicles for transmitting pathogens from one object to another and specially into mouth. Studies on handwashing interventions have reported up to 44% reduction of diarrhoeal diseases (17). Here contamination level of hands among various sanitation groups were similar.

Clinical data in Banaripara was low and incompatible to other places. The field data also do not support reasons for this low rate. We do not know why it so.

These findings suggest that WSH maximum improvements are yet to be achieved. Health impact studies should collect data on appropriate WSH indicators to represent real and effective improvement through interventions. Inappropriate and inadequate measurement of WSH indicators and its use in health impact analysis may result in erroneous results and confuse readers.