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# REPORT ON COMMUNITY BASELINE SURVEY

# INCORPORATING KNOWLEDGE – ATTITUDE – PRACTICE & CUSTOMER SATISFACTION

## BAC NINH CITY – BAC NINH PROVINCE

**Hanoi, April 2009**

**Ministry of Construction – Hanoi**

*in cooperation with*

**Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH**

**Technical Assistance on behalf of GTZ by GFA Consulting Group & Associates**

Your contact
with GFA Consulting Group GmbH

**Gudrun Krause**

Fax +49 (40) 6 03 06169

Email: gudrun.krause@gfa-group.de

Address

**GFA Consulting Group GmbH**

**Eulenkrugstraße 82**

**D-22359 Hamburg**

**Germany**

This report was prepared by

**Center for Environment, People and Community (CEPAC)**

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# ABBREVIATIONS

| | |
|---|---|
| BLS | Baseline Survey |
| CCU | Customer Care Unit |
| CEPAC | Center for Environment, People and Community |
| CSS | Consumer Satisfaction Survey |
| DOC | Department of Construction |
| DONRE | Department of Natural Resources and Environment |
| DOH | Department of Health |
| FA | Financial Assistance |
| FGD | Focus Group Discussion |
| GFA | German GFA Consulting Group GmbH |
| GTZ | Gesellschaft für Technische Zusammenarbeit |
| IDI | In-depth Interview |
| KAP | Knowledge Attitude Practice |
| KfW | Kreditanstalt für Wiederaufbau |
| SOE | State Owned Enterprises |
| SPSS | Statistical Package for the Social Sciences |
| TA | Technical Assistance |
| TCVN | Vietnamese Standard |
| WB | World Bank |
| WTP | Willingness to Pay |
| WWM | Capacity Development in **Wastewater Management** (TC Component 2) |
| WSSD | Bac Ninh Water Supply Sewerage and Drainage One Member Limited Liability Company (WSSD Co., Ltd.) |
| WWC | Wastewater Management Company |

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## 1. INTRODUCTION

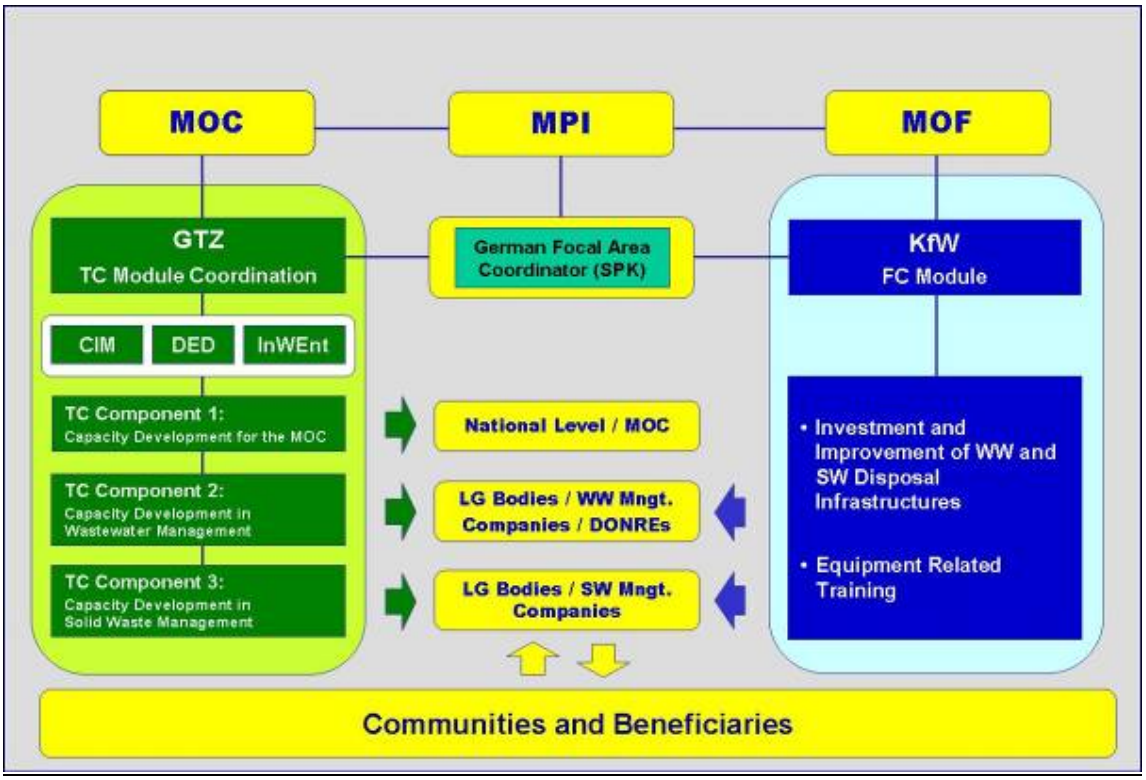
"Wastewater and Solid Waste Management in Provincial Centers" is a program funded by the German government and jointly implemented by different institutions of the Government of Vietnam and several German Development Cooperation (GDC) agencies. The program consists of two complementary modules (Figure 1-1):

a) the Financial Cooperation (FC) module, jointly financed by the German Development Bank (KfW) and the Government of Vietnam (GoV), and

b) the Technical Cooperation (TC) module, implemented by the German Technical Cooperation (GTZ), the German Development Service (DED) and InWEnt with the Ministry of Construction (MOC) as the responsible line ministry.

The FC module focuses on providing new infrastructural facilities for wastewater and solid waste management; it currently targets six provincial cities in Vietnam. The TC module consists of three components that provide "Capacity Development for the MOC" (TC Component 1), "Capacity Development in Wastewater Management" (TC Component 2) – also referred to as "WWM" – and "Capacity Development in Solid Waste Management" (TC Component 3) – also referred to as "SWM".

**Figure 1-1** German Development Cooperation for Wastewater and Solid Waste Management in Vietnam




The overall objective of the cooperation program reads:

**"Conditions for sustainable wastewater disposal and solid waste management are improved."**

The present study was conducted within the scope of TC Component 2 (WWM), which is being implemented by the GFA Consulting Group on behalf of German Technical Cooperation (GTZ). Implementation commenced in February 2005. In August 2008, WWM launched its second phase, which is scheduled to end in July 2011.

At this point, WWM is providing technical support to local governments, public wastewater companies (WWC) and Departments of Natural Resources and Environment (DONRE) in six

provincial urban centres in Vietnam, including the cities of Bac Ninh, Hai Duong, Vinh, Can Tho, Soc Trang and Tra Vinh. Depending on the outcome of ongoing investment studies and the availability of sufficient funds, an extension of WWM to additional cities is foreseen within the current phase. WWM focuses on creating favourable conditions for improved public wastewater services and raising awareness on wastewater related issues among the communities and beneficiaries. Accordingly, the overall objective of TC Component 2 is that:

**"Wastewater management in the supported provincial centers is improved."**

In order to achieve this objective, WWM applies a holistic approach and concentrates its activities on capacity building in the following seven areas:

- Local Government Level
  - Creating favourable local institutional framework conditions for wastewater management
- Wastewater Company Level
  - Institutional & organizational development
  - Financial management & tariff calculation
  - Asset management, operation & maintenance (O&M) and documentation
  - Customer relations management and community participation, and
  - Human resource management
- DONRE Level
  - Surface water and effluent discharge monitoring

The present Community Baseline Survey (BLS) is meant to aid the WWCs in improving customer relations and community participation. The TC component commissioned two Vietnamese consulting companies to implement a total of six surveys. Necessary preparations were made in close collaboration with the Customer Care Units (CCUs) of the participating WWCs as well as WWM advisors. Preparations included, among other things, the finalization of data collection tools, training of interviewers, and respondent selection. The surveys in the three Northern provinces (**Bac Ninh**, Hai Duong, Vinh) were conducted by the sub-contractor CEPAC, a Vietnamese company specializing in household surveys. SDRC, another Vietnamese survey institution, was commissioned to conduct the studies in the three provinces in the Project Area South, Can Tho, Soc Trang and Tra Vinh**.**

## 2. THE OBJECTIVES OF THE BASELINE SURVEY

In order to support the Wastewater Management Companies in improving their customer services and in achieving gradual changes in community awareness and behaviour patterns, relevant reliable data are necessary for planning corresponding activities.

**Thus, the objectives of this survey are as follows:**

1) To determine *the current practices of urban people* in the program sites regarding the management of water supply, wastewater, storm water and sanitation.
2) To determine *the current knowledge of people* in the program sites regarding the management of water supply, wastewater, storm water and sanitation.
3) To determine *the current attitudes of people* in the program sites towards the management of water supply, wastewater, storm water and sanitation.
4) To determine *the main influences on customers' attitudes* towards water supply, wastewater, storm water and sanitation.
5) To determine *the main constraints on customers* increasing their knowledge of water supply, wastewater, storm water and sanitation.
6) To provide information mainly to the Bac Ninh Water Supply Sewerage and Drainage One Member Limited Liability Company (WSSD - subsequently also referred to as "the

company") and other stakeholders in order to improve the effectiveness of their CRM and CPM programs, including targeted Program Information Campaigns, Public Awareness Campaigns, the developing of IEC materials and selection of suitable Pilot Measures.

7) To provide *information on customer satisfaction and needs* to the WSSD in order to improve the performance of its Customer Care Unit.

8) To identify the most effective means of informing, educating and communicating with the community on program-related issues.

9) To determine the views of customers regarding the level of services provided by the company as well as their attitudes concerning wastewater tariffs.

10) To provide on-the-job capacity building to officers of WSSD on the subjects of participatory research, basic skills and techniques for conducting base-line studies.

## 3. SURVEY AREAS AND TOOLS FOR THE BASELINE STUDY

### 3.1 Survey Areas

Four wards in the target area of the WWM-project in Bac Ninh City: Thi Cau, Ninh Xa, Suoi Hoa and Kinh Bac.

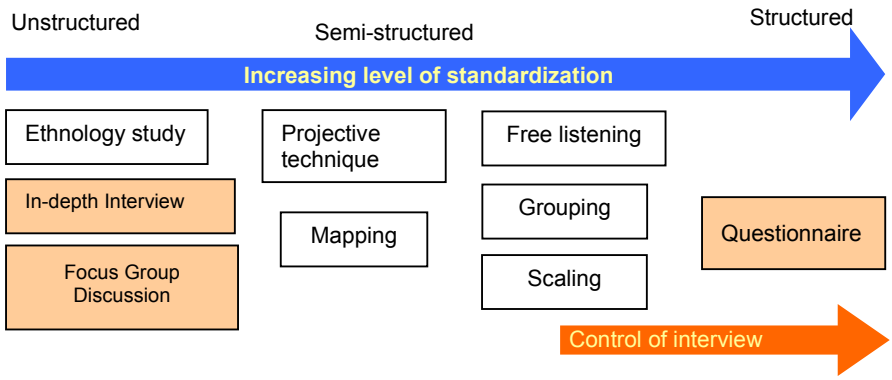
### 3.2 The Survey Tools for the Baseline Study

*The survey tools* used in the baseline survey are:

- Quantitative method of using household questionnaires,
- Qualitative method of using in-depth interviews (IDI) and focus group discussions (FGD).

As shown in Figure 3-1IDI and FGD are classified as unstructured survey tools and are therefore less controlled interview processes. In comparison, household questionnaires are classified as highly structured survey tools.

**Figure 3-1** Survey tools




#### 3.2.1 Qualitative Method

**In-depth interview (IDI)**

IDIs are interviews with key persons playing a special role and/or function in the community, and are considered as representative of the ideas of the community. The informant can be an authority figure, a key community figure, or a respected representative of the community.

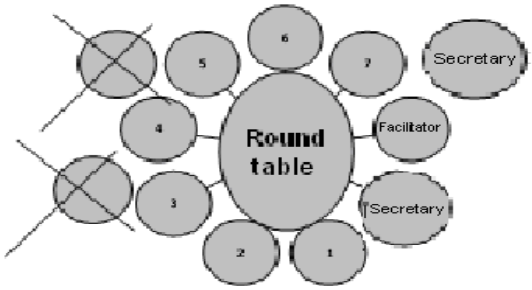
**Focus group discussion (FGD)**

A FGD is a special type of discussion, which includes around 6 to 12 persons. This group is guided by a facilitator (and an observer) sitting in the group. The members of the group should be homogeneous, for example the heads of a sub-ward or youth's union. The

members discuss a topic and are free to give their ideas and suggestions freely regarding the discussion topic.

The facilitator listens; if necessary s/he can guide the discussion in terms of content or order of respondents. The FGD mainly provides information about the awareness, attitude and practices of the group.

**Figure 3-2** Group discussion – Theory and practice




The FGD should be carefully prepared and guided and the facilitator should be experienced. The discussion should be held in a spacious location that is suitable for a meeting and will not affect the discussion. For the discussion 5-10 open questions should be prepared and directed in such a way as to get the necessary information.

### 3.2.2 Quantitative Method

The questionnaire is used during household interviews and is a tool for measuring and surveying. In order to ensure the necessary accuracy and reliability, the questionnaire is carefully developed in several phases: first the goals of the survey are determined, then variables are designated, and finally the questionnaire is pre-tested.

**The structure of questionnaire**

The questionnaire consists of structured questions. The types of question can be either "open," meaning the range of answers is not limited, or "closed" in which case the answers are limited to a predetermined set. Questionnaires can also contain a combination of open and closed questions.

**The steps for designing a questionnaire**

- Determine the contents of the questions
- Formulate the questions
- Arrange the questions in the right order
- Pre-testing the questionnaire to determine its level of reliability, validity and accuracy of language used as well as structure applied.

## 3.3 Estimation of Sample Size and Its Distribution in Wards

In order to compile results that allow conclusions to be drawn that extend from the unit of investigation (sample) to the whole population of interest (representative results), the sampling procedure and the sample size is of great importance for the study. There are two sampling approaches: Simple random sampling (SRS) and probability proportional to size (PPS). In this case, PPS is applied to determine the sample size. The formulas are taken from "The Power of Survey Design" by Giuseppe (WB library, 2006). As required, we aim for a 95% confidence level with a margin for error of 5% (confidence interval) and using a conservative response distribution of 100%. The formula is defined as:

$$n = \frac{\left\{z_{1-\alpha/2}\sqrt{2\bar{p}(1-\bar{p})} + z_{1-\beta}\sqrt{p_1(1-p_1)+p_2(1-p_2)}\right\}^2}{(p_1-p_2)^2}$$

Where:

$z_{1-\alpha}$= significance level of 95% (1.645)

$z_{1-\beta}$= sampling power of 90% (1.282)

$p_1$= percentage of tap water use (estimation) (80%)

$p_2$= estimated percentage of tap water use in next year (additional 10%)

$p=(p_1+p_2)/2$

The minimum sample size in Bac Ninh is therefore 360 respondents with a buffer of +5-10% in case the originally sampled respondent is not available at the moment the respective interview would take place. A total of about 380 - 400 households divided into 4 wards were selected for this survey: Thi Cau, Ninh Xa, Suoi Hoa and Kinh Bac.

**Table 3-1** Determination of sample size

| City | Population in study area (estimated in 2006) | Number of households in study area (estimated) | Minimum sample size |
|---|---|---|---|
| Bac Ninh | 149,215 | 21,000 | 360 |

**Table 3-2** Distribution of sample size for the selected wards

| Ward | Total number of households | Minimum sample size |
|---|---|---|
| Thi Cau | 3,315 | 148 |
| Kinh Bac | 1,680 | 75 |
| Ninh Xa | 1,777 | 79 |
| Suoi Hoa | 1,295 | 58 |
| **Total** | **8,067** | **360** |

### 3.4 Some Characteristics of Wards Selected for the Baseline Survey

Bac Ninh City is located 30 km northeast of Hanoi. The natural area is 26.34 $km^2$ and has a population of over 149,215 inhabitants (2006). Bac Ninh has 19 administrative units, 10 wards (Vu Ninh, Dap Cau, Thi Cau, Kinh Bac, Ve An, Tien An, Dai Phuc, Ninh Xa, Suoi Hoa and Vo Cuong) and 9 communes (Hoa Long, Van An, Khuc Xuyen, Phong Khe, Kim Chan, Van Duong, Nam Son, Khac Niem and Hap Linh).

Bac Ninh City has an advantageous location as it is a transportation hub in the main economic zone of North Vietnam. It has high potential in trading services and developing industries (industry centre) as well as a very long cultural tradition. Since Bac Ninh Province was re-established (01.01.1997), Bac Ninh City has increasingly become a political and economic centre of the province and an important cultural location in the region.

Based on:

- Statistical data of the Department for Statistics – Financial Plan of People's Committee of Bac Ninh City,
- The annual reports of wards and
- The results of IDIs with the president or vice president of the wards, and key persons of the People's Committee of the wards.

The main characteristics of the wards Thi Cau, Kinh Bac, Suoi Hoa and Ninh Xa, selected for the baseline study, are presented in Table 3-3 and Table 3-4. Kinh Bac Ward is the largest of

the wards, but the population is concentrated mostly in Ninh Xa and Thi Cau Ward. The rate of natural population growth in Ninh Xa and Suoi Hoa is 11.6% and 11.5% respectively. A special characteristic of Bac Ninh City is that in all the wards there are different kinds of households with main income from agriculture, fishery, services, industry, etc. This characteristic has an important influence on the knowledge, attitudes and practices of people towards environmental problems, wastewater and solid waste.

The map of Bac Ninh City and the sewage system plan are presented in Figure 3-3.

**Figure 3-3** Bac Ninh City and the wards selected for BLS


**Table 3-3** Some statistical data of Bac Ninh City for 2006 (natural area, average population, population density and average rate of natural population growth)

| Ward | Natural area ($km^2$) | Average population (head) | Population density (head/$km^2$) | Average rate of natural population growth (%) |
|---|---|---|---|---|
| Thi Cau | 1.71 | 12,055 | 7,052 | 7.2 |
| Kinh Bac | 2.06 | 5,998 | 2,911 | 8.3 |
| Ninh Xa | 0.81 | 7,047 | 8,722 | 11.6 |
| Suoi Hoa | 1.19 | 5,383 | 4,543 | 11.5 |

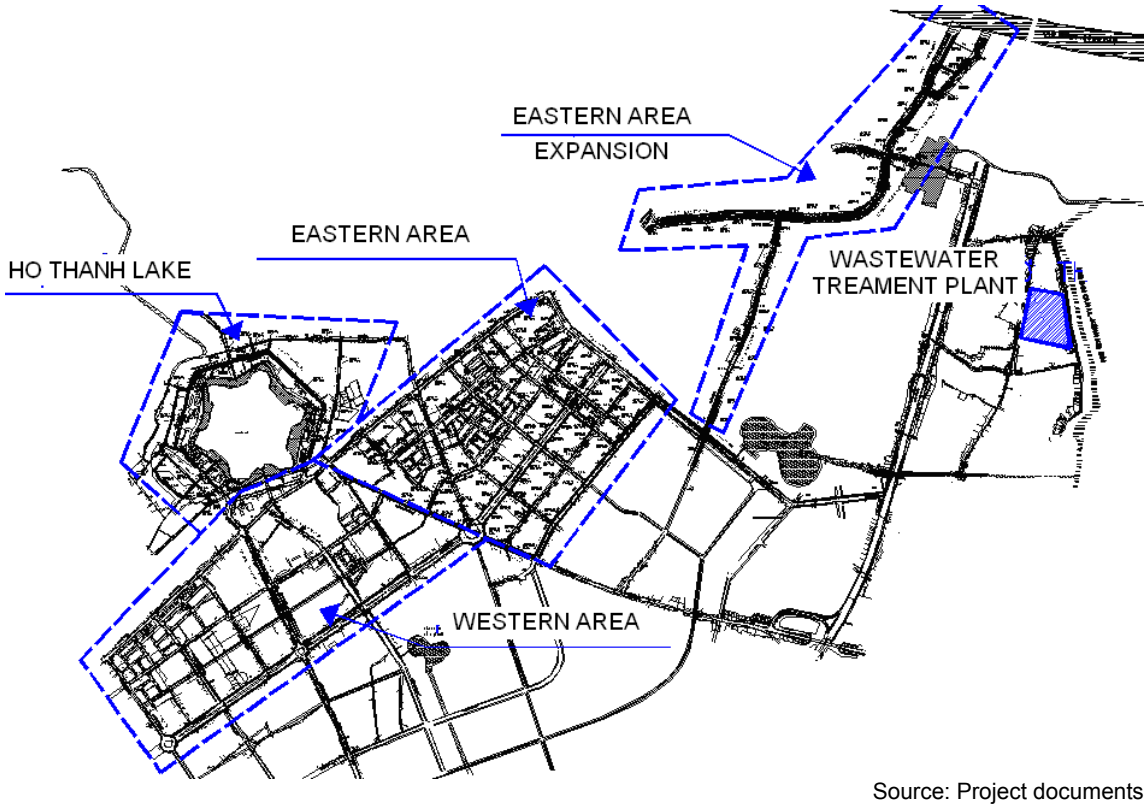
Source: Statistical yearbook of Bac Ninh City, p. 59, 61, 66

**Table 3-4** Total number of households and poverty rate in Bac Ninh City (2006)

| Ward | Total number of households | Percentage of poor households (%) | Total number of poor households (hh) |
|---|---|---|---|
| Thi Cau | 3,315 | 2.81 | 93 |
| Kinh Bac | 1,680 | 3.39 | 57 |
| Ninh Xa | 1,777 | 1.86 | 33 |
| Suoi Hoa | 1,295 | 0.15 | 2 |

Source: Statistical yearbook of Bac Ninh City, p. 81

**Figure 3-4** The sewage system - Bac Ninh City




Source: Project documents

## 4. SURVEY RESULTS OF THE BASELINE SURVEY

### 4.1 CEPAC – the Baseline Survey Implementing Institution

CEPAC was established in 2006 by a group of six university teachers from the Faculty of Economy and Management of Natural Resources of Hanoi Water Resources University, under the leadership of Assoc. Prof. Dr. habil. Nguyen Trung Dung, Vice Director of Department of Economics and Management of Natural Resources. CEPAC implemented some projects financed by the Water Resources University, Ministry of Agriculture and Rural Development and international organizations.

| | |
|---|---|
| **Name of institution** | CEPAC |
| **Director** | Assoc. Prof. Dr. habil. Nguyen Trung Dung |
| **Address** | 65 Khuong Thuong Str., Dong Da District, Hanoi |
| **Mobil** | 0983064990 |
| **E-mail** | center_epac@yahoo.com.vn |

## 4.2 Initial Requirements of CEPAC

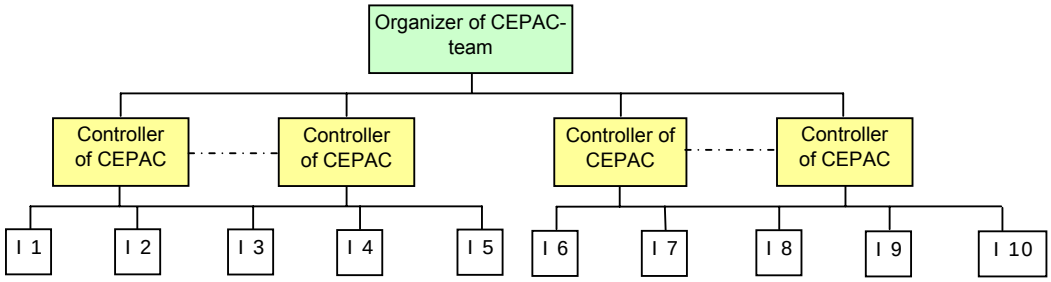
**Survey techniques applied**

- Application of face-to-face structured interview
- The informant: Head or main person of each household interviewed
- Age of the respondent: 25-60
- Gender balance between female and male respondents.
- The necessary duration of an interview is 35+ minutes.

**Assurance and quality control of survey**

- The interviewers went to households that had been randomly selected before the start of data collection. If the key informant of the household was not at home or was unable to provide information, the interviewer either returned at another time or interviewed a neighbouring household.

**Figure 4-1** Organisational sketch for the household survey




- Two CEPAC staff supervised each group of five interviewers from the counterpart company. They worked together in controlling/assuring the survey quality. They randomly checked the time, location and interview duration of the interviewers. In many cases, they accompanied the interviewer throughout the entire process.
- A general organizer managed all 4 controllers and controlled the daily reporting on the situation of the interviewers.
- Each day, all the returned questionnaires were checked to ensure that the information gathered was accurate and comprehensive.
- A meeting was held each afternoon with the survey organizer, supervisor and all interviewers. The issues of the day were canvassed and reported, and solutions were proposed. All questionnaires were controlled in the evening.
- Quantitative data was analysed using the statistical software SPSS (Statistical Package for the Social Sciences). Qualitative data and information obtained was encoded as necessary.

## 4.3 The Training Program for Baseline Survey and Survey Skills

A three-day training program was organised for the assigned staff from April 2-4, 2008 in Hotel Thanh Thanh (Bac Ninh City). 11 persons were delegated by the company: five from the drainage department, five from network management and one from CCU (See the list in Appendix 1). Mr. Axel Binder and Mr. Tran Tien Duc from the WWM-project were present, as were six persons from CEPAC.

The tasks, as described by the project, were to:

- Provide the necessary service and assistance to the company, enabling it to conduct a baseline survey (BLS) incorporating KAP (Knowledge-Attitude-Practice) and Customer-Satisfaction-Survey (CSS). After this survey, the company staff should be able to organise and manage the execution of similar studies.

- Ensure that the survey quality was as high as possible.

**Figure 4-2** Pictures from the training program

The three-day training program therefore focused on the following lessons /topics:

- Session 1: Participatory approach
- Session 2: Introduction to the baseline survey of WWM-project in six provinces
- Session 3: Survey tools & skills
- Session 4: Household questionnaire
- Session 5: Field work – Data collection
- Session 6: Data processing with SPSS
- Session 7: Writing report

The training program is presented in Appendix 2. Generally, the results of the training program, according to participant evaluation, showed the training to be both successful and very practical. The training contents were further developed during practical field application.

### 4.4 The Progress of Survey Implementation

The field survey was conducted from April 7-12, 2008 in four wards with the close cooperation of 11 members delegated by the company and six CEPAC-members as technical providers and supervisors. In total, 386 households were interviewed, eight FGDs were held, and eighteen IDIs in wards and city authorities were conducted (see Appendix 3).

As outlined in the project proposal, CEPAC allocated 5-6 staff members to work as project managers, technical assistants and supervisors of data collection. The following general agreements applied:

- A meeting for submitting the questionnaires and checking all problems should take place during the day and be held from 7.00 - 7.30 am and 5.00 - 5.30 pm each day.
- One member of CEPAC should continuously supervise and provide technical assistance for 2-3 company persons during the execution of the survey,
- Nearly 100% of the questionnaires were verified by the CEPAC team after the interviews were conducted and, if necessary, corrected the following day.

*The duration of interviews*. In order to ensure the quality of the surveys and data collection, CEPAC required a minimum length for all household interviews. During the first days, the interviewers were not able to conduct the survey as efficiently, so the duration of each interview was longer than in the later days of surveying as the interviewers gained experience in interviewing techniques. Generally, the average duration of an interview varied between 30 - 40 minutes/interview, which corresponds with the requirements of the WWM project and CEPAC. Some interviews lasted over two hours. There was little difference between the number of interviews planned and those actually carried out. The random selection of respondents and the sample size were maintained. This information is presented in Table 4-1 and Table 4-2.

**Table 4-1** Average duration of conducted interviews

| Date | n | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| 07.04.08 | 52 | 0:15 | 1:35 | 0:37 | 0:13 |
| 08.04.08 | 65 | 0:20 | 2:30 | 0:40 | 0:16 |
| 09.04.08 | 66 | 0:05 | 1:35 | 0:36 | 0:09 |
| 10.04.08 | 96 | 0:05 | 0:50 | 0:34 | 0:07 |
| 11.04.08 | 75 | 0:20 | 2:25 | 0:35 | 0:14 |
| 12.04.08 | 32 | 0:25 | 1:10 | 0:33 | 0:08 |
| **Total** | **386** | | | | |

**Table 4-2** Date and number of questionnaires returned from April 7-12, 2008

| Date | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| 07.04.08 | 52 | 36.1 | | | | | | | **52** | **13.5** |
| 08.04.08 | 65 | 45.1 | | | | | | | **65** | **16.8** |
| 09.04.08 | 27 | 18.8 | | | 38 | 97.4 | 1 | 1.0 | **66** | **17.1** |
| 10.04.08 | | | | | 1 | 2.6 | 95 | 99.0 | **96** | **24.9** |
| 11.04.08 | | | 75 | 70.1 | | | | | **75** | **19.4** |
| 12.04.08 | | | 32 | 29.9 | | | | | **32** | **8.3** |
| **Total** | **144** | | **107** | | **39** | | **96** | | **386** | |

## 5. THE RESULTS OF THE BASELINE SURVEY

In this part, we focus on analysing the data gathered from the BLS implementation. The analysis follows the sequence of questions/content in the household questionnaire.

### 5.1 Characteristics of Respondents

CEPAC, company staff and WWM consultants organised the survey implementation. Interviews were conducted with 386 household representatives in four wards: Thi Cau, Ninh Xa, Suoi Hoa and Kinh Bac. The determination of sample size, distribution of sample, and household selection were based on the agreement between the Bac Ninh Water Supply and Sewage Company, WWM and CEPAC.

*The number of household members.* On average there were 4.13 persons per household (Table 5-1 and Figure 5-1). In most cases, households had four persons. In a few cases, households had as many as eleven persons, while other households had only a few members.

*The gender structure of respondents.* According to the numbers of both sexes selected as respondents for the household survey were nearly the same; 194 males (50.3%) and 192 females (49.7%) were interviewed. More precisely, in Thi Cau Ward there were 74 male (51.4%) and 70 female (48.6%); Ninh Xa Ward 56 male (52.3%) and 51 female (47.7%); Suoi Hoa Ward 18 male (46.2%) and 22 female (53.8%) and Kinh Bac Ward 46 male (47.9%) and 50 female (52.1%) respondents.

**Figure 5-1** Number of household members

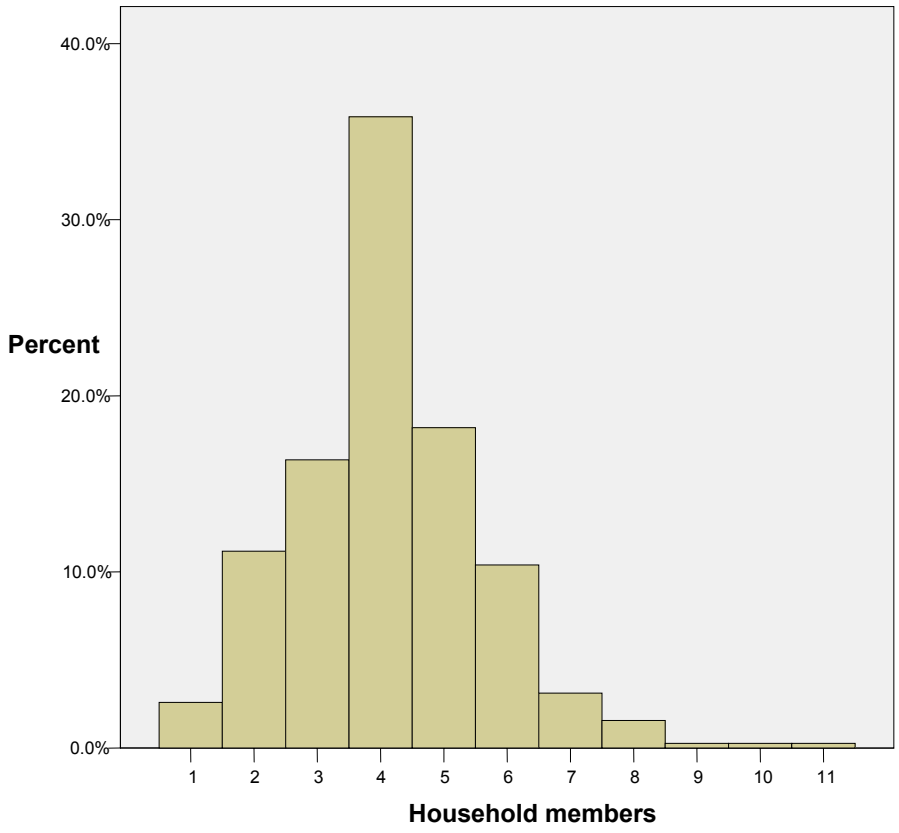



**Table 5-1** Number of household members by ward

| Members | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | n | % | n | % |
| 1 | 7 | 4.9 | 1 | 0.9 | | | 2 | 2.1 | 10 | 2.6 |
| 2 | 15 | 10.4 | 11 | 10.3 | 5 | 12.8 | 12 | 12.6 | 43 | 11.2 |
| 3 | 22 | 15.3 | 18 | 16.8 | 6 | 15.4 | 17 | 17.9 | 63 | 16.4 |
| 4 | 46 | 31.9 | 43 | 40.2 | 13 | 33.3 | 36 | 37.9 | 138 | **35.8** |
| 5 | 30 | 20.8 | 17 | 15.9 | 8 | 20.5 | 15 | 15.8 | 70 | 18.2 |
| 6 | 15 | 10.4 | 13 | 12.1 | 3 | 7.7 | 9 | 9.5 | 40 | 10.4 |
| 7 | 5 | 3.5 | 3 | 2.8 | 2 | 5.1 | 2 | 2.1 | 12 | 3.1 |
| 8 | 3 | 2.1 | 1 | 0.9 | | | 2 | 2.1 | 6 | 1.6 |
| 9 | | | | | 1 | 2.6 | | | 1 | 0.3 |
| 10 | 1 | 0.7 | | | | | | | 1 | 0.3 |
| 11 | | | | | 1 | 2.6 | | | 1 | 0.3 |

**Table 5-2** Number of interviewers, categorized by gender and ward

| Gender | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | N | % | N | % | N | % | n | % |
| Male | 74 | 51.4 | 56 | 52.3 | 18 | 46.2 | 46 | 47.9 | **194** | **50.3** |
| Female | 70 | 48.6 | 51 | 47.7 | 21 | 53.8 | 50 | 52.1 | **192** | **49.7** |
| **Total** | **144** | **100.0** | **107** | **100.0** | **39** | **100.0** | **96** | **100.0** | **386** | **100.0** |

*The age structure of respondents*. The average age of respondents and their age distribution according to gender are presented in Figure 5-3 and Figure 5-4. Generally, the age and gender of respondents in the four wards was rather homogeneous. The ages varies from 20-80 years old, but mainly fell between 41 and 60 for males (43.8%) and females (52.1%).

Respondents proved to be old enough to have some knowledge of technical matters as well as general knowledge regarding socio-economic problems of wastewater and drainage. Hence, they were able to provide the information needed for the BLS.

**Table 5-3** Average age of respondents

| Ward/Commune | n | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Thi Cau | 144 | 26 | 84 | 54.17 | 12.44 |
| Ninh Xa | 107 | 20 | 83 | 52.53 | 14.63 |
| Suoi Hoa | 39 | 22 | 79 | 49.38 | 14.60 |
| Kinh Bac | 96 | 26 | 81 | 50.30 | 13.08 |

**Table 5-4** Distribution of respondents' age by sex

| Gender | Respondent's age | n | % |
|---|---|---|---|
| Male | <30 | 12 | 6.2 |
| | 31-40 | 28 | 14.4 |
| | 41-50 | 38 | 19.6 |
| | 51-60 | 47 | 24.2 |
| | 61-70 | 44 | 22.7 |
| | >70 | 25 | 12.9 |
| | **Total** | **194** | **100.0** |
| Female | <30 | 10 | 5.2 |
| | 31-40 | 41 | 21.4 |
| | 41-50 | 41 | 21.4 |
| | 51-60 | 59 | 30.7 |
| | 61-70 | 32 | 16.7 |
| | >70 | 9 | 4.7 |
| | **Total** | **192** | **100.0** |

*The educational level of respondents*. Most respondents had completed secondary and high school education Figure 5-5). About 33.3% of respondents in Suoi Hoa Ward had bachelor/master degrees or higher. The percentage of "illiterate" respondents was very small (2.1% in Thi Cau and 1.9% in Ninh Xa Ward). Figure 5-6 shows the differences among wards based on gender.

**Table 5-5** Educational levels of respondents

| Educational level | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | n | % | n | % | n | % | n | % |
| Illiterate | 3 | 2.1 | 3 | 1.9 | | | | | **5** | **1.3** |
| Primary (1-5) / Grade 1 | 16 | 11.2 | 12 | 11.2 | 1 | 2.6 | 6 | 6.3 | **35** | **9.1** |
| Secondary (6-9) / Grade 2 | 42 | 29.4 | 31 | 29.0 | 3 | 7.7 | 37 | *39.0* | **113** | ***29.4*** |
| High school (10-12) / Grade 3 | 45 | *31.5* | 33 | *30.8* | 9 | *23.1* | 17 | 17.9 | **104** | **27.1** |
| Worker | 10 | 7.0 | 7 | 6.5 | 4 | 10.3 | 5 | 5.3 | **26** | **6.8** |
| College | 17 | 11.9 | 13 | 12.2 | 9 | *23.1* | 18 | 19.0 | **57** | **14.8** |
| Bachelor, master degree & higher | 10 | 7.0 | 9 | 8.4 | 13 | 33.3 | 12 | 12.6 | **44** | **11.5** |
| **Total** | **143** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **384** | **100** |

**Table 5-6** Educational levels of respondents, by gender (Unit: %)

| Educational level | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female |
| Illiterate | 1.4 | 2.9 | 1.8 | 2.0 | | | | |
| Primary (1-5) / Grade 1 | 9.6 | 12.9 | 10.7 | 11.8 | 5.6 | | 2.2 | 10.2 |
| Secondary (6-9) / Grade 2 | 27.4 | 31.4 | 26.8 | 31.4 | 11.1 | 4.8 | 30.4 | 46.9 |
| High school (10-12) / Grade 3 | 35.6 | 27.1 | 37.5 | 23.5 | 16.7 | 28.6 | 23.9 | 12.2 |
| Worker | 5.5 | 8.6 | 8.9 | 3.9 | 16.7 | 4.8 | 10.9 | |
| College | 9.6 | 14.3 | 5.4 | 19.6 | 16.7 | 28.6 | 15.2 | 22.4 |
| Bachelor, master degree and higher | 11.0 | 2.9 | 8.9 | 7.8 | 33.3 | 33.3 | 17.4 | 8.2 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

*The professional structure of respondents*. Due to the professional structure in Bac Ninh at the time of survey implementation, the respondents were mostly pensioners and people offering services or running small private businesses. Only in Suoi Hoa Ward were the respondents mostly employees and officials. The percentage of "farmer" respondents was very small and not significant; in Thi Cau and Kinh Bac Ward, the percentage of farmers was about 5.6% and 11.6%, respectively.

**Figure 5-2** Professional structure of respondents

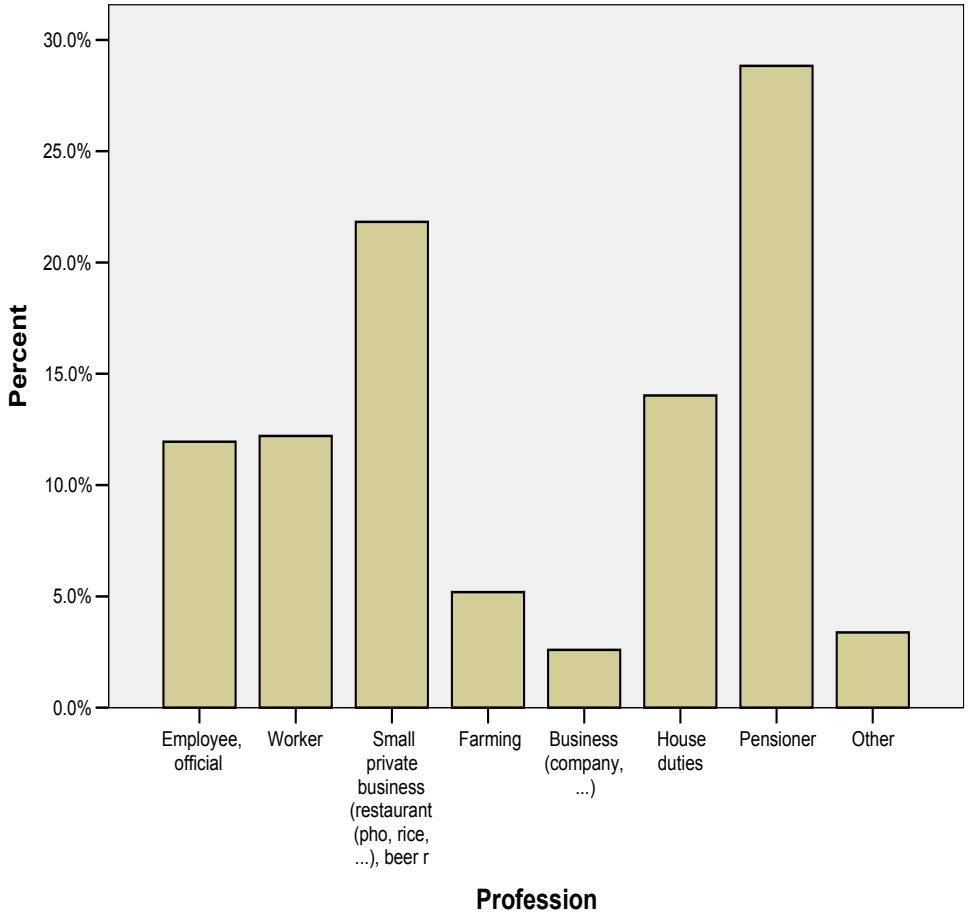



**Table 5-7** Professional structure of respondents

| Profession | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Employee, official | 16 | 11.1 | 11 | 10.3 | 9 | 23.1 | 10 | 10.5 | **46** | **11.9** |
| Worker | 28 | 19.4 | 7 | 6.54 | 2 | 5.1 | 10 | 10.5 | **47** | **12.2** |
| Small private business (shops, restaurant, pho, rice, ...), beer | 31 | 21.5 | 21 | 19.6 | 8 | 20.5 | 24 | *25.3* | **84** | **21.8** |
| Farming | 8 | 5.6 | 1 | 0.93 | | | 11 | 11.6 | **20** | **5.2** |
| Business (company, ...) | 3 | 2.1 | 2 | 1.87 | 4 | 10.3 | 1 | 1.0 | **10** | **2.6** |
| House duties | 12 | 8.3 | 25 | 23.4 | 1 | 2.6 | 16 | 16.8 | **54** | **14** |
| Pensioner | 42 | *29.2* | 34 | *31.8* | 15 | *38.5* | 20 | 21.1 | **111** | ***28.8*** |
| Other | 4 | 2.8 | 6 | 5.61 | | | 3 | 3.16 | **13** | **3.38** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

## 5.2 Some Aspects and Comments on Household's Living Standard

The definition of general standard of living among the households surveyed is relatively complicated. In many cases, we understand it as the monthly household income as shown in

Figure 5-8.The average household income lies between 1 – 4 mill. VND/month. However, in Suoi Hoa Ward there are some households (18%) receiving more than 8 mill. VND/month. The differences are vast and it is noteworthy that the percentage of employees and officials in this ward is high, which means that this kind of knowledge about income levels is public and people didn't hesitate to talk about it.

**Table 5-8** Average monthly household income over the last 12 months

| Income (mill. VND) | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | n | % | n | % |
| Under 1 | 15 | 10.4 | 8 | 7.5 | | | 6 | 6.3 | **29** | **7.5** |
| 1 – 2 | 33 | *22.9* | 17 | 15.9 | 4 | 10.3 | 26 | *27.4* | **80** | ***20.8*** |
| 2.1 – 3 | 46 | *31.9* | 20 | *18.7* | 7 | *18.0* | 23 | *24.2* | **96** | ***24.9*** |
| 3.1 – 4 | 21 | 14.6 | 23 | *21.5* | 7 | *18.0* | 13 | 13.7 | **64** | **16.6** |
| 4.1 – 5 | 12 | 8.3 | 12 | 11.2 | 4 | 10.3 | 11 | 11.6 | **39** | **10.1** |
| 5.1 - 6 | 7 | 4.9 | 12 | 11.2 | 6 | 15.4 | 6 | 6.3 | **31** | **8.1** |
| 6.1 – 7 | 3 | 2.1 | 6 | 5.6 | 1 | 2.6 | 4 | 4.2 | **14** | **3.6** |
| 7.1 – 8 | 1 | 0.7 | 1 | 0.9 | 3 | 7.7 | 1 | 1.1 | **6** | **1.6** |
| 8.1 – 9 | | | 2 | 1.9 | 2 | 5.1 | 1 | 1.1 | **5** | **1.3** |
| 9.1 – 10 | 4 | 2.8 | 4 | 3.7 | 4 | 10.3 | 2 | 2.1 | **14** | **3.6** |
| 10.1 – 11 | 1 | 0.7 | 1 | 0.9 | 1 | 2.6 | 1 | 1.1 | **4** | **1.0** |
| Over 11 | 1 | 0.7 | 1 | 0.9 | | | 1 | 1.1 | **3** | **0.8** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

However, in Vietnam there are often other income sources, perhaps more important than the regular/official income. This income can be shown using other measurements, for example income decides the household's expenditures. Normally, expenditure varies directly with income level. Therefore, the CEPAC team suggested checking other information such as the number of stories of the houses (Figure 5-9), the daily food expenditures (Figure 5-3 and Figure 5-10), and the main household assets (car, motorbike, air conditioner and TV). In addition, we used two measurement methods: Self-estimation by the household surveyed, and estimation by the interviewer as a neutral person (Figure 5-4)**Error! Reference source not found.**.

**Table 5-9** Number of stories of houses (Unit: %)

| Stories of House | Thi Cau | Ninh Xa | Suoi Hoa | Kinh Bac | Total |
|---|---|---|---|---|---|
| 1 | *44.4* | 16.0 | 10.3 | 29.8 | **28.7** |
| 1.5 | | 1.9 | | | **0.6** |
| 2 | 42.7 | *50.9* | 33.3 | *55.3* | ***47.4*** |
| 2.5 | 1.6 | 1.9 | 5.1 | 3.2 | **2.5** |
| 3 | 10.5 | 26.4 | *43.6* | 8.5 | **18.2** |
| 3.5 | | | 2.6 | 1.1 | **0.6** |
| 4 | 0.8 | 2.8 | 5.1 | 1.1 | **1.9** |
| 5 | | | | 1.1 | **0.3** |
| **Total** | **100** | **100** | **100** | **100** | **100** |

**Figure 5-3** Knowledge about daily food expenditure of household

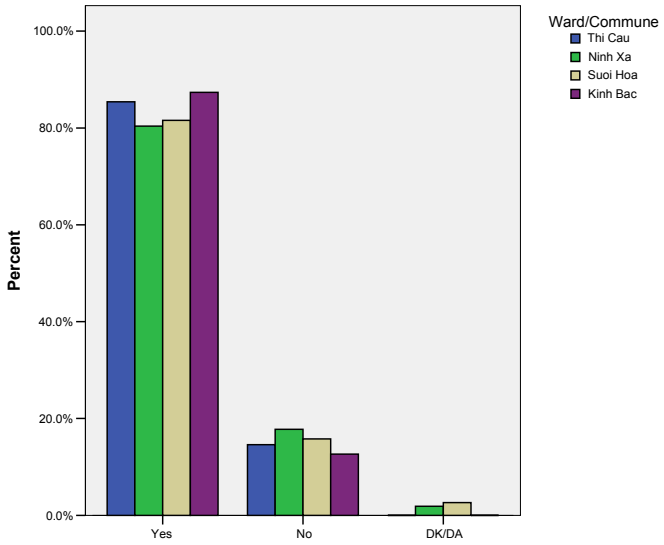
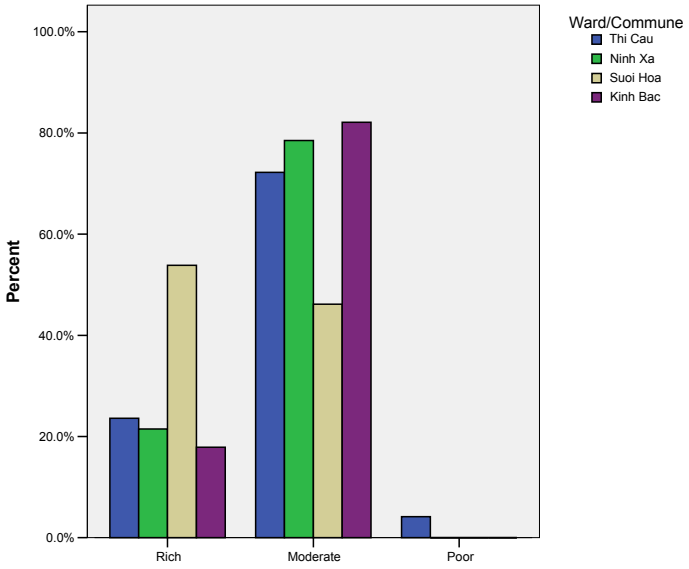



**Table 5-10** Average daily food expenditure of household

| Food expenditure (000' VND) | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Under 20 | 7 | 5.6 | 5 | 5.7 | | | 8 | 9.5 | **20** | **6.1** |
| 21 – 30 | 21 | 16.9 | 11 | 12.6 | 2 | 6.1 | 13 | 15.5 | **47** | **14.3** |
| 31 – 40 | 28 | *22.6* | 8 | 9.2 | 1 | 3.0 | 13 | 15.5 | **50** | **15.2** |
| 41 – 50 | 28 | *22.6* | 24 | *27.6* | 12 | *36.4* | 20 | *23.8* | **84** | ***25.6*** |
| 51 – 60 | 16 | 12.9 | 8 | 9.2 | 4 | 12.1 | 14 | 16.7 | **42** | **12.8** |
| 61 – 70 | 10 | 8.1 | 12 | 13.8 | 1 | 3.0 | 3 | 3.6 | **26** | **7.9** |
| 71 – 80 | 2 | 1.6 | 8 | 9.2 | | | 1 | 1.2 | **11** | **3.4** |
| 81 – 90 | | | | | 2 | 6.1 | | | **2** | **0.6** |
| 91 – 100 | 11 | 8.9 | 10 | 11.5 | 8 | 24.2 | 9 | 10.7 | **38** | **11.6** |
| Over 100 | 1 | 0.8 | 1 | 1.1 | 3 | 9.1 | 3 | 3.6 | **8** | **2.4** |
| **Total** | **124** | **100** | **87** | **100** | **33** | **100** | **84** | **100** | **328** | **100** |

**Figure 5-4** Standard of living as evaluated by the interviewer




## 5.3 Evaluation of Tap Water Use

The main task of the Bac Ninh Water Supply and Sewage Company is providing a water supply, and the results gained from this study are important to improving customer services.

### 5.3.1 Water Use for Drinking/Cooking

Using a combination of tap water and well water (drilled/shallow) is very typical and popular in Bac Ninh City. However the proportion of tap to well water depends on the ward and household context.

*On average,* 87.27% (78.95 – 91.67% in wards) of households use tap water for drinking/cooking. The remaining percentage use water from drilled/shallow wells for drinking/cooking (Table 5-11). The main reason given for using tap water is its “Good quality” (71.1% in Table 5-12). In Suoi Hoa Ward, however, 21.2% of respondents still claim there is “No alternative source”. This means that many households in Suoi Hoa Ward complained about the current quality of tap water – that the water is dull and has sedimentation after standing for some time, etc. In Section 5.8.1 is shown that when dealing with customer satisfaction about the water supply, water quality is the most commonly mentioned problem. In some FGDs, we tried to explain why the water quality is still bad. The raw water taken/extracted from 13 deep wells in Hoa Long Commune has a very high iron concentration and on some days the treatment of raw water is not perfectly operated, leading to production of poor quality water.

In order to help people understand the modern technologies used in water production and supply, the Bac Ninh Water Supply and Sewage Company should organise 1-2 open days per year during which those people interested in water quality can visit the water production system. Additionally, the company should maintain the treatment technologies for the clean water supply as well as addressing all leaking locations in order to minimize endosmosing of dirty water into the water system.

*The additional use of rainwater for household use was very popular many years ago*, but has now virtually disappeared. There are only some households in Kinh Bac Ward who still collect rainwater. The main reason for the reduction in rainwater collecting is the critical air pollution in Bac Ninh City, which is already alarming due to high dust content and dangerous pollutants from industries. Based on the report of DONRE Bac Ninh (05.2007), the dust content measured in Bac Ninh (cross-road Tran Hung Dao – Ngo Gia Tu) is 1.53 - 1.73 times

higher than TCVN (Vietnamese standard). Therefore, rainwater which was once considered "*purity from sky*" before the 1980s can no longer be used for drinking/cooking.

**Table 5-11** Water sources for drinking/cooking

| Water sources for drinking/cooking | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Rain water | | | | | | | 1 | 1.05 | **1** | **0.26** |
| Drilled well | 1 | 0.69 | 5 | 4.67 | 3 | 7.69 | 9 | 9.47 | **18** | **4.68** |
| Shallow well | 1 | 0.69 | | | | | | | **1** | **0.26** |
| Pipe water | 132 | *91.67* | 96 | *89.72* | 33 | *84.62* | 75 | *78.95* | **336** | ***87.27*** |
| Pipe water+drilled well | 9 | 6.25 | 5 | 4.67 | 2 | 5.13 | 9 | 9.47 | **25** | **6.49** |
| Pipe water+shallow well | 1 | 0.69 | 1 | 0.93 | 1 | 2.56 | | | **3** | **0.78** |
| Other | | | | | | | 1 | 1.05 | **1** | **0.26** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

**Table 5-12** Reasons for using tap water for drinking/cooking

| Reasons for using tap water for drinking/cooking | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Habit | 4 | 3.0 | 2 | 2.1 | 3 | 9.1 | 2 | 2.7 | **11** | **3.3** |
| Affordable | 9 | 6.8 | 2 | 2.1 | | | 6 | 8.0 | **17** | **5.1** |
| No alternative source | 21 | *15.9* | 8 | *8.3* | 7 | *21.2* | 8 | *10.7* | **44** | ***13.1*** |
| Free of charge | | | 1 | 1.0 | | | | | **1** | **0.3** |
| Good quality water | 90 | *68.2* | 75 | *78.1* | 18 | *54.5* | 56 | *74.7* | **239** | ***71.1*** |
| Habit+Affordable | 1 | 0.8 | | | | | | | **1** | **0.3** |
| Habit+Good quality water | 1 | 0.8 | | | | | | | **1** | **0.3** |
| Affordable+Good water quality | 4 | 3.0 | 2 | 2.1 | 2 | 6.1 | 1 | 1.3 | **9** | **2.7** |
| No alternative source + Good water quality | 2 | 1.5 | | | 1 | 3.0 | | | **3** | **0.9** |
| Habit + No alternative source + Free of charge | | | 1 | 1.0 | | | | | **1** | **0.3** |
| Other | | | 5 | 5.2 | 2 | 6.1 | 2 | 2.7 | **9** | **2.7** |
| **Total** | **132** | **100** | **96** | **100** | **33** | **100** | **75** | **100** | **336** | **100** |

*Clean water demand in some areas*

- In Yen Man Street (Kinh Bac Ward), the people still have to use water from drilled wells for cooking and they require access to tap water (Mrs. Nguyen Thu Ha, President of Women's Union of Kinh Bac Ward)
- "*The proportion of those using well water and tap water is 30% and 70% respectively, because many household don't still have tap water*" (Mr. Nguyen Kinh Quoc, head of sub-ward Y Na, Kinh Bac Ward)
- "*The district was newly established; therefore the water supply is good, but sometimes the water quality has problems. Some people checked the water quality with measuring instruments (doesn't mention the instrument names) and concluded that the water quality was still not good*" (FGD in Suoi Hoa Ward).

### 5.3.2 Use of Water for Washing

*For washing*. On average 60% (46.3% - 63.2% in wards) of households use tap water and 26% (14.6% - 41.1%) use drilled wells for washing. Only 17.4% of households in Thi Cau Ward use water from shallow wells for washing (Table 5-11). The main reasons given for using this water source (not including pipe water) for washing were: "Affordable" and "Free of charge" (Table 5-14). During surveys in some households, the people said that the water quality in wells is getting worse than before, but it can still be used for washing and bathing, especially in summer when the air temperature is very high and the well water is so fresh and cold. In the future, if the ground water quality can be controlled, then the Bac Ninh Water Supply and Sewage Company should encourage the people to use this combination. It would help the company relax the strain on the tight water supply situation and save energy. This suggestion was discussed in FGDs with heads of sub-wards and citizens. The strain on the water supply was brought up due to the current migration and rapid population growth in the urban areas/cities and the accompanying industrial development. This is the general trend across Vietnam and in Bac Ninh City as well.

**Table 5-13** Water use for washing

| Water use for washing | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Drilled well | 21 | *14.6* | 29 | *27.*1 | 11 | *28.2* | 39 | *41.1* | **100** | ***26.0*** |
| Shallow well | 25 | 17.4 | | | | | | | **25** | **6.5** |
| Buying water | | | | | | | 1 | 1.1 | **1** | **0.3** |
| Pipe water | 91 | *63.2* | 69 | *64.5* | 27 | *69.2* | 44 | *46.3* | **231** | ***60.0*** |
| Pipe water + drilled well | 3 | 2.1 | 9 | 8.4 | | | 11 | 11.6 | **23** | **6.0** |
| Pipe water + shallow well | 4 | 2.8 | | | 1 | 2.6 | | | **5** | **1.3** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

**Table 5-14** Reasons given for using these water sources (not including pipe water) for washing

| Reasons for using for washing | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Habit | 2 | 4.4 | | | | | 1 | 2.6 | **3** | **2.4** |
| Affordable | 18 | *40.0* | 7 | 24.1 | 5 | *45.5* | 14 | *35.9* | **44** | ***35.5*** |
| No alternative source | | | | | 1 | 9.1 | 4 | 10.3 | **5** | **4.0** |
| Free of charge | 13 | *28.9* | 12 | *41.4* | 4 | *36.4* | 15 | *38.5* | **44** | ***35.5*** |
| Good quality water | 5 | 11.1 | 1 | 3.4 | 1 | 9.1 | 4 | 10.3 | **11** | **8.9** |
| Habit + Free of charge | 2 | 4.4 | 8 | *27.6* | | | | | **10** | **8.1** |
| Free of charge + Good water quality | 1 | 2.2 | | | | | | | **1** | **0.8** |
| Other | 3 | 6.7 | 1 | 3.4 | | | 1 | 2.6 | **5** | **4.0** |
| Free of charge + Good quality water + Other | 1 | 2.2 | | | | | | | **1** | **0.8** |
| **Total** | **45** | **100** | **29** | **100** | **11** | **100** | **39** | **100** | **124** | **100** |

### 5.3.3 Cost, Price and Value of Tap Water

#### 5.3.3.1 The Average Monthly Water Cost

*The average monthly water bill* of each household depends in part on the number of members (Table 5-15) and in part on the household living standard. If the household uses a combination of tap water and well water the average cost of tap water will vary from 10,000 to 30,000 VND per month (Table 5-15 and Figure 5-5). Kinh Bac Ward is the ward with the highest pipe water savings, while in Suoi Hoa Ward, water costs vary between 20,000 and 80,000 VND per month.

According to our study, there is a relationship between the monthly cost of clean water, standard of living and number of household members. The relationship is not, however, clearly between the cost of tap water and the household standard of living. As we know, water is an essential element of daily life for everybody, rich or poor. The relationship between cost of clean water and number of household members is clearer. The correlation coefficient, however, between these factors is very low and it could be said that it is an "unclose" relationship.

Tap water costs account for only 0.9-1.08% of household income. Compared with the average daily household food expenditure, the water costs are nearly equal to the household's daily food expenditure. Therefore in FGDs many people said that the cost of tap water is low and they are willing to pay more if the company can guarantee higher tap water quality.

**Figure 5-5** Average monthly water bill, divided according to number of household members

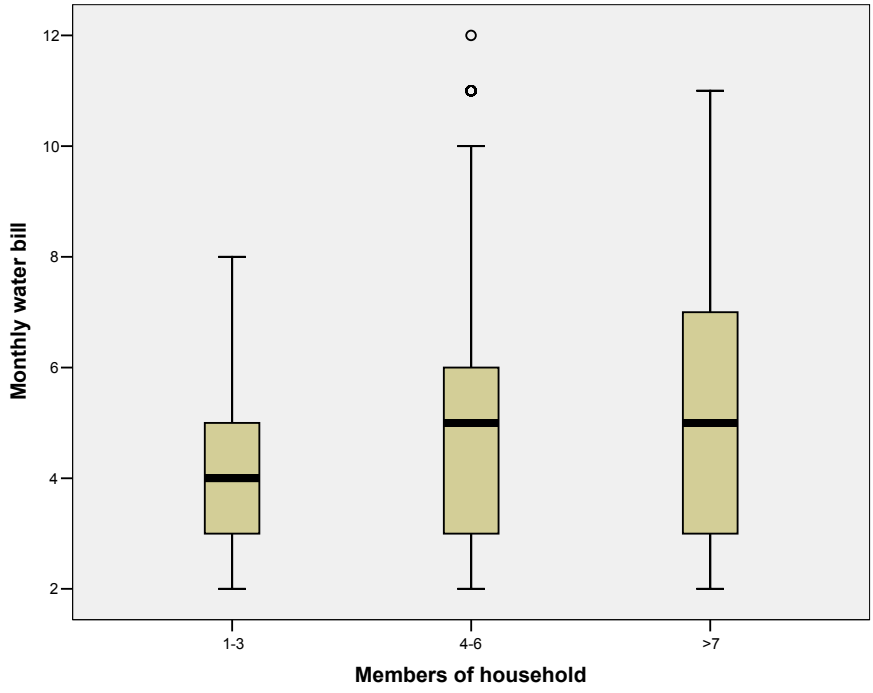


**Table 5-15** Average monthly household cost for piped water

| The average monthly cost (1000 VND/month) | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| No use | 22 | 16.5 | 9 | 9.3 | 1 | 3.0 | 12 | 15.8 | **44** | **13.0** |
| Under 10 | 28 | *21.1* | 18 | *18.6* | 2 | 6.1 | 17 | *22.4* | **65** | ***19.2*** |
| 10 – 20 | 26 | *19.5* | 13 | *13.4* | 2 | 6.1 | 13 | *17.1* | **54** | ***15.9*** |
| 21 – 30 | 29 | *21.8* | 24 | *24.7* | 7 | *21.2* | 14 | *18.4* | **74** | ***21.8*** |
| 31 – 40 | 14 | 10.5 | 7 | 7.2 | 3 | 9.1 | 10 | 13.2 | **34** | **10.0** |
| 41 – 50 | 5 | 3.8 | 5 | 5.2 | 4 | *12.1* | 1 | 1.3 | **15** | **4.4** |
| 51 – 60 | 3 | 2.3 | 4 | 4.1 | 2 | 6.1 | | | **9** | **2.7** |
| 61 – 70 | 1 | 0.8 | 4 | 4.1 | 4 | *12.1* | | | **9** | **2.7** |
| 71 – 80 | | | 2 | 2.1 | 4 | *12.1* | 1 | 1.3 | **7** | **2.1** |
| 81 – 90 | 1 | 0.8 | 7 | 7.2 | 1 | 3.0 | 3 | 3.9 | **12** | **3.5** |
| 91 – 100 | | | | | 1 | 3.0 | | | **1** | **0.3** |
| Over 100 | 4 | 3.0 | 4 | 4.1 | 2 | 6.1 | 5 | 6.6 | **15** | **4.4** |
| DK/DA | 22 | 16.5 | 9 | 9.3 | 1 | 3.0 | 12 | 15.8 | **44** | **13.0** |
| **Total** | **133** | **100** | **97** | **100** | **33** | **100** | **76** | **100** | **339** | **100** |

**Table 5-16** Average monthly cost of piped water according to number of household members (%)

**a) Divided by ward**

| Average cost (000' VND/mo) | Thi Cau | | | Ninh Xa | | | Suoi Hoa | | | Kinh Bac | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1-3 mem | 4-6 mem | >7 mem | 1-3 mem | 4-6 mem | >7 mem | 1-3 mem | 4-6 mem | >7 mem | 1-3 mem | 4-6 mem | >7 mem | |
| No use | | | | 3.3 | 1.4 | | | | | 7.1 | 3.4 | | **1.6** |
| Under 10 | *31.8* | 6.6 | *22.2* | 10.0 | 9.7 | *25.0* | 9.1 | | | 10.7 | 16.9 | | **12.5** |
| 10 – 20 | 29.5 | 23.1 | 11.1 | 13.3 | 20.8 | *25.0* | 9.1 | 8.7 | | *28.6* | *23.7* | | ***21.2*** |
| 21 – 30 | 22.7 | 18.7 | *22.2* | *33.3* | 5.6 | | 18.2 | 4.3 | | 17.9 | 18.6 | | **16.4** |
| 31 – 40 | 13.6 | *24.2* | *22.2* | 30.0 | *23.6* | | 18.2 | *21.7* | *50.0* | 17.9 | 13.6 | *25.0* | **20.7** |
| 41 – 50 | 2.3 | 13.2 | 11.1 | | 8.3 | *25.0* | | 13.0 | | 14.3 | 10.2 | | **9.0** |
| 51 – 60 | | 4.4 | 11.1 | | 5.6 | *25.0* | *27.3* | 4.3 | | 3.6 | 1.7 | | **4.2** |
| 61 – 70 | | 3.3 | | 3.3 | 4.2 | | 9.1 | 4.3 | | | | | **2.4** |
| 71 – 80 | | 1.1 | | | 5.6 | | | 13.0 | *50.0* | | | | **2.4** |
| 81 – 90 | | | | | 2.8 | | | 17.4 | | | | *25.0* | **1.9** |
| 91 – 100 | | 1.1 | | | 9.7 | | | 4.3 | | | 5.1 | *25.0* | **3.4** |
| Over 100 | | | | | | | | 4.3 | | | | | **0.3** |
| DK/DA | | 4.4 | | 6.7 | 2.8 | | 9.1 | 4.3 | | | 6.8 | 25.0 | **4.0** |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

**b) Not divided by ward**

| The average monthly cost (000' VND/month) | Number of member in household | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | 1-3 member | | 4-6 member | | >7 member | | | |
| | n | % | n | % | n | % | n | % |
| No use | 3 | 2.7 | 3 | 1.2 | | | **6** | **1.6** |
| Under 10 | 21 | 18.6 | 23 | 9.4 | 3 | 15.8 | **47** | **12.5** |
| 10 – 20 | 26 | *23.0* | 52 | *21.2* | 2 | 10.5 | **80** | ***21.2*** |
| 21 – 30 | 27 | *23.9* | 33 | 13.5 | 2 | 10.5 | **62** | **16.4** |
| 31 – 40 | 22 | 19.5 | 52 | *21.2* | 4 | *21.1* | **78** | ***20.7*** |
| 41 – 50 | 5 | 4.4 | 27 | 11.0 | 2 | 10.5 | **34** | **9.0** |
| 51 – 60 | 4 | 3.5 | 10 | 4.1 | 2 | 10.5 | **16** | **4.2** |
| 61 – 70 | 2 | 1.8 | 7 | 2.9 | | | **9** | **2.4** |
| 71 – 80 | | | 8 | 3.3 | 1 | 5.3 | **9** | **2.4** |
| 81 – 90 | | | 6 | 2.4 | 1 | 5.3 | **7** | **1.9** |
| 91 – 100 | | | 12 | 4.9 | 1 | 5.3 | **13** | **3.4** |
| Over 100 | | | 1 | 0.4 | | | **1** | **0.3** |
| DK/DA | 3 | 2.7 | 11 | 4.5 | 1 | 5.3 | **15** | **4.0** |
| **Total** | **113** | **100** | **245** | **100** | **19** | **100** | **377** | **100** |

### 5.3.3.2 The Water Price System

*The current water unit price* is a uniform price applied to the whole country based on the following decrees:

- Decree No. 104/2004/TTLT-BTC-BXD (8 November 2004) of Ministry of Finance & Ministry of Construction, guidelines for principles, method for determination and right for decision in clean water consumption price in urban area, industrial zones, rural region.
- Decree No. 38/2005/QĐ-BTC (30 June 2005) of Ministry of Finance on the frame of clean water price for domestic use
- In the context of Bac Ninh City, the decree No. 785/QĐ-CT (24 May 2005) of Bac Ninh is valid.

The percentage of respondents aware of tap water prices is nearly the same in all wards, from 77% to 84% Figure 5-6). In Suoi Hoa Ward, where respondents have a higher income and higher educational level and are mostly employees, officials, pensioners, etc, this percentage is the lowest, perhaps meaning that they do not care about the water prices.

*Paying for tap water by using the flat rate of 10,000 VND/month* in Kinh Bac Ward, while the company installed water meter before, was hardly complained. Company has to explain people about this problem.

*Is the water unit price expensive or cheap?* Respondents were asked what they think about the current water price. Based on Table 5-17, we can see that the most respondents (>70%) think that the water price is moderate. Surprisingly (and somewhat shockingly) the household group enjoying the highest living standard, 20% in Suoi Hoa Ward and 18,8% in Kinh Bac Ward, thinks that the current water price is expensive. We assume that those households enjoying a comparatively high standard of living are largely those households which also have higher general knowledge/awareness as well as higher educational level and are thus afraid of increasing water prices. From this starting points they haven't got good attitude as ''non-cooperative" and intentionally try to "distort the facts"

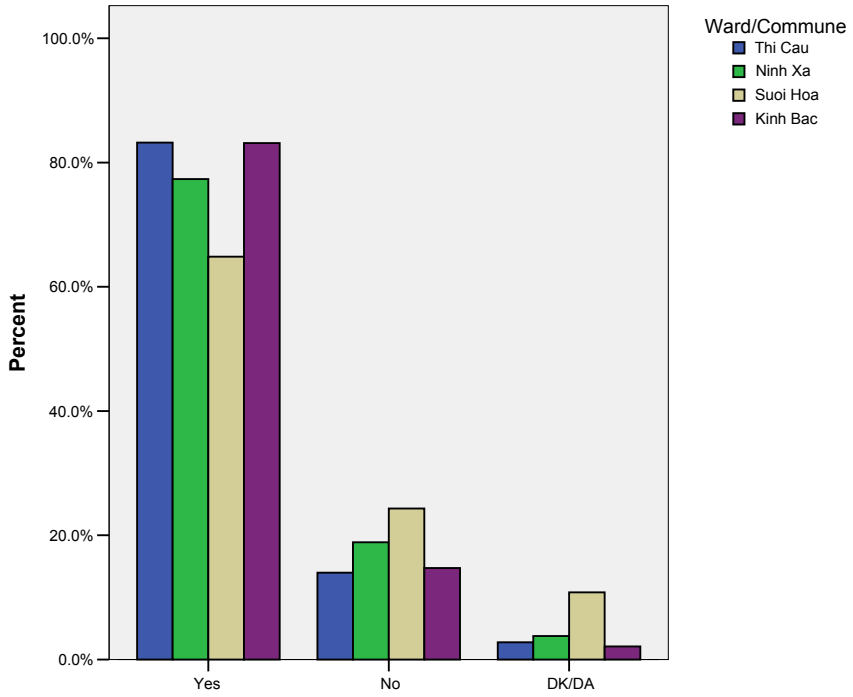
**Table 5-17** Household opinions about the current tap water prices

| Current tap water prices | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Expensive | 2 | 1.4 | 1 | 1.0 | 3 | 8.3 | 1 | 1.2 | 7 | **1.9** |
| Light expensive | 6 | 4.2 | 8 | 7.7 | 2 | 5.6 | 6 | 7.1 | 22 | **6.0** |
| Moderate | 130 | *90.3* | 90 | *86.5* | 29 | *80.6* | 76 | *89.4* | 325 | ***88.1*** |
| Cheap | 2 | 1.4 | 5 | 4.8 | | | 1 | 1.2 | 8 | **2.2** |
| DK/DA | 4 | 2.8 | | | 2 | 5.6 | 1 | 1.2 | 7 | **1.9** |
| **Total** | **144** | **100** | **104** | **100** | **36** | **100** | **85** | **100** | **369** | **100** |

**Table 5-18** Household opinions (by ward) about the current tap water price, subdivided by living standard (Rich, Moderate and Poor)

| Current tap water price | | Thi Cau | | | Ninh Xa | | Suoi Hoa | | Kinh Bac | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Rich | Mode-rate | Poor | Rich | Mode-rate | Rich | Mode-rate | Rich | Moder-ate |
| Expensive | n | | 2 | | | 1 | 2 | 1 | | 1 |
| | % | | 1.9 | | | 1.2 | 10.0 | 6.3 | | 1.5 |
| Light expensive | n | 2 | 4 | | 3 | 5 | 2 | | 3 | 3 |
| | % | 5.9 | 3.9 | | 13.0 | 6.2 | 10.0 | | 18.8 | 4.4 |
| Moderate | n | 30 | 94 | 6 | 20 | 70 | 14 | 15 | 12 | 64 |
| | % | *88.2* | *90.4* | *100.0* | *87.0* | *86.4* | *70.0* | *93.8* | *75.0* | *92.8* |
| Cheap | n | 1 | 1 | | | 5 | | | | 1 |
| | % | 2.9 | 1.0 | | | 6.2 | | | | 1.5 |
| DK/DA | n | 1 | 3 | | | | 2 | | 1 | |
| | % | 2.9 | 2.9 | | | | 10.0 | | 6.3 | |
| **Total** | **n** | **34** | **104** | **6** | **23** | **81** | **20** | **16** | **16** | **69** |

**Figure 5-6** Percentage of respondents aware of the tap water price




### 5.3.3.3 Tap Water Quality

In Ninh Xa Ward, Mrs. Nguyen Thi Mai, leader of the Ninh Xa Ward Health Care Department, said: *"The ward leaders provided information about tap water. More than 99% of households have been using tap water, thereby protecting them from diseases such as trachoma, skin-disease, and internal disease. In former times people used the shallow/drilled well and suffered from gravel. Now this disease is lessening. I think that this is a positive effect of using tap water".*

There are, however, the following problems:

- In FGD the household representatives stated that the tap water quality is not good and still contains sediment.
- In FGD with households in Ninh Xa Ward, Mrs. Tran Thi Diem (71 years old with a high income) complained very much about the tap water quality, which is not appropriate in view of the present tap water bill, 2500 VND/$m^3$. She thought that the tap water quality is only worth 1000 VND/$m^3$. Following deep discussion and explanation, she changed her opinion and is even prepared to pay more for tap water if the water quality is guaranteed. The colour of tap water can be yellowish due to high iron content, but must not contain pollutants dangerous to human health such as pesticides, fertilizers, etc. These requirements are big future challenges for the company, because the deep wells for extraction of raw water are located in the paddy field of Hoa Long Commune. Who can "manage" the fertilizing practices of the farmers? They should use less fertilizer and pesticides in order to protect the groundwater quality.

**Figure 5-7** FGD in Ninh Xa Ward and Mrs. Tran Thi Diem (left)

#### 5.3.3.4 Willingness To Pay for Tap Water by Improving/Guaranteeing the Quality

*The scenario given by us is: How would the people respond to a higher water bill in conjunction with improved service quality and/or tap water quality by the company?* We got the same answer according to the old thinking of the "command economy": "Depends on the state. The state requires how much we pay, then we pay it." After receiving this answer, however, we try to simulate a bidding game concerning the tap water price. The respondents gave us the price they would be willing to pay (WTP). After analysing the data, we were able to draw a general picture of WTP for tap water. WTP fluctuates between 3235 and 3635 VND/$m^3$. The wards Kinh Bac and Suoi Hoa have the highest WTP. The statistical characteristics are shown in Table 5-19. The relation between WTP and household income was analysed with the correlation coefficient, but it did not show significance. Therefore, if the government and provincial authorities allow it, the company can increase the water price while improving the water quality and service quality.

**Table 5-19** WTP for tap water

| Ward/Commune | n | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Thi Cau | 143 | 2500 | 6000 | 3468.53 | 809.75 |
| Ninh Xa | 104 | 2500 | 6000 | 3235.58 | 657.14 |
| Suoi Hoa | 37 | 2500 | 6000 | 3635.14 | 940.22 |
| Kinh Bac | 86 | 2500 | 6000 | 3523.26 | 900.68 |
| **Total** | **370** | **2500** | **6000** | **3432.43** | **814.52** |

## 5.4 Evaluation of Household Sanitation System

### 5.4.1 Toilet Coverage in Bac Ninh City

Nearly 100% of the surveyed households in Bac Ninh City have their own (private) toilets, while more than 90% of households surveyed in all wards had septic tank toilets. These facts were confirmed in IDIs with the ward leaders and FGDs in the wards as follows:

- In Thi Cau Ward, about 90% of households have septic tank toilets (Table 5-21)
- In Kinh Bac Ward, Mr. Nguyen Van Tam, leader of Yen Man Sub-ward, said: "*Septic tank toilet are dominant, with about 80% of the total. The remaining percentage are direct flushing and pit toilets. There aren't any public toilets.*" Mrs. Nguyen Thu Ha, the leader of the Kinh Bac Women's Union, said: "*80% of households have septic tank toilets and 20% have pit toilets. The manure from pit toilets can be used as fertilizer and for feeding fish."*
- In Suoi Hoa Ward, Mr. Nguyen The Nho, leader of Sub-ward 1, said "*In our sub-ward, most of the households have septic tank toilets; the percentage is 99%. The remaining 1%*

*are direct flushing toilets, (ward and commune help to build them). In the apartment block, there are four public toilets. The main reason for no-own-toilets is that the households don't intend to stay here for a long time (they wait to sell the land and move). In addition, the economic situation of some households is very difficult and therefore they can not build septic tank toilets*"

Pit toilets still exist in the wards. The chance for some households to change from pit toilets to septic tank toilets is difficult due to the following:

- The economic situation of the household, for example if it is a poor household,
- The traditional use of human waste for fertilizer and the feeding of fish,
- Will not change until the household builds a new house,
- If the household has a big enough garden, the pit toilet does not have any influence on their way of life, for example: Mr. Dinh Van Hung, living at 22 Hoang Quoc Viet street (Thi Cau Ward), was a university lecturer and is now a retiree. He said that he is proud of his pit toilet because it has always been very clean; or Mr. Nguyen Van Oanh, the chairman of Ninh Xa Ward, who said: "*The majority have septic tank toilets (about 95%), the remaining 5% have pit toilet, and there are no public toilets. The reason for the existence of pit toilets is that these households have enough area for a pit toilet and it is always clean*".

**Table 5-20** Percentage of households with private toilet

| Own toilet | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 133 | 92.4 | 107 | 100.0 | 39 | 100.0 | 95 | 100.0 | **374** | **100.0** |
| No | 11 | 7.6 | | | | | | | | |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **374** | **100** |

**Table 5-21** Type of toilet

| Kind of HH's toilet | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | n | % | n | % |
| Pit toilet | 8 | 6.0 | 4 | 3.8 | | | 5 | 5.4 | **17** | **5.0** |
| Central (off-site) sewage system | | | | | | | 2 | 0.0 | **2** | **0.0** |
| Septic tank toilet | 126 | 94.0 | 101 | 96.2 | 39 | 100.0 | 88 | 92.6 | **354** | **95.0** |
| **Total** | **134** | **100** | **105** | **100** | **39** | **100** | **95** | **100** | **373** | **100** |

*Loans for building toilets*. In IDIs and FGDs, we mentioned this topic and there were some important ideas, for example:

- Mrs. Pham Thi Binh, Vice President of Kinh Bac Ward, said: "*Generally, everybody is interested in environmental sanitation, so they try to build septic tank toilets. However, some households cannot build them due to their economic situation. They don't want to borrow any money to build them because they are afraid of not having enough money to pay back the loan. If there is financial support, though, then they receive it.* "
- According to Mr. Nguyen Van Oanh, Chairman of Suoi Hoa Ward: "*They don't want to borrow money because the construction of a septic tank toilet is very easy. They think the pit toilet is also clean.*"
- Some poor households want to get a loan for improving their toilet, but the form of lending is unsuitable for their household situation. Mrs. Nguyen Thu Ha, chairman of the women's union, said: "*The poor households don't have septic tank toilets. If there is any loan program for improving their toilets, they would be ready to borrow in the form of security, but unfortunately there is no such program in our ward."*

It is important to note that during survey implementation in Thi Cau and Ninh Xa Ward, we met some people who told us that the neighbouring household only has a direct flushing toilet and the waste is running into the canal, causing a bad odour. We then went to the neighbouring household and conducted the survey asking about their toilet. Surprisingly, the neighbouring household reported that they have a septic tank toilet - one with two chambers even. We do not know who was right in this situation. Therefore, we should be careful with this statistical data and tend to use the lower estimates (Table 5-17).

### 5.4.2 The Actual Condition of the Septic Tank Toilets

#### 5.4.2.1 Construction and Location of the Septic Tank Toilets

Most of the septic tank toilets have two or three chambers (Figure 5-8). Toilets with only one chamber are only found in Thi Cau and Kinh Bac Ward. In Suoi Hoa Ward, in particular, there are a number of new houses in good (economic) condition that have a high number and volume of septic tank (2.6% of septic tank with 4 chambers).

In Thi Cau and Kinh Bac Ward, septic tank toilets are normally located outside the house, because both wards are located in the border area and there is sufficient land area. In Suoi Hoa Ward, 97% of septic tanks are located inside the house.

**Figure 5-8** Number of chambers in septic tanks

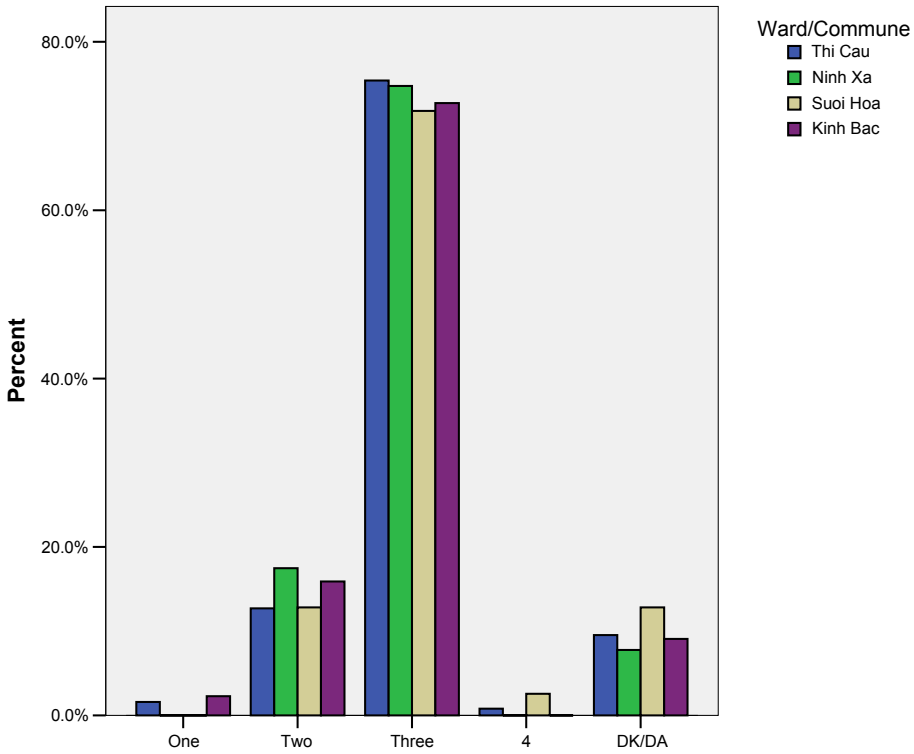



**Table 5-22** Location of septic tank

| The location of septic tank | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Inside house | 99 | *78.6* | 93 | *90.3* | 38 | *97.4* | 72 | *81.8* | **302** | ***84.8*** |
| Outside house (yard, garden) | 25 | 19.8 | 10 | 9.7 | 1 | 2.6 | 15 | 17.1 | **51** | **14.4** |
| DK/DA | 2 | 1.6 | | | | | 1 | 1.1 | **3** | **0.8** |
| **Total** | **126** | **100** | **103** | **100** | **39** | **100** | **88** | **100** | **356** | **100** |

### 5.4.2.2 Volume of Septic Tank

Most of the septic tanks are 3 - 6 $m^3$. In Suoi Hoa Ward, in particular, there are some septic tanks with high volumes. This information was re-checked and verified (Table 5-20).

**Table 5-23** Volume of septic tank

| The size of septic tank | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | N | % | n | % | n | % | n | % |
| Under 3 $m^3$ | 10 | 10.2 | 13 | 16.1 | 3 | 11.1 | 7 | 10.5 | **33** | **12.1** |
| 3.1 to 6 $m^3$ | 67 | *68.4* | 52 | *64.2* | 10 | 37.0 | 40 | *59.7* | **169** | ***61.9*** |
| Over 6 $m^3$ | 21 | 21.4 | 16 | 19.8 | 14 | *51.9* | 20 | 29.9 | **71** | **26.0** |
| **Total** | **98** | **100** | **81** | **100** | **27** | **100** | **67** | **100** | **273** | **100** |

### 5.4.2.3 Kind of Wastewater Deposited in Septic Tank and Where It Subsequently Goes

Based on the survey results in Table 5-24, over 96% of households discharge wastewater from their toilets into the septic tank. We estimate, however, that this number could be higher because when constructing and operating septic tanks, households generally follow the minimal technical requirements and only let wastewater from their toilets run into the septic tanks.

**Table 5-24** Kind of wastewater disposed of in septic tanks

| Kind of wastewater | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Toilet | 121 | *96.0* | 103 | *100.0* | 38 | *97.4* | 86 | *97.7* | **348** | ***97.8*** |
| Toilet + bathroom | | | | | 1 | 2.6 | | | **1** | **0.3** |
| Toilet + bathroom + kitchen | | | | | | | 1 | 1.1 | **1** | **0.3** |
| Toilet + bathroom + kitchen + business | 3 | 2.4 | | | | | 1 | 1.1 | **4** | **1.1** |
| DK/DA | 2 | 1.6 | | | | | | | **2** | **0.6** |
| **Total** | **126** | **100** | **103** | **100** | **39** | **100** | **88** | **100** | **356** | **100** |

Suoi Hoa Ward has a good infrastructural system, which was newly constructed according to the city plan. Therefore, 100% of wastewater is flowing into the public system. In Ninh Xa and Thi Cau Ward, the rate of non-collection into the public system is still about 3-5% (into river, canal, pond, etc). This was confirmed by Mrs. Pham Thi Binh (Vice President of Kinh Bac Ward) and Mr. Le Si Binh (President of People's Committee of Suoi Hoa Ward) in IDIs. In Kinh Bac Ward, in particular, 11,4% of households still discharge waste into rivers, ponds, etc. We are of the opinion that the company should coordinate with city authorities in order to call, convince and even support (financially) households discharging toilet wastewater into the public system.

**Table 5-25** Discharge of wastewater from toilet

| Where does toilet wastewater go? | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | n | % | n | % | n | % | n | % |
| Public drainage system | 114 | *90.5* | 93 | *90.3* | 39 | *100.0* | 69 | *78.4* | **315** | ***88.5*** |
| Public road | 4 | 3.2 | 7 | 6.8 | | | 2 | 2.3 | **13** | **3.7** |
| River, open channel, pond or lake | 2 | 1.6 | 1 | 1.0 | | | 10 | 11.4 | **13** | **3.7** |
| Infiltrate into the soil, flow into garden, ... | 3 | 2.4 | 2 | 1.9 | | | 5 | 5.7 | **10** | **2.8** |
| River + Garden | 1 | 0.8 | | | | | | | **1** | **0.3** |
| DK/DA | 2 | 1.6 | | | | | 2 | 2.3 | **4** | **1.1** |
| **Total** | **126** | **100** | **103** | **100** | **39** | **100** | **88** | **100** | **356** | **100** |

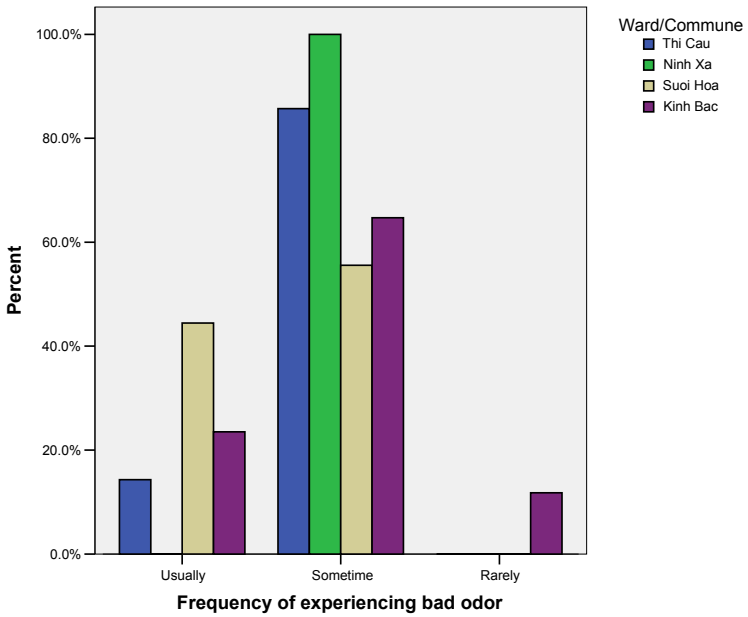
### 5.4.2.4 Operation of Septic Tank

In many cases (more 80%) people do not experience bad odours from the septic tank in their houses. If bad odour is experienced (15.5% - 25.6%), then it only occurs sometimes (Figure 5-9). It is notable that Suoi Hoa Ward has a high percentage of households experiencing bad odours from the septic tank (25.6%) and high percentage reporting odours occurring (44.4%).

**Table 5-26** Percentage reporting bad odour from septic tank in their house

| Bad odour from septic tank in house? | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 22 | 17.5 | 16 | 15.5 | 10 | 25.6 | 17 | 19.3 | **65** | **18.3** |
| No | 104 | *82.5* | 87 | *84.5* | 29 | *74.4* | 70 | *79.6* | **290** | ***81.5*** |
| DK/DA | | | | | | | 1 | 1.1 | **1** | **0.3** |
| **Total** | **126** | **100** | **103** | **100** | **39** | **100** | **88** | **100** | **356** | **100** |

**Figure 5-9** Frequency of experiencing bad odour of septic tank



### 5.4.2.5 Empty Septic Tank

The number of households that do not empty their septic tanks at all is very high. In the case that they do empty their septic tank, the frequency is less than once every 5 years. The percentage of respondents using septic tank medicine is very high, over 75% in all wards. In most cases, medicine is used annually (Figure 5-10, Table 5-27 to Table 5-29).

In the future, the company has to set up a plan for monitoring household septic tanks; to recommend and to gradually require regular emptying of household septic tanks as well as to collect all sludge from the emptying of the septic tank in the wastewater treatment plant.

**Table 5-27** Empty septic tank

| Empty septic tank | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 19 | 15.1 | 22 | 21.6 | 6 | 15.4 | 12 | 13.6 | **59** | **16.6** |
| No | 107 | *84.9* | 80 | *78.4* | 31 | *79.5* | 76 | *86.4* | **294** | ***82.8*** |
| DK/DA | | | | | 2 | 5.1 | | | **2** | **0.6** |
| **Total** | **126** | **100** | **102** | **100** | **39** | **100** | **88** | **100** | **355** | **100** |

**Table 5-28** Frequency of emptying septic tank

| Frequency | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Annually | 1 | 5.3 | | | 2 | 25.0 | | | **3** | **5.1** |
| 2 - 3 years | 2 | 10.5 | 5 | 26.3 | 2 | 25.0 | | | **9** | **15.3** |
| 4 - 5 years | 6 | 31.6 | 1 | 5.3 | | | 3 | 23.1 | **10** | **17.0** |
| > 5 years | 9 | *47.4* | 9 | *47.4* | 3 | *37.5* | 2 | 15.4 | **23** | ***39.0*** |
| Any time if blocked or fully | 1 | 5.3 | 4 | 21.1 | 1 | 12.5 | 7 | *53.9* | **13** | **22.0** |
| DK/DA | | | | | | | 1 | 7.7 | **1** | **1.7** |
| **Total** | **19** | **100** | **19** | **100** | **8** | **100** | **13** | **100** | **59** | **100** |

**Figure 5-10** Use of septic tank medicine for toilet

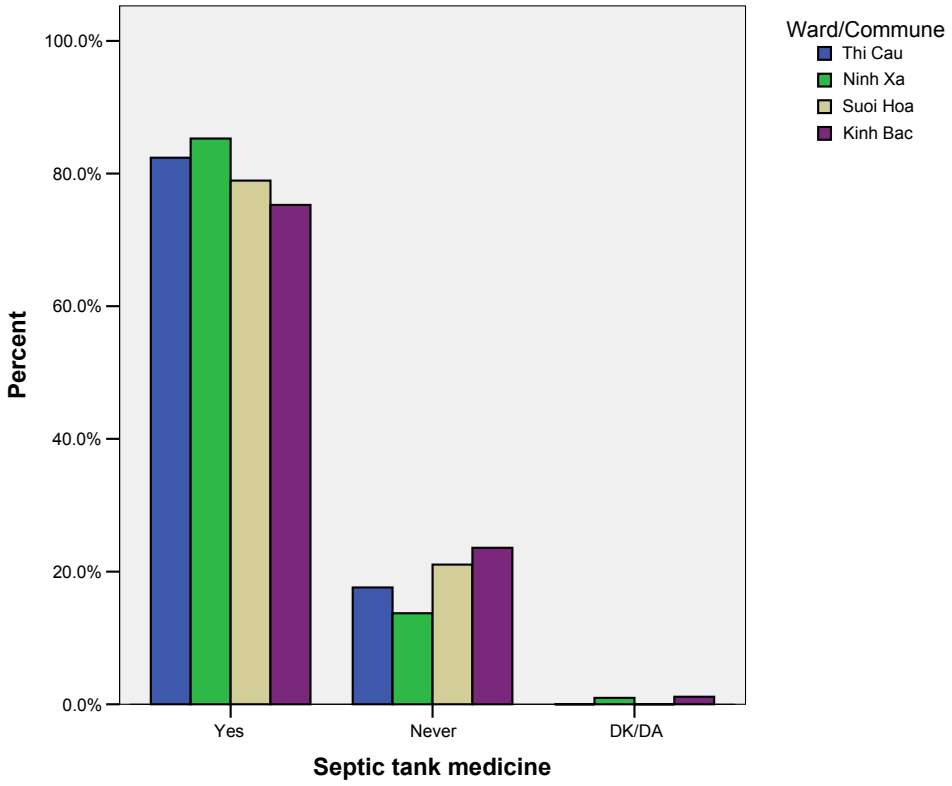



**Table 5-29** Frequency of using septic tank medicine for toilet

| Frequency | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Annually | 94 | *93.0* | 82 | *94.3* | 27 | *87.1* | 65 | *97.0* | **268** | ***93.7*** |
| Every several years | 5 | 5.0 | 4 | 4.5 | 4 | 12.9 | 2 | 3.0 | **15** | **5.2** |
| If blocked | 2 | 2.0 | 1 | 1.2 | | | | | **3** | **1.1** |
| **Total** | **101** | **100** | **87** | **100** | **31** | **100** | **67** | **100** | **286** | **100** |

### 5.4.2.6 Awareness about Using the River or Field as a Toilet and Direct Flushing Toilet

In most cases, people use the public latrine. This question is too sensitive; therefore we cannot get a reliable answer (Table 5-30). The opinions about using river/field as a toilet are analysed in Table 5-31, 86.2% of respondents believe that it “Spreads dangerous diseases”, 78.1% that it “Pollutes the water source” and only small percentages stated other opinions such as “Not harmful” or did not offer an answer. It is very clear that most citizens understand the effects of disposing human waste into rivers/fields. This is a positive result of education and communication carried out by government for many years in this field.

**Table 5-30** Where is human waste disposed of if there is no private toilet

| If no private toilet than | Thi Cau | | Ninh Xa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % |
| In the river | | | | | 1 | 50.0 | 1 | 6.7 |
| In the waste water system (canal system) | 1 | 8.3 | | | | | 1 | 6.7 |
| Use neighbour's latrine | 3 | 25.0 | | | | | 3 | 20.0 |
| Public Toilet | 4 | 33.3 | | | | | 4 | 26.7 |
| Other | 4 | 33.3 | 1 | 100.0 | 1 | 50.0 | 6 | 40.0 |
| **Total** | **12** | **100** | **1** | **100** | **2** | **100** | **15** | **100** |

**Table 5-31** Opinion about using river/field as a toilet

| Opinion | Thi Cau | Ninh Xa | Suoi Hoa | Kinh Bac | Total | |
|---|---|---|---|---|---|---|
| Spreads dangerous diseases | 98 | 75 | 31 | 52 | **256** | **(86.2 %)** |
| Pollutes the water source | 89 | 70 | 27 | 46 | **232** | **(78.1%)** |
| Not harmful | 5 | 3 | 1 | 7 | **16** | **(5.4%)** |
| Other | 5 | 10 | | 6 | **21** | **(7.1%)** |
| DK/DA | 4 | 1 | 1 | 1 | **7** | **(2.4%)** |
| **Total** | **118** | **78** | **33** | **68** | **297** | |

## 5.5 Evaluation of Sewage Connections and Household Wastewater Drainage

As in the following sketch displaying connection techniques, there are four types of household connections with the public drainage system:

- Type 1: Grade 1 direct connection with the canalisation system of grade 1
- Type 2: Grade 2 direct connection with the canalisation system of grade 2
- Type 3: Grade 3 direct branched connection with the canalisation system
- Type 4: Drainage into surrounding area and not into the public canalisation system

The collection and drainage system in the urban areas of Vietnam is unsystematic and incomplete. This fact is mentioned in the "National strategy for environmental protection up to 2010 and direction to 2020" (10.2003 of Mr. Mai Ai Truc, Minister of Natural Resources and Environment): "*The environment in many urban centres of our country is degraded and polluted because of pollution from the old canalisation and drainage system degraded rapidly and therefore can not meet the demand ; the capacity of collection of solid waste is still not good, on average only 60% - 70% solid waste, especially the harmful solid waste can not be collected and treated based on the regulations.*" Thus, the effects of collection and drainage are still low. At the same time, only a very small percentage of wastewater in Vietnam can be treated before being discharged into the surface water.

According to project documents, the present drainage situation in Bac Ninh City, faces the following "hot" problems:

- The system has sewerage including box sewers and circular sewers discharged into Mo At Lake, channels, ponds and Thi Cau Lake. The canalisation is old, incomplete, and in some cases wastewater is even flowing backward.
- In the city, there are some "hot" points, which are often flooded when it rains heavily: Cong O Intersection, Niem Xa Bridge, Incombank, Dau Ma Road, etc.

On the basis of a report by the Bac Ninh Water Supply and Sewage Company, the company is in charge of Grade 1 and 2 canalisation. The canalisation and Grade 3 sewers and further grade (branch) are in the charge of the communes. Normally, the Grade 1 and 2 systems are

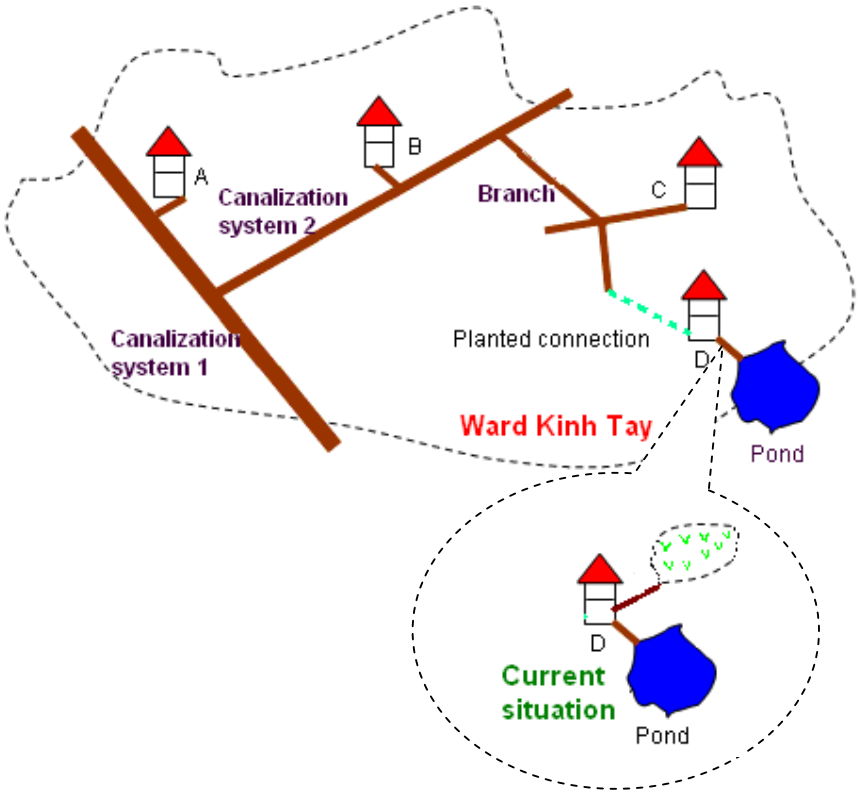
constructed by city authorities and managed by the company. In the table, the wards/communes and main pipelines of the WWM-Project are presented. Four wards are shown in bold letters.

**Table 5-32** WWM-Project in Bac Ninh: Wards and communes in benefitting area

| No. | Ward/commune | Description of positions of pipelines along road |
|---|---|---|
| 1 | Dap Cau Ward | Hoang Quoc Viet, Bac Son and other streets, ... |
| **2** | **Thi Cau Ward** | **Hoang Quoc Viet, Tran Luu, Dau Ma, wastewater pumping station no. 4** |
| 3 | Vu Ninh Ward | Dau Ma, pressure pipes in the field of ThanhSon and PhuongVy (as planned), |
| **4** | **Suoi Hoa Ward** | **Phu Dong Thien Vuong, Nguyen Phi Y Lan, le Van Thinh, Cao Lo Vuong, Nguyen Dang Dao, Ngo Gia Tu, Han Thuyen** |
| 5 | Dai Phuc Ward | Hai Ba Trung (Go do), Le Thai To, Nguyen Dang Dao, Tran Hung Dao (nga 6), Han Thuyen, ... |
| 6 | Tien An Ward | Ngo Gia Tu, Vu Kiet, Nguyen Gia Thieu, Nguyen Dang Dao, Tran Hung Dao, Do Trong Vy (trong cho Nhon) |
| **7** | **Ninh Xa Ward** | **Nguyen Du, Huyen Quang, Nguyen Trai, Le Thai To, Ngo Gia Tu** |
| 8 | Ve An Ward | Thien Duc, Rap hat, Thanh co, Le Phung Hieu, ... |
| **9** | **Kinh Bac Ward** | **Ho Ngoc Lan, Rap hat, Le Phung Hieu, Thien Duc, ...** |
| 10 | Commune Vo Cuong | Ngo Tat To, Hoang Hoa Tham, Nguyen Cao, Ly Anh Tong, ... |

Source: Project document

**Figure 5-11** Sketch of kinds of connection with the public collection and drainage system of urban wastewater



In this part, the connection status of the households surveyed will be studied in regards to two things: (i) Household connection (form and kind of wastewater, canal) and (ii) the drainage situation in the home street as well as the awareness of respondents about wastewater.

### 5.5.1 The Status of Household Connection and Wastewater Drainage

#### 5.5.1.1 How is the Household's Drainage System Connected?

Based on the following tables, it can be seen that around 90% of households are connected to the public system (Table 5-33). The percentage of households discharging wastewater into rivers, open channels, ponds, lakes, etc is nearly 10% in Kinh Bac Ward and Thi Cau Ward. The percentage of households discharging wastewater into gardens, and allowing infiltration into soil, etc is very small in Thi Cau, Ninh Xa and Kinh Bac Ward. In Suoi Hoa Ward, a new ward with good (modern) infrastructure, there is a high capacity for waste collection and drainage. In the other three wards, the percentage of wastewater which cannot be managed in the public system is about 7% in Thi Cau Ward, 15% in Kinh Bac Ward and approximately 4% in Ninh Xa Ward. The company should check on those households which do not discharge wastewater into the public drainage system. If the reason for their behaviour is found to be a lack of a nearby tertiary sewer for connection, then the company can work with the ward and sub-ward to convince the households to construct the tertiary sewer. In the worst case scenario, the company can financially support construction in these cases.

**Table 5-33** Discharge wastewater (not from toilet)

| To where discharge wastewater | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Public drainage system | 128 | *88.9* | 97 | *90.7* | 38 | *97.4* | 79 | *83.2* | **342** | ***88.8*** |
| Public road | 3 | 2.0 | 6 | 5.6 | 1 | 2.6 | 1 | 1.1 | **11** | **2.9** |
| River, open channel, pond or lake | 6 | 4.2 | 1 | 0.9 | | | 9 | 9.5 | **16** | **4.2** |
| Infiltrate into the soil, flow into garden | 4 | 2.8 | 3 | 2.8 | | | 5 | 5.3 | **12** | **3.1** |
| River and garden | 1 | 0.7 | | | | | | | **1** | **0.3** |
| DK/DA | 2 | 1.4 | | | | | 1 | 1.1 | **3** | **0.8** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

**Table 5-34** Type of household drainage

| Type of drainage from household | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Open drain | 7 | 5.0 | 11 | 10.5 | | | 4 | 4.3 | **22** | **5.8** |
| Covered drain | 127 | 90.1 | 91 | 86.7 | 37 | 94.9 | 83 | 89.3 | **338** | ***89.4*** |
| Open & covered drain | 5 | 3.6 | 3 | 2.9 | 2 | 5.1 | 6 | 6.5 | **16** | **4.2** |
| DK/DA | 2 | 1.4 | | | | | | | **2** | **0.5** |
| **Total** | **141** | **100** | **105** | **100** | **39** | **100** | **93** | **100** | **378** | **100** |

In Table 5-34, between 86.7% (Ninh Xa Ward) and 94.9% (Suoi Hoa Ward) of households have covered drains. In Thi Cau, Ninh Xa and Kinh Bac Ward there are still approximately 4.3% - 10.5% of households with open drains. Based on IDIs and FGDs, we know that the drainage system in these wards is still not complete. Thus, this situation causes environmental pollution (bad odour) and the problem was re-confirmed in FGD with the heads of the sub-wards.

### 5.5.1.2 Blockage of Wastewater Discharge Pipes

In Bac Ninh, the discharge pipe and sewers have virtually no problems. Only a small percentage of discharge pipes are blocked (Table 5-35). In FGDs and IDIs with heads of the wards, this problem was not mentioned.

**Table 5-35** Blockage of wastewater discharge pipes

| Blockage of wastewater discharge pipes | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 6 | 4.3 | 6 | 5.7 | 3 | 7.7 | 6 | 6.5 | **21** | **5.5** |
| No | 133 | *94.3* | 99 | *93.4* | 36 | *92.3* | 87 | *93.6* | **355** | ***93.7*** |
| DK/DA | 2 | 1.4 | 1 | 0.9 | | | | | **3** | **0.8** |
| **Total** | **141** | **100** | **106** | **100** | **39** | **100** | **93** | **100** | **379** | **100** |

**Table 5-36** Frequency of blockage of wastewater discharge pipes

| Blockage of wastewater discharge pipes | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Usually | 2 | 40.0 | 2 | 28.6 | | | | | **4** | **19.1** |
| Sometimes, rarely | 3 | *60.0* | 5 | *71.4* | 3 | *100.0* | 6 | *100.0* | **17** | ***81.0*** |
| **Total** | **5** | **100** | **7** | **100** | **3** | **100** | **6** | **100** | **21** | **100** |

### 5.5.2 Connections and Drainage in Surrounding Area

Most of respondents confirmed that the general drainage situation in the area varies from average good. The remaining 20-30% of drainage is bad (Table 5-37).

**Table 5-37** Drainage situation in surrounding area

| Drainage situation in surrounding area | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | N | % | n | % |
| Good | 78 | *54.2* | 42 | *39.3* | 20 | *51.3* | 49 | *51.6* | **189** | ***49.1*** |
| Normal | 31 | 21.5 | 32 | 29.9 | 12 | 30.8 | 24 | 25.3 | **99** | **25.7** |
| Bad | 32 | 22.2 | 31 | 29.0 | 7 | 18.0 | 22 | 23.2 | **92** | **23.9** |
| DK/DA | 3 | 2.1 | 2 | 1.9 | | | | | **5** | **1.3** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

We wanted, however, to examine this problem in IDIs and FGDs.

**Thi Cau Ward:** The drainage system is still incomplete. A number of sub-wards are still characterized by difficult economic conditions. They were, therefore, only able to build open drains (sewer), causing environmental pollution.

**Kinh Bac Ward:**

- Mrs. Pham Thi Binh, second chairman of the ward, listed all the facts: "*Kinh Bac Ward is located in the western part of the city and has the area's lowest elevation. Therefore wastewater from everywhere runs into here. For example, wastewater from Niem Xa runs into the sewer, wastewater from both Co Niem and Yen Man runs into the pond Ao Dinh, wastewater from Thuy Chung runs into public drainage, and the wastewater of Y Na runs into the pond Ao Diem. The Niem Xa area collects all wastewater into the Co Niem drainage, then runs into the field of Co Niem causing bad odours.*"
- *Mrs. Nguyen Thu Ha, chairman of the women's union, stated:*

+ There is no drainage system in Niem Xa leading to the public system. All wastewater runs into the fields, causing crop pollution.
+ Wastewater from hamlets and villages runs into the fields instead of discharging into public drainage.
+ Flooding sometimes lasts for several hours in Cau Cang (Niem Xa). If flooding occurs, people must inform the company so that the problem is solved immediately.

In FGDs, the heads of the sub-wards as well as the people are very angry about the wastewater situation in Niem Xa, because it is the so-called collection place for wastewater from the whole city and there are no drainage possibilities. Wastewater damages the paddy and crops and is an urgent problem. People think that the government and community should cooperate to solve this problem.

**Suoi Hoa Ward:**

- Based on the discussion with Mr. Nguyen The Nho, head of Sub-ward 1, we know: *"The percentage of households connected to the public system is 90%. The remaining 10% discharge wastewater into ponds and the surrounding area. This 10% is mostly concentrated in the residential area of Nong San and along the railway. They discharge wastewater directly into the fields and there is sometimes flooding and no drainage during heavy rains."*
- Mrs. Tran Thi Luu, representative of the women's union, said: "*The residential area Nong San doesn't have a drainage system. Therefore there is always flooding, which lasts for several hours during the rainy season.*"
- In FGDs with household representatives, people talked about the drainage situation in the residential areas.
  + The drainage situation in the residential areas is bad, and the sewer system in Mai Bang has problems. The sewer floor does not have a concrete layer, and therefore wastewater leeks into the soil. There are difficulties when cleaning the sewer as the drain does not have a gradient, leading water to run backwards.
  + If the manhole cover is broken, nearby households replace/repair it so that there are no bad odours. Some households have a low level of awareness in regards to protecting the environment - they throw waste everywhere, sometimes directly into the public drainage system.
  + The drainage canal behind the houses is in poor condition and the people have proposed solutions to the problem. The drainage system should be maintained to prevent flooding. The drainage system seems to be good, but the canalisation on both sides of the street is in bad condition.

**Ninh Xa Ward:**

- Mr. Nguyen Van Oanh, President of the People's Committee, tells us:
  + The drainage system is not good because it is not complete. Even the sewage plans are not complete, particularly in areas between the old and new systems.
  + 100% of households are connected to the public drainage system.
  + There is flooding at the beginning of Nguyen Cao Street, near Road No. 38, and at the Ninh Xa Market.
- Mrs. Tran Ngoc Bich, Vice President of the Women's Union offered the following information:
  + 100% of households have their own drainage system, but it is not good and in some places flooding occurs during the rainy season, for example in the streets Nguyen Cao, Nguyen Van Cu, Nguyen Trai, and the area around market Do Xa.
  + There is flooding, no drainage/bad drainage in small streets, alleys, etc.

It is clear that the drainage situation in the residential area is a "hot" problem and should be addressed in the framework of the WWM-project. In the case of breakdowns in the drainage system, the type of system (grade 1, 2, 3 or branch in Figure 5-11) determines whether the

problem is managed by the community, or whether they must inform the company. Results are shown in Table 5-38.

**Table 5-38** What is done if the local drainage system has a problem

| If the local system has a problem, what should be done? | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Repaired by the whole neighbourhood | 65 | *45.1* | 39 | 36.8 | 7 | 18.0 | 24 | 25.3 | **135** | **35.1** |
| Inform the Company | 64 | 44.4 | 45 | *42.5* | 25 | *64.1* | 58 | *61.1* | **192** | ***50.0*** |
| Do nothing | 1 | 0.7 | 1 | 0.9 | 1 | 2.6 | 1 | 1.1 | **4** | **1.0** |
| Repair + Inform company | 8 | 5.6 | 14 | 13.2 | | | 7 | 7.4 | **29** | **7.6** |
| DK/DA | 6 | 4.2 | 7 | 6.6 | 6 | 15.4 | 5 | 5.3 | **24** | **6.3** |
| **Total** | **144** | **100** | **106** | **100** | **39** | **100** | **95** | **100** | **384** | **100** |

### 5.5.3 Citizen Awareness Regarding Wastewater (Pollution, Treatment and Fee)

#### 5.5.3.1 Which Problems are Caused by Bad Drainage?

In Table 5-39 it is shown that a total of 102 respondents listed the problems causes by bad drainage. These problems can be classified as follows:

- 76.5% (78 of 102 respondents): Bad odour
- 62.7% (64 of 102 respondents): Mosquitoes breeding
- 44.1% (45 of 102 respondents): Spread diseases
- 41.2% (42 of 102 respondents): Flooding
- 35.3% (36 of 102 respondents): Polluted water source.

"Flooding" and "Polluted water source" had lower percentages than other responses. If we analyse these problems by ward, then "Flooding" is ranked as the third problem in Ninh Xa, Kinh Bac and Suoi Hoa Ward. Unfortunately, "Polluted water source", which has a long-term effect on the environment, is designated as the last problem in this evaluation. Hence, the WWM-project and company needs to do more in the campaign to explain this problem.

**Table 5-39** Problems caused by bad drainage

| Phường | | Mosquitoes breeding | Spread diseases | Bad odours | Polluted water sources | Flooding | Total |
|---|---|---|---|---|---|---|---|
| **Thi Cau** | n | 25 | 16 | 24 | 10 | 7 | **39** |
| | % | *64.1* | *41* | *61.5* | 25.6 | 18 | **100** |
| **Ninh Xa** | n | 18 | 16 | 30 | 16 | 20 | **32** |
| | % | *56.3* | 50 | *93.8* | 50 | *62.5* | **100** |
| **Suoi Hoa** | n | 2 | 2 | 5 | 2 | 3 | **8** |
| | % | 25 | 25 | *62.5* | 25 | *37.5* | **100** |
| **Kinh Bac** | n | 19 | 11 | 19 | 8 | 12 | **23** |
| | % | *82.6* | 47.8 | *82.6* | 34.8 | *52.2* | **100** |
| **Total** | **n** | **64** | **45** | **78** | **36** | **42** | **102** |
| | **%** | ***62.8*** | ***44.1*** | ***76.5*** | **35.3** | **41.2** | **100** |

### 5.5.3.2 Knowledge of Respondents about Wastewater Treatment and Wastewater Fee

Environmental pollution is always a critical issue. Accordingly, more than 90% of respondents think that the wastewater should be treated before being returned to the river or sea (Table 5-40).

In Table 5-41 we asked the people why the wastewater is treated before being discharged into the river and sea. Most of the respondents believe (1) "To protect health of household, people & community", (2) "This is obligation of all people to keep the green, clean & beautiful environment" and (3) "Collection and treatment of wastewater is very costly & citizen should have financial contribution". There is a clear difference in level of citizen awareness between Ninh Xa Ward and the other three wards. This result is due to the leaflets from the recent information campaign implemented in Ninh Xa Ward. However, in all wards the final criterion always receives a small percentage (16.2% - 37.8%) in comparison with (1) and (2). Therefore, improvements need to be made in integrating this problem into all campaigns.

We analyse this problem in greater detail in Table 5-42. In comparison to other respondents with lower educational levels, respondents of the group “High School/ Grade 3" are better informed in regards to environmental issues and were more inclined to respond that "collection + treatment is very costly and therefore requires financial contributions of citizens".

In Table 5-43 we present an awareness level analysis in regards to gender and age. The results show that the relation between this criterion and gender + age is not clear. Information campaigns should, therefore, not differentiate between subjects.

**Table 5-40** Awareness of necessity of wastewater treatment prior to discharge into the sea or river

| Necessity of wastewater treatment | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 131 | *91.0* | 98 | *92.5* | 36 | *92.3* | 88 | *92.6* | **353** | ***91.9*** |
| No | 7 | 4.9 | 4 | 3.8 | 2 | 5.1 | 5 | 5.3 | **18** | **4.7** |
| DK/DA | 6 | 4.2 | 4 | 3.8 | 1 | 2.6 | 2 | 2.1 | **13** | **3.4** |
| **Total** | **144** | **100** | **106** | **100** | **39** | **100** | **95** | **100** | **384** | **100** |

**Table 5-41** Knowledge about reasons for wastewater treatment prior to discharge into the sea or rivers – subdivided by ward

| Ward | | To protect health of HH, people & community | This is obligation of all people to keep the green, clean & beautiful environment | Collection + treatment of WW: Very costly & financial contribution of citizens | Other | DK/ DA | Total |
|---|---|---|---|---|---|---|---|
| **Thi Cau** | N | 123 | 85 | 31 | 1 | 2 | **130** |
| | % | 94.6 | 65.4 | 23.9 | 0.8 | 1.5 | **100** |
| **Ninh Xa** | N | 98 | 78 | 37 | | | **98** |
| | % | 100 | 79.6 | 37.8 | 0 | 0 | **100** |
| **Suoi Hoa** | N | 34 | 26 | 6 | | | **37** |
| | % | 91.9 | 70.3 | 16.2 | 0 | 0 | **100** |
| **Kinh Bac** | N | 86 | 61 | 19 | | | **88** |
| | % | 97.7 | 69.3 | 21.6 | 0 | 0 | **100** |
| **Total** | **N** | **341** | **250** | **93** | **1** | **2** | **353** |
| | **%** | **96.6** | **70.8** | **26.4** | **0.3** | **0.6** | **100** |

**Table 5-42** Knowledge about reasons for wastewater treatment prior to discharge into the sea or rivers – subdivided by educational level

| Educational level | | To protect health of HH, people & community | This is obligation of all people to keep the green, clean & beautiful environment | Collection + treatment of WW: Very costly & financial contribution of citizens | Other | DK/ DA | Total |
|---|---|---|---|---|---|---|---|
| **Illiterate** | n | 4 | 2 | | | | **4** |
| | % | 100 | 50 | | | | **100** |
| **Primary (1-5) / Grade 1** | n | 30 | 17 | 5 | | | **30** |
| | % | 100 | 56.7 | 16.7 | | | **100** |
| **Secondary(6-9) / Grade 2** | n | 97 | 71 | 23 | 1 | 2 | **101** |
| | % | 96 | 70.3 | 22.8 | 1 | 2 | **100** |
| **High school (10-12) / Grade 3** | n | 92 | 73 | 39 | | | **96** |
| | % | 95.8 | 76 | **40.6** | | | **100** |
| **Worker** | n | 23 | 17 | 5 | | | **25** |
| | % | 92 | 68 | 20 | | | **100** |
| **College** | n | 55 | 38 | 12 | | | **55** |
| | % | 100 | 69.1 | 21.8 | | | **100** |
| **Bachelor / master degree & higher** | n | 39 | 32 | 9 | | | **41** |
| | % | 95.1 | 78 | 22 | | | **100** |

**Table 5-43** Knowledge about reasons for wastewater treatment prior to discharge into the sea or rivers – subdivided by gender and age group

| Age | Gender | To protect health of household, people & community | This is obligation of all people to keep the green, clean & beautiful environment | Collection and treatment of wastewater is very costly & citizen should have financial contribution | Other | DK/ DA |
|---|---|---|---|---|---|---|
| < 30 | Male | 91.7 | 75 | 33.3 | | |
| | Female | 100 | 70 | 10.0 | | |
| 31 – 40 | Male | 96.2 | 57.7 | 30.8 | | |
| | Female | 89.2 | 78.4 | 18.9 | | |
| 41 – 50 | Male | 100 | 62.9 | 37.1 | | |
| | Female | 94.7 | 71.1 | 13.2 | | 2.6 |
| 51 – 60 | Male | 100 | 84.1 | 43.2 | | |
| | Female | 100 | 65.4 | 21.2 | | |
| 61 – 70 | Male | 97.6 | 66.7 | 33.3 | | |
| | Female | 92.9 | 67.9 | 17.9 | 3.6 | 3.6 |
| > 70 | Male | 95.5 | 72.7 | 22.7 | | |
| | Female | 100 | 100 | 14.3 | | |

The WWM-project and company can be pleased by the results of Table 5-44 through Table 5-49. Some relevant remarks:

- More than 90% of respondents think that the community and households have to pay for wastewater treatment. It is notable, however, that 11.9% of retailers with small businesses

such as pho restaurants, and 7.4% of housewives do not agree with this opinion (Table 5-46). This sector is responsible for the most wastewater.

- The results of the bidding game for calculating the wastewater fee fluctuate between 1,875 – 2,337 VND/$m^3$. WTP of Kinh Bac Ward was the highest. The median was 1,500 and 2,000 VND/$m^3$.
- The "rich" households are willing to pay more (Figure 5-12).
- Over 90% of respondents are ready to sign a contract for connection rights if the wastewater treatment system is in operation (Table 5-47).

**Table 5-44** Community has to pay for wastewater treatment

| Community has to pay for WW treatment | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 141 | *97.9* | 103 | *97.2* | 38 | *97.4* | 94 | *99.0* | **376** | ***97.9*** |
| No | 1 | 0.7 | 1 | 0.9 | | | 1 | 1.1 | **3** | **0.8** |
| DK/DA | 2 | 1.4 | 2 | 1.9 | 1 | 2.6 | | | **5** | **1.3** |
| **Total** | **144** | **100** | **106** | **100** | **39** | **100** | **95** | **100** | **384** | **100** |

**Table 5-45** Households have to pay for wastewater treatment

| HH has to pay for WW treatment | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 129 | *89.6* | 94 | *87.9* | 36 | *92.3* | 86 | *90.5* | **345** | ***89.6*** |
| No | 14 | 9.7 | 8 | 7.5 | 2 | 5.1 | 4 | 4.2 | **28** | **7.3** |
| DK/DA | 1 | 0.7 | 5 | 4.7 | 1 | 2.6 | 5 | 5.3 | **12** | **3.1** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

**Table 5-46** Households have to pay for wastewater treatment: Subdivided by profession

| Profession | Yes | | No | | DK/DA | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Employee, official | 43 | 12.5 | 3 | 10.7 | | |
| Worker | 46 | 13.3 | 1 | 3.6 | | |
| Small private business (restaurant (pho, rice, ...), beer | 69 | 20.0 | 10 | *35.7* | 5 | *41.7* |
| Farming | 18 | 5.2 | 2 | 7.1 | | |
| Business (company, ...) | 9 | 2.6 | | | 1 | 8.3 |
| House duties | 47 | 13.6 | 4 | 14.3 | 3 | 25.0 |
| Pensioner | 102 | *29.6* | 7 | 25.0 | 2 | 16.7 |
| Other | 11 | 3.2 | 1 | 3.6 | 1 | 8.3 |
| **Total** | **345** | **100** | **28** | **100** | **12** | **100** |

**Table 5-47** Willingness to sign the connecting contract

| Connecting contract? | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 134 | *95.7* | 100 | *94.3* | 39 | *100.0* | 88 | *94.6* | **361** | ***95.5*** |
| No | 3 | 2.1 | 2 | 1.9 | | | 2 | 2.2 | **7** | **1.9** |
| DK/DA | 3 | 2.1 | 4 | 3.8 | | | 3 | 3.2 | **10** | **2.7** |
| **Total** | **140** | **100** | **106** | **100** | **39** | **100** | **93** | **100** | **378** | **100** |

**Figure 5-12** The results of bidding game for wastewater price

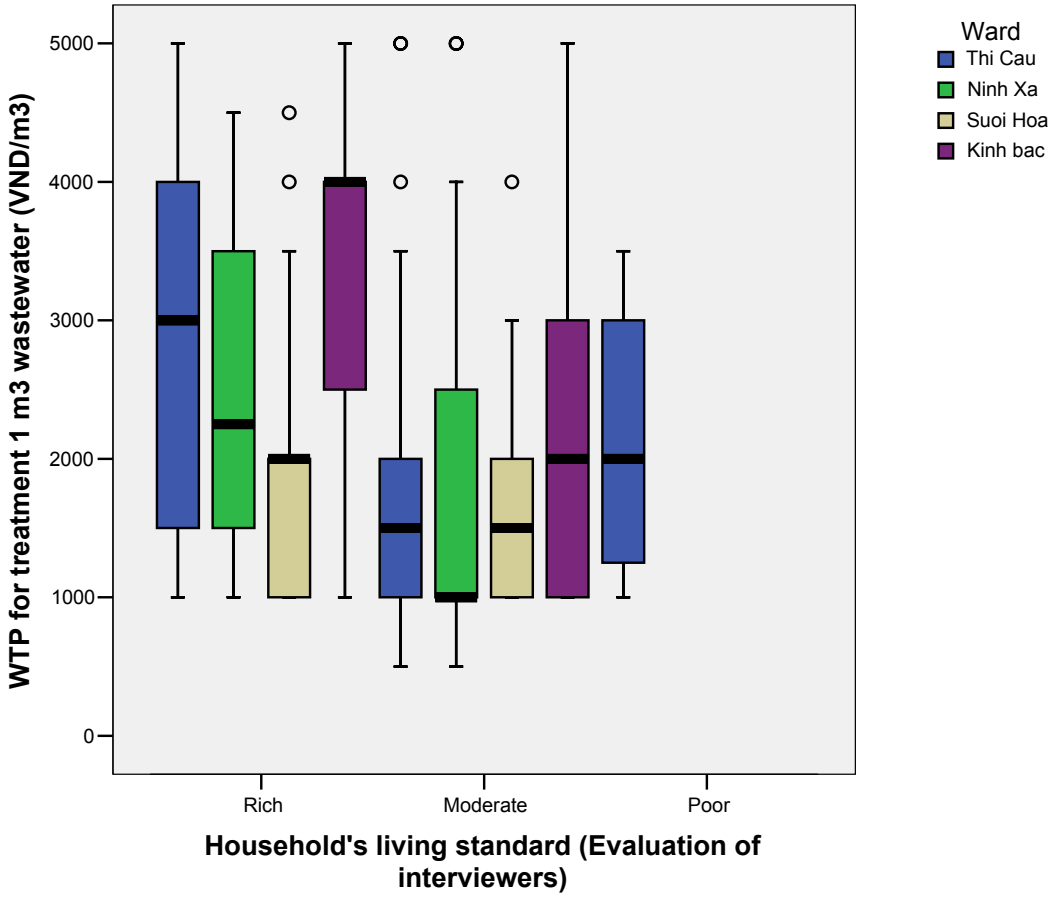



**Table 5-48** WTP for treatment of 1 $m^3$ wastewater

| Ward | Statistical data | WTP |
|---|---|---|
| **Thi Cau** | Minimum | 500 |
| | Maximum | 5000 |
| | Mean | ***1992*** |
| | Median | 1500 |
| | Mode | 1000 |
| | n | 121 |
| **Ninh Xa** | Minimum | 500 |
| | Maximum | 5000 |
| | Mean | ***1989*** |
| | Median | 1500 |
| | Mode | 1000 |
| | n | 92 |
| **Suoi Hoa** | Minimum | 1000 |
| | Maximum | 4500 |
| | Mean | ***1875*** |
| | Median | 1750 |

| Ward | Statistical data | WTP |
|---|---|---|
| | Mode | 1000 |
| | n | 32 |
| **Kinh Bac** | Minimum | 1000 |
| | Maximum | 5000 |
| | Mean | ***2338*** |
| | Median | 2000 |
| | Mode | 1000 |
| | n | 74 |
| **Bac Ninh city** | Minimum | **500** |

## 5.6 Evaluation of Solid Waste Disposal in Drainage System

Table 5-49 shows that there is still a problem regarding the disposal of solid waste into the drainage system. In IDIs and GFDs, the status of solid waste disposal in the wards was said to be as follows:

- Mr. Le Quang Hung, working in the heath care department of Thi Cau Ward, said: "*As the ward is located on high terrain, the environmental situation is quite clean. Every day, people from the urban management company come and collect the solid waste. Generally, the level of awareness among the people is good, and every household has its own dustbin, so that people don't throw the solid waste into the street and sidewalk. Normally, they empty the dustbin regularly. In Sub-ward 7, however, there is always some water stagnation. Sometimes we receive four complaints about water stagnation.*"
- Mr. Nguyen Quyet, head of the heath care department of Kinh Bac Ward, informed: "*The environmental situation is not good because the ward is still in a building period. It is very noisy and dusty. The drainage system is always blocked. Solid waste has not been completely collected yet. In some places, the households don't want to pay the solid waste fee, therefore the solid waste is still thrown everywhere (especially in the large places). Up to now the ward doesn't have sanctions against this type of behaviour*".
- In FGDs in Suoi Hoa Ward, there were a number of remarks:
  + The solid waste must be completely collected and reused in order to avoid pollution and blockage of the sewers.
  + There is a great need for public dustbins located in the right places so that everyone can dispose of their solid waste conveniently.
- In FGDs in Ninh Xa Ward, there were also a number of ideas:
  + People are aware of how to protect the city's sewer system by maintaining manhole covers and avoiding the disposal of solid waste into the sewer system
  + People are aware that they should collect all solid waste. They should throw the solid waste into the regulated places for solid waste storage in a timely manner, and not in or near the drainage system.
  + The ward has plans for cleaning the environment and collecting solid waste as well as wastewater.

**Table 5-49** Frequency of solid waste disposal in the sewer system

| Frequency | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Usually | 22 | 15.3 | 8 | 7.5 | 3 | 7.7 | 10 | 10.5 | **43** | **11.1** |
| Sometimes | 29 | 20.1 | 14 | 13.1 | 4 | 10.3 | 11 | 11.6 | **58** | **15.1** |
| Never | 87 | *60.4* | 85 | *79.4* | 31 | *79.5* | 73 | *76.8* | **276** | ***71.7*** |
| DK/DA | 6 | 4.2 | | | 1 | 2.6 | 1 | 1.1 | **8** | **2.1** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

## 5.7 Evaluation of Information, Education and Communication

The ICE activities are very important for raising public awareness. In the next part we deal with the related issues.

### 5.7.1 TV and Radio

Today, TV is considered a “live newspaper” for people. Nearly 100% of households have a television. Due to the content and form of TV programs, they have become increasingly attractive and varied. Major TV programs such as VTV 1, 2 and 3 are watched more often than Bac Ninh's TV programs. About 89.7% of respondents answered that they watch central TV programs (VTV 1, 2, 3) every day, but only 51.3% answered that they watch Bac Ninh TV programs.

**Table 5-50** Frequency of watching TV program

| Programs | Frequency | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | n | % | n | % |
| VTV 1,2,3 | Every day | 124 | 87.9 | 98 | 92.5 | 35 | 92.1 | 81 | 88.0 | 338 | **89.7** |
| | 4-6 days | 7 | 5.0 | 1 | 0.9 | 3 | 7.9 | 5 | 5.4 | 16 | 4.2 |
| | 1-3 days | 8 | 5.7 | 7 | 6.6 | | | 6 | 6.5 | 21 | 5.6 |
| | Never | 2 | 1.4 | | | | | | | 2 | 0.5 |
| | **Total** | **141** | **100.0** | **106** | **100.0** | **38** | **100.0** | **92** | **100.0** | **377** | **100.0** |
| Bac Ninh | Every day | 69 | 48.6 | 64 | 60.4 | 19 | 50.0 | 42 | 45.7 | 194 | **51.3** |
| | 4-6 days | 18 | 12.7 | 3 | 2.8 | 2 | 5.3 | 9 | 9.8 | 32 | 8.5 |
| | 1-3 days | 39 | 27.5 | 29 | 27.4 | 10 | 26.3 | 31 | 33.7 | 109 | 28.8 |
| | Never | 16 | 11.3 | 10 | 9.4 | 7 | 18.4 | 10 | 10.9 | 43 | 11.4 |
| | **Total** | **142** | **100.0** | **106** | **100.0** | **38** | **100.0** | **92** | **100.0** | **378** | **100.0** |

The percentage of households with radios is relatively small (less than 25% of households). Today, radio seems to be backwards in comparison to other communication facilities. In its role as a “speaking newspaper”, however, radio has particular advantages when compared to other communication technologies.

**Table 5-51** Frequency of radio listening

| Own a radio | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Yes | 39 | 27.1 | 24 | 22.4 | 15 | 38.5 | 20 | 21.1 | 98 | 25.5 |
| No | 104 | 72.2 | 82 | 76.6 | 24 | 61.5 | 75 | 78.9 | 285 | 74.0 |
| DK/DA | 1 | 0.7 | 1 | 0.9 | | | | | 2 | 0.5 |
| **Total** | **144** | **100.0** | **107** | **100.0** | **39** | **100.0** | **95** | **100.0** | **385** | **100.0** |

**Table 5-52** Frequency of radio listening

| Frequency | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Every day | 22 | 61.1 | 18 | 78.3 | 10 | 66.7 | 12 | 60.0 | 62 | 66.0 |
| 4-6 days | 6 | 16.7 | 1 | 4.3 | 3 | 20.0 | 3 | 15.0 | 13 | 13.8 |
| 1-3 days | 8 | 22.2 | 4 | 17.4 | 1 | 6.7 | 5 | 25.0 | 18 | 19.1 |
| Never | | | | | 1 | 6.7 | | | 1 | 1.1 |
| **Total** | **36** | **100.0** | **23** | **100.0** | **15** | **100.0** | **20** | **100.0** | **94** | **100.0** |

### 5.7.2 Receiving Information about Tap Water and Wastewater

Based on the results of Table 5-53 and Table 5-54, we can analyse the number and percentage of "households which got information on pipe water and wastewater" over the last six months. The number of households receiving information on pipe water, however, is higher than the number of households receiving information on wastewater. Among the four wards studied, information dissemination in Suoi Hoa Ward was most sparse. In the final community campaign about wastewater, the company distributed leaflets in Ninh Xa Ward. In Table 5-54 we could clearly see that households in Ninh Xa Ward received the most information on both tap water and wastewater (73.8% and 51.4% respectively). Until now, information had only been provided once to people (Table 5-46).

**Table 5-53** Received information about water supply and wastewater within the last 6 months

| Received information | | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n | % | N | % | n | % | n | % | n | % |
| Information about water supply | Yes | *111* | *77.6* | *79* | *73.8* | *22* | *56.4* | *61* | *64.2* | ***273*** | ***71.1*** |
| | No | 31 | 21.7 | 27 | 25.2 | 14 | 35.9 | 33 | 34.7 | **105** | **27.3** |
| | DK/DA | 1 | 0.7 | 1 | 0.9 | 3 | 7.7 | 1 | 1.1 | **6** | **1.6** |
| | **Total** | **143** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **384** | **100** |
| Information about wastewater | Yes | 65 | 45.1 | 55 | 51.4 | 15 | 38.5 | 46 | 48.9 | **181** | **47.1** |
| | No | *79* | *54.9* | *49* | *45.8* | *21* | *53.9* | *47* | *50.0* | ***196*** | ***51.0*** |
| | DK/DA | | | 3 | 2.8 | 3 | 7.7 | 1 | 1.1 | **7** | **1.8** |
| | **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **94** | **100** | **384** | **100** |

**Table 5-54** Frequency of receiving information on tap water

| Frequency | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| 1 time | 95 | *86.4* | 72 | *91.1* | 18 | *78.3* | 54 | *88.5* | **239** | ***87.6*** |
| 2-3 times | 10 | 9.1 | 2 | 2.5 | 2 | 8.7 | 5 | 8.2 | **19** | **7.0** |
| 4- 5 times | 2 | 1.8 | | | | | | | **2** | **0.6** |
| > 5 times | 3 | 2.7 | 2 | 2.5 | 1 | 4.4 | | | **6** | **2.2** |
| DK/DA | | | 3 | 3.8 | 2 | 8.7 | 2 | 3.3 | **7** | **2.6** |
| **Total** | **110** | **100** | **79** | **100** | **23** | **100** | **61** | **100** | **273** | **100** |

**Table 5-55** Frequency of receiving information on wastewater

| Frequency | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| 1 time | 58 | *70.7* | 49 | *80.3* | 13 | *72.2* | 40 | *83.3* | **160** | ***76.6*** |
| 2 - 3 times | 7 | 8.5 | 2 | 3.3 | 1 | 5.6 | 4 | 8.3 | **14** | **6.7** |
| 4 - 5 times | | | 1 | 1.6 | | | | | **1** | **0.5** |
| > 5 times | 1 | 1.2 | 2 | 3.3 | 1 | 5.6 | | | **4** | **1.9** |
| DK/DA | 16 | 19.5 | 7 | 11.5 | 3 | 16.7 | 4 | 8.3 | **30** | **14.4** |
| **Total** | **82** | **100** | **61** | **100** | **18** | **100** | **48** | **100** | **209** | **100** |

### 5.7.3 Customer Regulations and Leaflets about Wastewater

*Receiving customer regulations.* In Table 5-56, it is evident that the percentage of respondents who received the customer regulations was highest in Thi Cau Ward (83.7%) and lowest in Suoi Hoa Ward (56.4%). In comparison, most respondents in Kinh Bac and Ninh Xa Ward answered that they had already read the regulations (66.7% and 64.8%, respectively).

*Receiving and reading leaflets about wastewater.* Table 5-57 shows that most respondents of Ninh Xa Ward received the information and also read it (50% and 53%, respectively). In other wards, this percentage was lower. The people were aware that the leaflet contains information about the rights and obligations for discharging wastewater (Table 5-57). However, the percentage of respondents who knew about the "Right in discharging wastewater" was higher than those who knew about the "Obligation in discharging wastewater" (93.6% and 70.8%, respectively). Some respondents believed that they had received information about the "construction/plan of a wastewater treatment system", "wastewater treatment", etc. In the next campaign, activities concerning the wastewater fee, company and WWM should focus more on information about the "Obligation in discharging wastewater".

**Table 5-56** Received and read customer regulations

| Received & read | | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | n | % | N | % |
| Got customer regulations | Yes | 118 | *83.7* | 75 | *70.8* | 22 | *56.4* | 61 | *65.6* | **276** | ***72.8*** |
| | No | 23 | 16.3 | 31 | 29.3 | 17 | 43.6 | 32 | 34.4 | **103** | **27.2** |
| | **Total** | **141** | **100** | **106** | **100** | **39** | **100** | **93** | **100** | **379** | **100** |
| Read customer regulations | Yes | 68 | *51.1* | 59 | *64.8* | 12 | 33.3 | 46 | *66.7* | **185** | ***56.2*** |
| | No | 65 | 48.9 | 32 | 35.2 | 24 | *66.7* | 23 | 33.3 | **144** | **43.8** |
| | **Total** | **133** | **100** | **91** | **100** | **36** | **100** | **69** | **100** | **329** | **100** |

**Table 5-57** Received and read flyer "Water & Wastewater"

| Received & read | | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | n | % | N | % |
| Got flyer | Yes | 62 | 44.9 | 52 | *50.0* | 18 | 48.7 | 42 | 45.2 | **174** | **46.8** |
| | No | 76 | *55.1* | 52 | *50.0* | 19 | *51.4* | 51 | *54.8* | **198** | ***53.2*** |
| | **Total** | **138** | **100** | **104** | **100** | **37** | **100** | **93** | **100** | **372** | **100** |
| Read flyer | Yes | 41 | 36.0 | 44 | *53.0* | 10 | 31.3 | 30 | 47.6 | **125** | **42.8** |
| | No | 73 | *64.0* | 39 | 47.0 | 22 | *68.8* | 33 | *52.4* | **167** | ***57.2*** |
| | **Total** | **114** | **100** | **83** | **100** | **32** | **100** | **63** | **100** | **292** | **100** |

**Table 5-58** Received information about wastewater management

| Information on waste water | Ward/Commune | | | | Total |
|---|---|---|---|---|---|
| | Thi Cau | Ninh Xa | Suoi Hoa | Kinh Bac | |
| Right in discharging wastewater | 60 | 51 | 12 | 37 | **160** |
| Response % | 89.6 | 100.0 | 85.7 | 94.9 | ***93.6*** |
| Obligation in discharging wastewater | 45 | 37 | 9 | 30 | **121** |
| Response % | 67.2 | 72.5 | 64.3 | 76.9 | ***70.8*** |

*Who did they get this information from?* The previously mentioned information was received from the Bac Ninh Water Supply and Sewage Company (93.2%), through the loudspeaker system (46.6%), by respected persons in the ward (36.6%) and neighbours/friends (32.1%) as presented in Table 5-59. Radio and newspaper are ranked as the last information provider.

**Table 5-59** Who did you get the information from?

| From whom? | | Thi Cau | Ninh Xa | Suoi Hoa | Kinh Bac | Total | |
|---|---|---|---|---|---|---|---|
| Neighbours / Friends | n | 29 | 28 | 5 | 23 | 85 | **32.1%** |
| | % | 34.1 | 32.9 | 5.9 | 27.1 | 100 | |
| Company for WS & WWM Bac Ninh | n | 101 | 70 | 21 | 55 | 247 | **93.2%** |
| | % | 40.9 | 28.3 | 8.5 | 22.3 | 100 | |
| Health communicator / volunteer | n | 5 | 12 | 5 | 2 | 24 | 9.1% |
| | % | 20.8 | 50 | 20.8 | 8.3 | 100 | |
| Respected persons in the ward | n | 42 | 29 | 9 | 17 | 97 | **36.6%** |
| | % | 43.3 | 29.9 | 9.3 | 17.5 | 100 | |
| TV | n | 26 | 5 | 6 | 15 | 52 | 19.6% |
| | % | 50 | 9.6 | 11.5 | 28.8 | 100 | |
| Radio | n | 2 | | | | 2 | 0.8% |
| | % | 100 | | | | 100 | |
| Newspaper | n | 2 | | 1 | 1 | 4 | 1.5% |
| | % | 50 | | 25 | 25 | 100 | |
| Loudspeaker | n | 61 | 31 | 8 | 24 | 124 | 46.8% |
| | % | 49.2 | 25 | 6.5 | 19.4 | 100 | |

### 5.7.4 Evaluation of Communication Channels

#### 5.7.4.1 Where Does the Information Come From and Who are the Most Effective Informants?

We are interested in determining who and/or which channels are the most effective and persuasive ways to reach the people. As shown in Table 5-60, the most effective information source, according to the opinions of the people/community, is the “head of sub-ward” as well as “the company” (92.9% in both cases). Additionally, we wanted to check whether there is any difference between male and female respondents. The informants: “head of sub-ward” and company, have the same percentages (Table 5-61), however, the female respondents are of the opinion that the women’s union plays an important role (19.7%), while only 11.5% of the male respondents thought so. In addition, we studied whether these results were affected by educational level or age. The differences were significant (Table 5-62 and Table 5-63).

According to Table 5-64, the company has never organized any public meetings. Only in Thi Cau Ward could 21% of respondents remember a public meeting taking place some months (2- 6 months) before. The company needs to organize meetings and public discussions so that people can know and understand what the company has to do and what difficult problems it is confronting. The company can work closely with the community in cooperating to solve their problems. The situation should be avoided in which each party "goes their own way," where the community and company do different things and have different interests.

**Table 5-60** Who are the community’s information sources?

| Ward | | Head of ward | Head of sub-ward | Com-pany | Health worker | Women's Union | Youth Union | Respective person | Total |
|---|---|---|---|---|---|---|---|---|---|
| Thi Cau | n | 79 | 128 | 128 | 24 | 27 | 2 | 3 | 139 |
| | % | *56.8* | *92.1* | *92.1* | 17.3 | 19.4 | 1.4 | 2.2 | |
| Ninh Xa | n | 58 | 95 | 100 | 19 | 7 | 1 | 10 | 103 |
| | % | *56.3* | *92.2* | *97.1* | 18.5 | 6.8 | 1 | 9.7 | |
| Suoi Hoa | n | 21 | 34 | 33 | 7 | 6 | 2 | 3 | 36 |
| | % | *58.3* | *94.4* | *91.7* | 19.4 | 16.7 | 5.6 | 8.3 | |
| Kinh Bac | n | 46 | 82 | 78 | 20 | 17 | 2 | 8 | 87 |
| | % | *52.9* | *94.3* | *89.7* | 23 | 19.5 | 2.3 | 9.2 | |
| **Total** | **n** | **204** | **339** | **339** | **70** | **57** | **7** | **24** | **365** |
| | **%** | ***55.9*** | ***92.9*** | ***92.9*** | **19.2** | **15.6** | **1.9** | **6.6** | |

**Table 5-61** Who are the community’s information sources? By gender (Unit: %)

| Gender | Head of ward | Head of sub-ward | Company | Health worker | Member of women's Union | Member of Youth Union | Respective person |
|---|---|---|---|---|---|---|---|
| Male | *55.5* | *94.5* | *92.9* | 25.8 | 11.5 | 2.7 | 7.7 |
| Female | *56.3* | *91.3* | *92.9* | 12.6 | 19.7 | 1.1 | 5.5 |

**Table 5-62** Who are the community's information sources? By age (Unit: %)

| Age | Head of ward | Head of sub-ward | Company | Health worker | Member of women's Union | Member of Youth Union | Respective person |
|---|---|---|---|---|---|---|---|
| < 30 | *63.6* | *90.9* | *95.5* | 22.7 | 13.6 | 4.5 | |
| 31 - 40 | *54.8* | *95.2* | *96.8* | 21.0 | 12.9 | 3.2 | 9.7 |
| 41 - 50 | *50.7* | *86.7* | *92.0* | 20.0 | 21.3 | 1.3 | 8 |
| 51 - 60 | *50.5* | *94.2* | *93.2* | 23.3 | 16.5 | 1.0 | 4.9 |
| 61 - 70 | *68.1* | *94.4* | *88.9* | 11.1 | 15.3 | 2.8 | 2.8 |
| > 70 | *54.8* | *96.8* | *93.5* | 16.1 | 6.5 | | 16.1 |

**Table 5-63** Who are the community's information sources? By education level (Unit: %)

| Education | Head of ward | Head of sub-ward | Com-pany | Health worker | Member of Wo-men's Union | Member of Youth Union | Res-pective person |
|---|---|---|---|---|---|---|---|
| Illiterate | *50.0* | *100.0* | *100.0* | | *50.0* | | |
| Primary (1-5) / Grade 1 | *63.6* | *93.9* | *90.9* | 6.1 | 12.1 | 6.1 | 18.2 |
| Secondary (6-9) / Grade 2 | *48.1* | *92.6* | *93.5* | 23.1 | 14.8 | 3.7 | 5.6 |
| High school (10-12) / Grade 3 | *56.7* | *89.7* | *92.8* | 26.8 | 19.6 | | 5.2 |
| Worker | *69.2* | *100.0* | *96.2* | 7.7 | 23.1 | | |
| College | *70.2* | *94.7* | *94.7* | 12.3 | 8.8 | | |
| Bachelor, mater degree | *38.5* | *92.3* | *89.7* | 20.5 | 12.8 | 2.6 | 15.4 |

**Table 5-64** Meeting in ward organised by company

| Meeting in ward | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | N | % | n | % | n | % | n | % |
| Never | 100 | *69.44* | 98 | *91.59* | 36 | *92.31* | 91 | *95.8* | **325** | ***84.42*** |
| < 1 month | | | 1 | 0.93 | | | | | **1** | **0.26** |
| Every 2 months | 1 | 0.69 | 1 | 0.93 | | | | | **2** | **0.52** |
| 2-6 months | 10 | 6.94 | 1 | 0.93 | | | 1 | 1.05 | **12** | **3.12** |
| > 6 months | 20 | 13.89 | 5 | 4.67 | 1 | 2.56 | 1 | 1.05 | **27** | **7.01** |
| DK/DA | 13 | 9.03 | 1 | 0.93 | 2 | 5.13 | 2 | 2.11 | **18** | **4.68** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

### 5.7.4.2 The Loudspeaker System

A loudspeaker system exists in all wards (Table 5-65). This is the community's daily communication channel and is perhaps the easiest way to disseminate information to the people. This traditional communication channel is highly reliable and effective; however, the big issues are broadcasting time and frequency in order to reach as many people as possible so that people can get more information. The most effective broadcasting time is in the afternoon (50.6%) and/or the early morning (39.6%) (Table 5-65). In IDIs and GFDs, respondents proposed specific broadcasting times.

**Figure 5-13** Loudspeaker system in ward

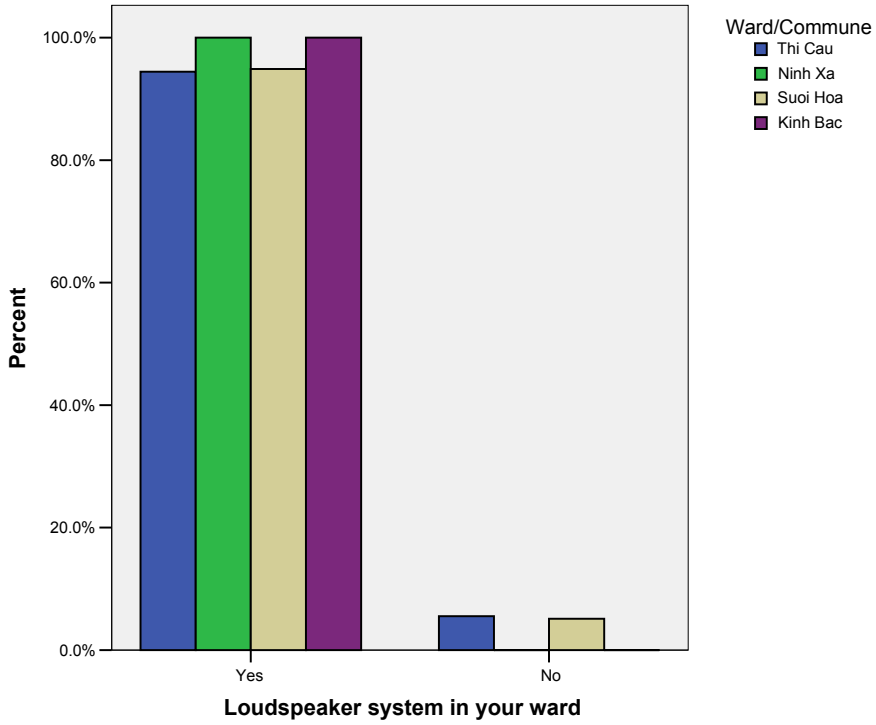



**Table 5-65** The most suitable time for listening to loudspeaker

| Suitable time | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Early Morning | 88 | 38.4 | 70 | 37.8 | 27 | 45.0 | 67 | 41.4 | **252** | **39.6** |
| Mid Morning | 5 | 2.2 | 2 | 1.1 | 1 | 1.7 | | 0.0 | **8** | **1.3** |
| Noon | 6 | 2.6 | 5 | 2.7 | | 0.0 | 4 | 2.5 | **15** | **2.4** |
| Afternoon | 110 | *48.0* | 100 | *54.1* | 30 | *50.0* | 82 | *50.6* | **322** | ***50.6*** |
| Evening | 20 | 8.7 | 8 | 4.3 | 2 | 3.3 | 9 | 5.6 | **39** | **6.1** |
| **Total** | **229** | **100** | **185** | **100** | **60** | **100** | **162** | **100** | **636** | **100** |

### 5.7.4.3 Evaluation of Communication Channels

As shown in Table 5-66, there are different instruments/tools, which the company can use for communicating with households. These channels include:

- "Very effective": Home visit (75.6%)
- "Effective": Loudspeakers (59.9%), neighbourhood meeting (55.8%) and leaflet (49%)
- "Ineffective": Notice board (81.5%), poster (72.1%), radio (71.4%), TV and newsletter.

Information gathered during the IDIs and GFDs suggests that leaflets are currently being used too much. They are distributed everywhere and many people are not interested in reading them. Thus, leaflets should be directly distributed by company staff when they collect water bills. **Error! Reference source not found.**6 shows the differences between wards. In addition to "home visit", "neighbourhood" and "loudspeaker", the next means of communication, depending on ward, could be "leaflet" in Thi Cau, Ninh Xa and Kinh Bac Ward or "TV" in Suoi Hoa Ward.

**Table 5-66** The most effective channels for the company to communicate with people

| Channel | Criterion | Thi Cau | Ninh Xa | Suoi Hoa | Kinh Bac | Total |
|---|---|---|---|---|---|---|
| **Home visit** | Ineffective | 3.9 | 2.1 | 1.3 | 1.6 | 8.8 |
| | Effective | 6.5 | 4.9 | 0.5 | 3.6 | 15.6 |
| | Very effective | 27 | 20.8 | 8.3 | 19.5 | ***75.6*** |
| **Neighbourhood, ward meeting** | Ineffective | 7.5 | 3.1 | 0.5 | 4.7 | 15.8 |
| | Effective | 21.3 | 16.1 | 6.2 | 12.2 | ***55.8*** |
| | Very effective | 8.6 | 8.6 | 3.4 | 7.8 | 28.3 |
| **Loudspeakers** | Ineffective | 7.3 | 3.6 | 3.4 | 2.1 | 16.4 |
| | Effective | 22.9 | 17.4 | 3.6 | 15.9 | ***59.9*** |
| | Very effective | 6.8 | 6.5 | 2.9 | 6.5 | 22.7 |
| | DK/DA | 0.5 | 0.3 | 0.3 | | 1 |
| **Poster** | Ineffective | 29.4 | 21.1 | 6.5 | 15.1 | ***72.1*** |
| | Effective | 7.6 | 6.5 | 3.4 | 8.6 | 26 |
| | Very effective | 0.3 | 0.3 | | 0.8 | 1.3 |
| | DK/DA | 0.3 | | 0.3 | | 0.5 |
| **Leaflet** | Ineffective | 19 | 10.9 | 4.2 | 11.2 | ***45.3*** |
| | Effective | 16.4 | 15.4 | 5.5 | 11.7 | ***49*** |
| | Very effective | 2.1 | 1.6 | 0.3 | 1.3 | 5.2 |
| | DK/DA | | | 0.3 | 0.3 | 0.5 |
| **Notice Board** | Ineffective | 30.7 | 23.4 | 8.1 | 19.3 | ***81.5*** |
| | Effective | 6.8 | 4.2 | 1.8 | 4.9 | 17.7 |
| | Very effective | | 0.3 | | 0.3 | 0.5 |
| | DK/DA | | | 0.3 | | 0.3 |
| **Radio** | Ineffective | 25.8 | 21.9 | 6.5 | 17.2 | ***71.4*** |
| | Effective | 10.9 | 4.7 | 2.6 | 6.3 | 24.5 |
| | Very effective | 0.8 | 1.3 | 0.8 | 1 | 3.9 |
| | DK/DA | | | 0.3 | | 0.3 |
| **TV** | Ineffective | 17.7 | 14.3 | 4.2 | 12 | ***48.2*** |
| | Effective | 17.4 | 11.7 | 3.9 | 8.9 | ***41.9*** |
| | Very effective | 2.3 | 1.8 | 1.8 | 3.6 | 9.6 |
| | DK/DA | | | 0.3 | | 0.3 |
| **Newspaper** | Ineffective | 29.7 | 22.7 | 6.3 | 19.5 | ***78.1*** |
| | Effective | 7.6 | 5.2 | 2.9 | 4.9 | 20.6 |
| | Very effective | 0.3 | | 0.8 | | 1 |
| | DK/DA | | | 0.3 | | 0.3 |
| **Community campaign** | Ineffective | 13.6 | 11.8 | 2.6 | 9.2 | 37.3 |
| | Effective | 15.2 | 10.8 | 5.5 | 11.8 | ***43.3*** |
| | Very effective | 7.9 | 5 | 1.6 | 3.7 | 18.1 |
| | DK/DA | 0.8 | | 0.5 | | 1.3 |

### 5.7.5 Proposals for Communication from IDIs and FGDs

a) Kinh Bac Ward

- Currently, the most effective form of communication is the loudspeaker. With the existing loudspeaker system in the wards and the four local radio stations in the four sub-wards, the wards not only broadcast well within the wards themselves, but can also relay the radio program of the city.
- The broadcasting time is 6.00 – 6.30 am and 5.00 – 5.30 pm. Furthermore, every sub-ward has its own broadcasting time. If there is any document that needs to be broadcast to all the citizens, than the broadcasting time is 6.30 – 7.00 am and 4.00 – 5.40 pm. However, there are some other suggestions, for example at 9.00 am and 3.00 pm or after 6.00 pm (but we should avoid news program).
- Next, wastewater and environmental sanitation were mentioned at the sub-ward meeting. At a mass organizational meeting, the dirty street and hamlet were reported and the households offered pledges concerning the environmental sanitation.
- To strengthen the citizen's contribution to activities related with environmental sanitation, the women's union applied methods such as: Encouraging each other to implement the village regulations, integrating the issues, and becoming a "cultural village"
- Recently, the ward often received information from the Bac Ninh Water Supply and Sewage Company, and took on the task of further dissemination of the information.

b) Ninh Xa Ward

- The main form of communication in this ward is: Loudspeaker, notice board of sub-ward, ward meeting, etc. The most effective communication instrument, however, is the campaign and movements integrated with environmental sanitation in/at the meeting of the women's union organization sub-ward. Two times per week, workers from the health care department have to carry out the campaign to remind the people.
- The direct campaign is of importance. The loudspeaker is very effective, particularly if the broadcasting time is about 5.30 – 6.30 am, 5.00 – 6.00 pm. The women's union was active in carrying out the campaign and sending articles for broadcasting. At every meeting, the head of the organization and sub-ward address issues about environmental sanitation as well as launch movements about regular cleaning and public hygiene in the surrounding area.
- Integration of topics of solid waste, wastewater and environmental sanitation in the group meeting's program.
- A meeting between the company and ward was organized in order to introduce the wastewater project.
- The company has been cooperating with the sub-wards to communicate issues related to environmental sanitation.
- Cooperation between management boards and mass organization in the propagation of clean water and environmental sanitation information. This is a very important topic and requires leadership.
- Need to cooperate with mass organizations such as: Women's Union, Youth Union, leader of sub-ward and health care department for the propagation of clean water and improved environmental sanitation.

c) Suoi Hoa Ward

- Group meetings organized by Women's Union, Union of Elderly People, War Veteran's Union are the most effective instruments.
- Environmental sanitation is considered a criterion in the competition of "new cultural family" and "Family with 4 criteria".
- The ward aids the health care department, youth's union, women's union and head of sub-ward to organize meetings for dissemination of information and enforcement.

- Organizational structure for printing and distributing leaflets/official dispatches to every household.
- For several months, the company has worked closely and efficiently with the ward and has organized a meeting on wastewater drainage and carried out broad dissemination of information on this issue.
- On special occasions such as environmental days, many campaign activities were organized, for example over the loudspeaker and through the use of posters, etc. On Fridays, the staff of the health care department comes and leads the ward and sub-ward in cleaning the streets and surrounding area.
- The communication channels: TV + loudspeaker. If Bac Ninh television channel is used, then the most appropriate time is at 7.45 pm; the loudspeaker should broadcast from 6.00 to 6.30 am and/or from 5.00 to 6.00 pm. The ward should be encouraged to write brief articles about environmental sanitation for broadcasting.

d) Thi Cau Ward

- Every week, the staff of the environmental sanitation department has to inspect the environmental sanitation situation. If they discover any problems, they inform the ward leaders and company. At the same time, they often supervise and speed up this process and offer their own ideas to the ward leaders. They could meet directly with the group heads in order to solve the problem.
- Every year, the ward cooperates with the health care department and organizes one or two activities related to environmental sanitation in order to avoid a number of typical tropical and infectious diseases such as petechial fever.
- The ward's loudspeaker system is very good; broadcasting quality has improved (time and content). The ward arranges the broadcasting of the central radio program (frequency and timing). The ward organizes the writing of 200 articles and broadcasts 250 times on the occasion of important events in the country.
- The ward's People's Committee organizes meetings, guides mass organizations such as the health care department, Youth's union, women's union and heads of sub-ward in dissemination of information directly to households.
- Due to the small budget, the information campaigns are limited.
- According to the opinions of sub-ward heads, the best type of information campaign is face-to-face contact of company staff with households during the collecting of water fees and delivery of leaflets, disseminating information directly from the head of the sub-ward to every household.

## 5.8 Evaluation of Customer Satisfaction with Company's Services

### 5.8.1 Water Supply Service

Table 5-67 shows that 43.1% and 50.7% of respondents are "Very satisfied" and "Satisfied", respectively with the company's water supply service. There are, however, always problems with tap water: Water quality, theft of water meters, and billing/charges **(Error! Reference source not found.**). The company should minimize these problems and try to improve the services.

**Table 5-67** Satisfaction with water supply

| Satisfaction with the water supply | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Not satisfied | 7 | 4.9 | 3 | 2.8 | 2 | 5.1 | 7 | 7.5 | **19** | **5.0** |
| Satisfied | 74 | *51.4* | 49 | 45.8 | 24 | *61.5* | 47 | *50.5* | **194** | ***50.7*** |
| Very Satisfied | 62 | 43.1 | 54 | *50.5* | 12 | 30.8 | 37 | 39.8 | **165** | **43.1** |
| DK/DA | 1 | 0.7 | 1 | 0.9 | 1 | 2.6 | 2 | 2.2 | **5** | **1.3** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **93** | **100** | **383** | **100** |

**Table 5-68** The existing problems related with water supply

| Ward | Problems | Yes | | No | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| Thi Cau | Billing/Charges | 1 | 0.7 | 143 | 99.3 |
| | Incorrect meter reading | 3 | 2.1 | 141 | 97.9 |
| | No water supply | 3 | 2.1 | 141 | 97.9 |
| | Theft of water meter | 1 | 0.7 | 143 | 99.3 |
| | Faulty meter | 8 | 5.6 | 136 | 94.4 |
| | Leaks (before the meter) | | | 144 | 100.0 |
| | Water quality | 15 | 10.4 | 129 | 89.6 |
| | Poor pressure | 1 | 0.7 | 143 | 99.3 |
| | Poor installation of water meter | 1 | 0.7 | 143 | 99.3 |
| Ninh Xa | Billing/Charges | 2 | 1.9 | 104 | 98.1 |
| | Incorrect meter reading | 7 | 6.6 | 99 | 93.4 |
| | No water supply | 3 | 2.8 | 103 | 97.2 |
| | Theft of water meter | 5 | 4.7 | 101 | 95.3 |
| | Faulty meter | 6 | 5.7 | 100 | 94.3 |
| | Leaks (before the meter) | 4 | 3.8 | 102 | 96.2 |
| | Water quality | 14 | 13.2 | 92 | 86.8 |
| | Poor pressure | 6 | 5.7 | 100 | 94.3 |
| | Poor installation of water meter | 2 | 1.9 | 103 | 98.1 |
| Suoi Hoa | Billing/Charges | 4 | 10.5 | 34 | 89.5 |
| | Incorrect meter reading | 3 | 7.9 | 35 | 92.1 |
| | No water supply | 3 | 7.9 | 35 | 92.1 |
| | Theft of water meter | 6 | 15.8 | 32 | 84.2 |
| | Faulty meter | 1 | 2.6 | 37 | 97.4 |
| | Leaks (before the meter) | 3 | 7.9 | 35 | 92.1 |
| | Water quality | 15 | 39.5 | 23 | 60.5 |
| | Poor pressure | 2 | 5.3 | 36 | 94.7 |
| | Poor installation of water meter | 1 | 2.7 | 36 | 97.3 |
| Kinh Bac | Billing/Charges | 2 | 2.2 | 90 | 97.8 |
| | Incorrect meter reading | 3 | 3.3 | 89 | 96.7 |
| | No water supply | 5 | 5.4 | 87 | 94.6 |

| Ward | Problems | Yes | | No | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| | Theft of water meter | 5 | 5.4 | 87 | 94.6 |
| | Faulty meter | 1 | 1.1 | 91 | 98.9 |
| | Leaks (before the meter) | 2 | 2.2 | 90 | 97.8 |
| | Water quality | 22 | 23.9 | 70 | 76.1 |
| | Poor pressure | 6 | 6.5 | 86 | 93.5 |
| | Poor installation of water meter | 4 | 4.3 | 88 | 95.7 |
| **Total** | **Billing/Charges** | **9** | **2.4** | **371** | **97.6** |
| | **Incorrect meter reading** | **16** | **4.2** | **364** | **95.8** |
| | **No water supply** | **14** | **3.7** | **366** | **96.3** |
| | **Theft of water meter** | **17** | **4.5** | **363** | **95.5** |
| | **Faulty meter** | **16** | **4.2** | **364** | **95.8** |
| | **Leaks (before the meter)** | **9** | **2.4** | **371** | **97.6** |
| | **Water quality** | **66** | **17.4** | **314** | **82.6** |
| | **Poor pressure** | **15** | **3.9** | **365** | **96.1** |
| | **Poor installation of water meter** | **8** | **2.1** | **370** | **97.9** |

Table 5-69 shows four existing problems: no water supply, water quality, low water pressure and poor installation, which customers did not complain about, but which were mentioned by a high percentage of respondents (77.6% - 92.3%). Normally the people complained about problems directly related to money, for example billing/charge, incorrect meter reading, leaks, and the theft of water meters. The other problems are critical as well and include issues such as water quality, low water pressure, etc, but these issues were less commonly mentioned. The CCU has to check all cases (households) listed in Table 5-70 (have problem, but have not complained about it to the company).

**Table 5-69** Problems of water supply: Formal complaints registered

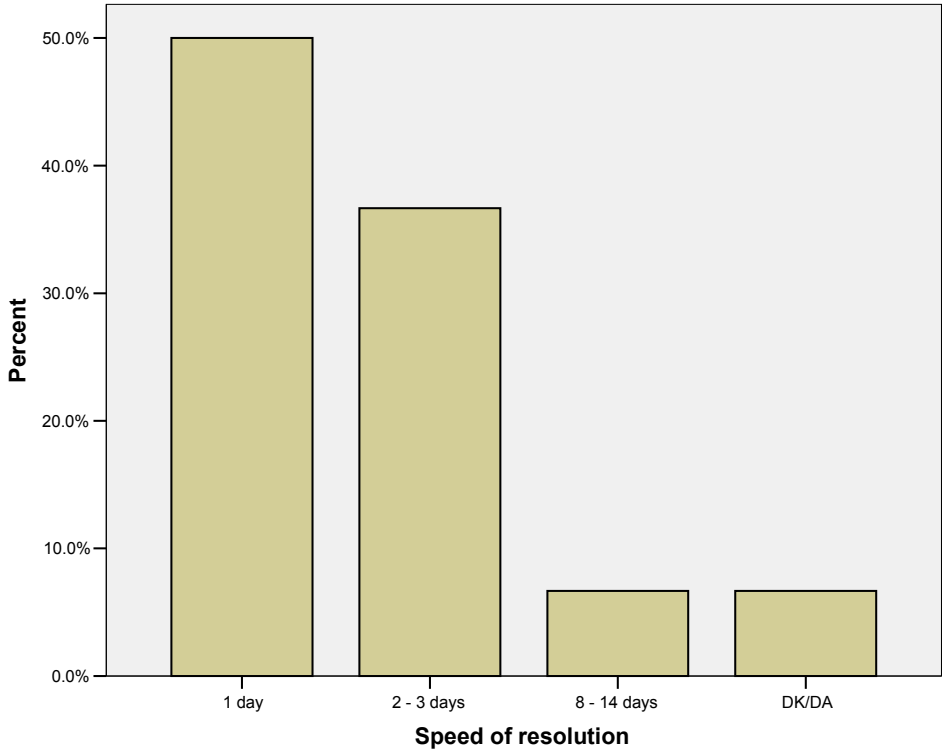
| Problems | Complained | | Not complained | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Billing/Charges | 4 | 50.0 | 4 | 50.0 | 8 | 100 |
| Incorrect meter reading | 7 | 43.8 | 9 | 56.3 | 16 | 100 |
| No water supply | 1 | 7.7 | 12 | ***92.3*** | 13 | 100 |
| Theft of water meter | 7 | 41.2 | 10 | 58.8 | 17 | 100 |
| Faulty meter | 8 | 53.3 | 7 | 46.7 | 15 | 100 |
| Leaks (before the meter) | 4 | 44.4 | 5 | 55.6 | 9 | 100 |
| Water Quality | 7 | 10.6 | 59 | ***89.4*** | 66 | 100 |
| Poor pressure | 2 | 13.3 | 13 | ***86.7*** | 15 | 100 |
| Poor installation | 2 | 22.2 | 7 | ***77.8*** | 9 | 100 |

In Table 5-70, 73.3% of the respondents rated the courtesy of company staff as "good" while 66.7% said that the way their complaints were resolved was "good". The speed of resolution was 1-3 days (Figure 5-14).

**Table 5-70** Evaluation of courtesy level in resolving complaints

| Rating | Rate the courtesy of company staff | | Effectively resolve the complain | |
|---|---|---|---|---|
| | n | % | n | % |
| Good | 22 | 73.3 | 20 | 66.7 |
| Fair | 8 | 26.7 | 7 | 23.3 |
| Poor | | | 2 | 6.7 |
| DK/DA | | | 1 | 3.3 |
| **Total** | **30** | **100** | **30** | **100** |

**Figure 5-14** The speed of resolution




### 5.8.2 Wastewater/Drainage Services

Similar to water supply services, the customers were “satisfied” with the drainage and wastewater services of the company. The main existing problem is bad odour and poor drainage. Because these services are new to people, they are hesitant to complain. Thus there is little data for further analysis. The existing problems included:

- Poor drainage in Ninh Xa Ward (14.29%), Suoi Hoa (10.53%) and Kinh Bac (17.02%)
- Blocked pipes in Kinh Bac Ward (11.70%)
- Bad odour in Thi Cau Ward (12.5%), Kinh Bac (26.60%)

Only a portion of these issues were the subject of formal complaints (Table 5-71).

**Table 5-71** Satisfaction with sewage service

| Satisfaction | Thi Cau | | Ninh Xa | | Suoi Hoa | | Kinh Bac | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | N | % | n | % |
| Not satisfied | 13 | 9.0 | 18 | 16.8 | 2 | 5.1 | 16 | 16.8 | **49** | **12.7** |
| Satisfied | 99 | *68.8* | 58 | *54.2* | 24 | *61.5* | 49 | *51.6* | **230** | ***59.7*** |
| Very Satisfied | 27 | 18.8 | 30 | 28.0 | 10 | 25.6 | 29 | 30.5 | **96** | **24.9** |
| DK/DA | 5 | 3.5 | 1 | 0.9 | 3 | 7.7 | 1 | 1.1 | **10** | **2.6** |
| **Total** | **144** | **100** | **107** | **100** | **39** | **100** | **95** | **100** | **385** | **100** |

**Table 5-72** The existing problems related with wastewater

| Ward | Problems | Yes | | No | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| Thi Cau | Poor Drainage | 6 | 4.2 | 138 | 95.8 |
| | Blocked Pipes | 6 | 4.2 | 138 | 95.8 |
| | Open manhole | 5 | 3.5 | 139 | 96.5 |
| | Flooding | 6 | 4.2 | 138 | 95.8 |
| | Bad odour | 18 | *12.5* | 126 | 87.5 |
| Ninh Xa | Poor Drainage | 15 | *14.3* | 90 | 85.7 |
| | Blocked Pipes | 12 | 11.4 | 93 | 88.6 |
| | Open manhole | 10 | 9.5 | 95 | 90.5 |
| | Flooding | 13 | *12.5* | 91 | 87.5 |
| | Bad odour | 28 | *26.7* | 77 | 73.3 |
| Suoi Hoa | Poor Drainage | 4 | *10.5* | 34 | 89.5 |
| | Blocked Pipes | 2 | 5.3 | 36 | 94.7 |
| | Open manhole | 2 | 5.3 | 36 | 94.7 |
| | Flooding | 5 | *13.2* | 33 | 86.8 |
| | Bad odour | 7 | *18.4* | 31 | 81.6 |
| Kinh Bac | Poor Drainage | 16 | *17.0* | 78 | 83.0 |
| | Blocked Pipes | 11 | *11.7* | 83 | 88.3 |
| | Open manhole | 8 | 8.5 | 86 | 91.5 |
| | Flooding | 8 | 8.5 | 86 | 91.5 |
| | Bad odour | 25 | *26.6* | 69 | 73.4 |
| **Total** | **Poor Drainage** | **41** | ***10.8*** | **340** | **89.2** |
| | **Blocked Pipes** | **31** | **8.1** | **350** | **91.9** |
| | **Open manhole** | **25** | **6.6** | **356** | **93.4** |
| | **Flooding** | **32** | **8.4** | **348** | **91.6** |
| | **Bad odour** | **78** | ***20.50*** | **303** | **79.5** |

**Table 5-73** Wastewater problems: Formal complaints registered

| Problems | Complained | | Still have not complained | |
|---|---|---|---|---|
| | n | % | n | % |
| Poor Drainage | 3 | 7.5 | 37 | 92.5 |
| Blocked Pipes | 3 | 9.7 | 28 | 90.3 |
| Open manhole | 2 | 8.0 | 23 | 92.0 |
| Flooding | 3 | 9.4 | 29 | 90.6 |
| Bad odour | 2 | 2.6 | 76 | 97.4 |

## 6. CONCLUSION AND RECOMMENDATION

*The following are conclusions and recommendations from the baseline study:*

1. *The training program* for conducting the survey was carried out as planned over three days from April 2-4, 2008. CEPAC provided technical assistance to company members on data collection at different levels over an additional 6 days from April 7-12, 2008. The skills provided included: team work and surveying as well as methods for data collection and analysis. It is anticipated that following the training program and survey implementation, the company members should be able to carry out similar studies on a small scale in the future.
2. *The quantitative method* was applied through BLS and was supplemented with qualitative methods. Interviews were conducted using a household questionnaire in 386 households in four wards: Ninh Xa, Thi Cau, Suoi Hoa and Kinh Bac. The average duration of each household interview was 33-40 minutes. Almost 100% of the completed questionnaires were verified in regards to their accuracy. Using the qualitative methodology framework, 18 IDIs and 8 FGDs were conducted, each lasting about one hour.
3. During the household survey, respondents were generally able to provide the necessary information for this study:
   - The gender of respondents was balanced with the total population. The female population is about 46% - 52% in all wards.
   - The age of respondents varied between 41 – 60 years for male (43.8%) and female (52.1%);
   - The educational level of respondents was mostly secondary and high school. In Suoi Hoa Ward, in particular, there was a high percentage of respondents with bachelors/masters degrees or above.
   - The main professions of respondents included working as employees, officials, owners of small private businesses or services, laborers, and pensioners.
   - The average monthly income of most households falls within the region's middle class (28.1% with 1-2 million VND/month, 28.4% with 2.1-3 million VND/month). The income was compared with other information such as: estimation of living standard by respondent and interviewer, household assets, food expenditure.
4. *The use of pipe water* combined with water from drilling and shallow well for drinking/cooking and washing/bathing characterizes the situation in Bac Ninh City. The use of pipe water for drinking and cooking fluctuates between 78.9% (Kinh Bac) and 91.7% (Thị Cau), for washing from 46.3% (Kinh Bac) to 69.2% (Suoi Hoa). Use of rainwater was widespread in earlier years, however, because of the critical air pollution (high dust content and other pollutants) rainwater could not be used for any purpose in the household.

☞ *In the future, the company has to encourage people to use this combination when the water quality from drilling and shallow well is still adequate in order to relax the strain on the water supply situation and to correspond with the current way of life/living standard in Bac Ninh City*

5. The cost of water consumption is 0.9-1.08% of household income. Most of the respondents believe that this current water price is acceptable. They are willing to pay more provided that the water quality is improved and the water supply is stable. Thus, the company has to check its water production technology and set up a long-term strategy for improving the water quality.

☞ *At the same time, the company has a chance to increase the water price if the legal corridor is granted by the provincial people's committee. If water prices were to increase, the maximum amount citizens are willing to pay fluctuates between 3,235 and 3,635 VND/$m^3$.*

6. Types *of toilets*: septic tank toilets account for more than 90% of the toilets among the households surveyed, but there is a small percentage of households without septic tanks (central (off-site) sewage system). Traditional toilets (pit toilet or compost toilet) exist in Bac Ninh City. Reasons for not changing from traditional toilets to newer ones include: "Still waiting for construction of new house", "The old habit of using the manure for fertilization and fish feeding", "The old one is still well functioning". Offering loans for the construction of toilets is a good idea, but people still are hesitant with the loan and refund form.

7. *Most of the septic tank toilets have three chambers.* They were mostly constructed inside the house, but in Thi Cau Ward nearly 20% are located outside the house (garden and yard). 30%-40% of households have septic tank volumes of 3-6 $m^3$. All households generally follow the minimal technical requirements and only let wastewater from their toilets run into the septic tanks and then into the public drains. It is notable, however, that 11.4% of households still discharge the wastewater from their septic tanks into ponds, canals and gardens.

☞ *The company should coordinate with city authorities in order to contact, convince and even support (financially) the households that are still not discharging toilet wastewater into public system. 80% of households do not experience bad odours from their septic tanks and those that do experience bad odours do so only rarely. Septic tanks are only emptied at intervals of over five years or if the tank is full. Up to 75% of households use "septic tank medicine" such as micro phot. In the future, the company has to set up a plan for monitoring the household septic tanks; to recommend and gradually mandate regular emptying of the household septic tanks as well as the collection of all sludge from emptying the septic tank in the wastewater treatment plant.*

8. *The* opinions *related to the use of rivers/fields as toilets are analysed* in Table 5-31, 86.2% of respondents share the opinion that it "Spreads dangerous diseases", 78.1% say it "Pollutes the water source" and only a small percentage have other opinions such as "Not harmful" or declined to answer. It is very clear that most citizens understand the effects of disposing of human waste in rivers/fields. This can be seen as a positive result of ICE in this field carried out by government many years ago.

9. Wastewater collection in Bac Ninh is still complicated. According to statistical analysis, the rate of connection and wastewater collection into public system is approximately 90.7% in Ninh Xa Ward, 88.9% in Thi Cau, 97.4% Suoi Hoa and 83.2% Kinh Bac. The percentage of households discharging wastewater into rivers, canals, ponds, etc is about 9.5%. Most of the household drains connecting to the public system are covered - 90.1% in Thi Cau, 86.7% in Ninh Xa, 94.9% in Suoi Hoa and 89.3% in Kinh Bac. In Ninh Xa Ward, 10.5% of households have open drains. Generally, the tertiary system managed by households and the community still has a number of problems.

☞ *In order to increase the collection rate while maintaining the existing system, the city government has to enforce decrees and general policies as a legal corridor for the company. Based on these guidelines, the community and households have to construct, repair, maintain and complete the tertiary scale and branch drainage system linkages, while the company is in charge of the of 1st and 2nd grade systems.*

10. Households were found which do not discharge wastewater into the public drainage system. The company must investigate on these cases.

- ☞ *If the reason is found to be a lack of a tertiary sewer in the area surrounding the household, then the company can cooperate with the ward and sub-ward to convince households to construct tertiary sewers. In extreme cases, the company can offer these households financial support.*

11. The current drainage and sewage situation around the home/street was evaluated as "not good" (17.9-29.0%). If the drainage system in the home/street area breaks down, then the people or community have to maintain or repair it, or inform the company.

- ☞ *In the FGDs there were a lot of complains about bad drainage in alleys, hamlets, small streets as well as some "black points" of flooding in the city. In the framework of the wastewater project, the company has to combine and solve these problems, or work with local authorities in constructing the drainage system.*

12. The environmental pollution related with wastewater has become increasingly critical, leading 91% of respondents to agree that wastewater should be treated (cleaned) before it returns to the river or sea. The general awareness is that wastewater treatment is necessary for protecting the health of household members, people and the community. This is, however, very costly and the citizens should make a financial contribution. 97% of respondents agree that the community (households, and other institutions e.g. industry, hospitals, markets etc) should pay for wastewater treatment. Approximately 90% of respondents think that households should pay as well. It is notable, however, that 11.9% of retailer, who have small business such as pho restaurants and 7.4% of housewives still do not agree with this opinion. This sector is responsible for producing the most wastewater.

- ☞ *The WWM-unit and company need to carry out different campaigns concerning the collection of a wastewater fee.*

13. In Table 5-41, we asked the people why wastewater is treated. Most respondents think (1) "To protect health of household, people & community", (2) "This is obligation of all people to keep the green, clean & beautiful environment" and (3) "Collection and treatment of wastewater is very costly & citizen should have financial contribution". There is a clear difference in citizen awareness between Ninh Xa Ward and the other three wards. This is due to a previously implemented leaflet campaign in Ninh Xa Ward. However, in all wards the final criterion always received a small percentage (16.2% - 37.8%) in comparison to (1) and (2). Therefore, improvements need to be made in integrating this problem into each campaign. We tried to analyse this problem in further detail (Table 5-41 and Table 5-43). The results show that there is no clear relation between this criterion and gender, age or educational level. Thus, in each campaign no distinction needs to be made in the target group.
14. The willingness to pay (WTP) for wastewater treatment is 2,059 VND/m3. The median is 1,000 VND/m3. Therefore, in order to reach full cost recovery for wastewater treatment in the future, the company has to carry out many activities such as ICE campaigns as well as proposing a legal corridor from the government to enable collecting a wastewater fee.
15. Many people inquired and had doubts about wastewater output following treatment; they want to know about the output quality in comparison with untreated wastewater.

- ☞ *After the treatment system is constructed and operational, the company should organise campaigns by using different communication channels and an "open day" for interested people to visit the system.*

16. Effects of bad drainage include: Bad odour (76.5%), Mosquito breeding (62.7%), spread diseases (44.1%), Flooding (41.2%) and Polluted water source (35.3%). "Flooding" and "Polluted water source" also received lower percentages than these other factors. "Polluted water source", which has a long-term effect on the environment of the whole region is the lowest ranked factor from the evaluation. Hence, the WWM-project and company should try to further explain this problem during the campaign.
17. In order to avoid sewer blockages, there is a great need for public dustbins located in the right places so that everyone is able to dispose of their solid waste conveniently.

18. The percentage of households that received information on tap water over last 6 months is higher than for wastewater (tap water fluctuates between 56.4-77.6%, wastewater 38.5-51.4%). Most respondents were receiving this information for the first time. Based on general knowledge, they had received information on the rights and obligations in the discharging of wastewater. The sources of this information were: Company (93%), Loudspeaker (34-57%), Neighbour/friend (21-37%) and Respective person (28-38%).
19. Based on analysis of different aspects (gender, age and education level of respondents), the most effective and persuasive communication channels are: (i) Company staff visit household, (ii) Neighbourhood meeting and (iii) Loudspeaker. Leaflets must be directly distributed by the company, and if the company uses the loudspeaker system for communication, then the most advantageous broadcasting time in all wards is the early morning and/or afternoon. The company needs to prepare brief, high quality articles related to wastewater to be broadcasted.
20. As shown in Table 5-66, there are different instruments and tools, which the company can use to communicate with households. These include:
    - "Very effective": Home visit (75.6%),.
    - "Effective": Loudspeakers (59.9%), neighbourhood meeting (55.8%) and leaflet (49%)
    - "Ineffective": Notice board (81.5%), poster (72.1%), radio (71.4%), TV and newsletter

☞ *Community campaigns were classified as "effective" so the WWM project and company should improve their community campaigns and the delivery of leaflets as leaflets are often misused (a lot of leaflets are delivered by other companies as well). According to the respondents, the company could even deliver leaflets while collecting the water bill. The company campaign can be integrated with other cultural meetings, competitions, etc. The WWM unit and company should improve their information campaigns so that citizens better understand the wastewater project.*

21. Analysis of the most effective and persuasive informants yields the following results: head of sub-ward (92.9%), the company (92.9%) and head of ward (55.6%). This result holds true when analysed according to different aspects such as gender, age and education level of respondents.
22. Many problems associated with the clean water supply are “officially” complained about, such as: billing/charge, incorrect meter reading and theft of water meter and leaks. Other problems are critical too, such as water quality, low water pressure, etc, but are still among the less common complaints registered by the company. The respondents are satisfied with the services provided by company. The courtesy of company staff is evaluated highly and the speed of resolution falls within 1-3 days. Similar to tap water services, drainage and wastewater services are evaluated as "satisfying" to a high percentage of respondents (51.6 -68.8%). Most complaints are linked to bad odour, blocked pipes and flooding.
23. Table 5-69 shows four existing problems: No water supply, poor water quality, low water pressure and poor installation, which have not been the subject of official complaints, but which are highly prevalent (77.6-92.3%). Normally, people complain about problems directly related with money, for example billing/charges, incorrect meter reading and theft of water meter, and leaks. The people should be encouraged to make use of their right to complain about issues of their concern. This would also foster the CCU of the company and increase their quality of service.
24. In the period from 1997-2000, the city government did not pay enough attention to drainage and wastewater system, canalisation, streets, roads, etc. As the financial budget is limited, the infrastructure could only be repaired or maintained locally. Now these problems play an important role. The point of view of the city government is that people are in charge of the drainage system in their residential area. This means that they worked together on constructing the drainage system for connecting to the public system (grade 1 and 2). Some places in city always have flooding and drainage problem. Difficulties include determining the contribution mechanism - how much will be paid by the

city and how much by households, for example in Phong Khe Commune and Hoa Long. There are also unsolved problems concerning the different kinds of infrastructure (street/road, electricity, traffic, telephone, as well as poor cooperation between departments in planning and construction of infrastructure). In the new residential area, the infrastructure is already completely constructed. The old area has an unsystematic layout and needs to be improved. The city government is supportive of ideas for constructing a decentralized wastewater treatment system.[1]

- *Three important communication means between company and communities are: (i) Home visit of company staff, for example every month the staff goes to households to collect water fees, (ii) Neighbourhood and ward meetings and (iii) Loudspeakers. The information campaign is classified as "effective" in Thi Cau and Kinh Bac Ward. The company has to improve the community campaign and the delivery of leaflets as there are currently many activities of other companies that involve the delivery of leaflets. According to the opinion of respondents, the company can deliver leaflets while collecting the water bill. As Bac Ninh is home to the well-known traditional melody "Quan ho" and every year there is a big competition singing "Quan ho", the wastewater problem can be integrated into this melody or "Quan ho" can be sung with new wastewater lyrics as part of a campaign.*

[1] IDI with Mr. Nguyen Thanh Hung, vice director of Department for city management of Bac Ninh City

## APPENDIX 1 LIST OF PARTICIPANTS IN TRAINING PROGRAM

### From Bac Ninh Water Supply & Sewerage Company

| No. | Name | Unit |
|---|---|---|
| 1 | Nguyen Ngoc Bon | Drainage |
| 2 | Nguyen Vu Hiep | " |
| 3 | Nguyen Đinh Quang | " |
| 4 | Cao Phan Truong | " |
| 5 | Nguyen Thi Huong | " |
| 6 | Phạm Anh Tuan | Network management |
| 7 | Nguyen Van Thuyen | " |
| 8 | Nguyen Van Khoa | " |
| 9 | Nguyen Mau Nhan | " |
| 10 | Nguyen Van Khang | " |
| 11 | Nguyen Thi Hien | CCU |

### From WWM project

- Axel Binder
- Tran Tien Duc

### From CEPAC

- Nguyen Trung Dung
- Nguyen Tuan Anh
- Tran Chien Thang
- Pham Thi Thanh Trang
- Bui Thu Hoa
- Nguyen Thi Hoa
- Phan Thi Hang
- Nguyen Hoang Hoa

## APPENDIX 2 TRAINING PROGRAM IN BAC NINH

# LESSON PLAN

| Time | Content | Method | Materials | Time | Person in charge |
|---|---|---|---|---|---|
| **Day 1**<br>08-11.30 am | Opening ceremony | Ice-breaking | | | |
| | - Welcome guest and participants | | | 10' | CEPAC |
| | - Introduction of BLS | | | 15' | GTZ-Staff |
| | - Objectives and arrangements of the training | | | 10' | CEPAC |
| | - Introduction of the training program | | | 10' | CEPAC |
| | - Pre-Test – Need to refresh the knowledge | | Pre-Test questionnaire | 10' | CEPAC |
| | Tea break and photo taking | | | 30' | |
| | **Session 1**: Participatory approach<br>- Introduction to participatory approach<br>- Examples of water supply, waste water and sanitation in developing countries<br>- Evaluation of pre-test | Presentation<br>Brainstorming | | 50' | CEPAC |
| | Tea break | | | 15' | |
| | **Session 2**: Introduction to the baseline survey of WWM-project in 6 provinces<br>- Baseline study<br>- Knowledge-Attitudes-Practice study<br>- Consumer satisfaction study is [IN] | Presentation<br>Brainstorming | | 40' | CEPAC |
| | *Exercise 1*: Public WC-Practice in cites – What to do? | Working in a group of 3 participants | A1, pens | 25' | CEPAC |
| 11.30-01.30 pm | Lunch together for starting training program | | | 120' | |
| 1.30-4.30 pm | **Session 3**: Survey tools & skills<br>- Quantitative & qualitative data survey<br>- Question: Sort, type, structure<br>- How to design a questionnaire | Presentation<br>Brainstorming | | 60' | CEPAC |
| | Tea break | | | 15' | |

| Time | Content | Method | Materials | Time | Person in charge |
|---|---|---|---|---|---|
| | - Some skills needed for a successful survey | | | 20' | CEPAC |
| | *Exercise 2*: Design a small questionnaire with a given topic | Working in a group of 3 participants | A1, pens | 50' | CEPAC |
| | Tea break | | | 15' | CEPAC |
| | - Presentation of 3 groups<br>- Evaluation of questionnaires | Plenary | A1, pens | 50' | CEPAC |
| **Day 2**<br>7.30-11.30 am | *Exercise 3*: Some solution scenarios in practice | Presentation<br>Brainstorming | | 20' | CEPAC |
| | **Session 3**: Cont'<br>- Practice instruction for qualitative survey | Presentation<br>Brainstorming | A1, pens | 30' | CEPAC |
| | Tea break | | | 10' | |
| | *Exercise 4*: Conducting In-depth interview and evaluation | Fish-bowl | In-depth questionnaire | 20' | CEPAC |
| | **Session 4**: Household questionnaire<br>Understanding the household questionnaire | Presentation | Household questionnaire | 50' | CEPAC |
| | Tea break | | | 10' | |
| | *Exercise 5*: Conducting the household survey | Working in a group of 3 participants & role play | Household questionnaire | 50' | CEPAC |
| | Tea break | | | 10' | |
| | - Evaluation | Plenary | A1, pens, .. | 20' | CEPAC |
| | - Survey plan: Some organizational issues & Survey principles | Brainstorming | A1, pens, .. | 10' | CEPAC |
| 11:30-01.30 am | Lunch | | | 120' | |
| 01.30-04.30 pm | **Session 5**: Field work – Data collection | Field work | | | |
| | - Go to the field and data collection (6 groups) | Deviation in group of 2-3 participants and conduct survey in the real world (selected households) | Household questionnaire | 120' | CEPAC |
| | - Preparation for result presentation (draft report) | Working on presentation | A1, pens | 60' | CEPAC |
| **Day 3**<br>08-11.30 am | **Session 5**: Cont'<br>- Presentation of results from field work and share experiences from the field<br>- What participants have experienced from the field | Plenary<br>Presentation | A1, pens | 60' | CEPAC |

| Time | Content | Method | Materials | Time | Person in charge |
|---|---|---|---|---|---|
| | - Difficulties during conducting survey<br>- How do they cope with difficulties<br>- Finalization of household questionnaire | | | | |
| | Tea break | | | 10' | |
| | **Session 6**: Data processing by SPSS | Presentation<br>Brainstorming | | 45' | CEPAC |
| | Tea break | | | 10' | |
| | **Session 6**: Cont' | | | 45' | CEPAC |
| 11:30-01.30 am | Lunch | | | 120' | |
| 01.30-04.00 pm | **Session 6**: Cont' (IF NEEDED) | | | 50' | |
| | Tea break | | | 10' | |
| | **Session 7**: Writing report<br>- Outlines of report<br>- Use of the report in community project | Presentation | | 50' | CEPAC |
| | Tea break | | | 10' | |
| | Wrap-up, evaluation and close | Plenary | | 30' | CEPAC |

## APPENDIX 3 SURVEY SCHEDULE IN BAC NINH

### Survey schedule

| Ward | Thi Cau | Suoi Hoa | Kinh Bac | Ninh Xa |
|---|---|---|---|---|
| **HH Survey** | | | | |
| **360 HHs (+10%)** | 150 Households | 40 Households | 90 Households | 120 Households |
| **07 – 09 April** | 7 ques/Inter'wer day x9 Inter'wer x 2.5 day | | | |
| **09 April** | | 8 ques/Inter'wer day x 9 Inter'wer x 0.5 day | | |
| **10 – 11 April** | | | 8 ques/Inter'wer day x 9 Inter'wer x 1.5 day | |
| **11 – 12 April** | | | | 9 ques/Inter'wer day x 9 Inter'wer x 1.5 day |
| **IDI & FGD** | | | | |
| **07 April** | 8.00 am 4 IDI<br>7.30 pm 2 FGD | | | |
| **08 April** | | | 9.00 am 4 IDI<br>9.30 am 2 FGD | |
| **09 April** | | 8.00 am 4 IDI<br>7.30 pm 2 FGD | | |
| **11 April** | | | | 8.00 am 4 IDI<br>7.30 pm 2 FGD<br>2 IDIs for Department of construction and Communication |

**Process of implementation of household survey**

| | Thi Cau | Ninh Xa | Suoi Hoa | Kinh Bac |
|---|---|---|---|---|
| 07.04.08 | 36.1% | | | |
| 08.04.08 | 45.1% | | | |
| 09.04.08 | 18.8% | | 97.4% | 1% |
| 10.04.08 | | | 2.6% | 99% |
| 11.04.08 | | 70.1% | | |
| 12.04.08 | | 29.9% | | |

## APPENDIX 4 SURVEY TOOLS

### a) Household questionnaire

| | |
|---|---|
| **Name of City** | Bac Ninh |
| **Company Name** | Bac Ninh Water Supply Sewerage and Drainage One Member Limited Liability Company (WSSD Co., Ltd.) |
| **Ward/Commune** | ..... |
| **Questionnaire Control number** | ..... |
| **Name of Interviewer** | ..... |
| **Address of House** | ..... |
| **Location of house of respondent** (Fulfilled by interviewer) | 1 □ Located **near** the main sewage system (along the main street)<br>2 □ Located **far** from the main sewage system (along the main street) |
| **Telephone No.** | ..... |
| **Date** | ..... / ..... / 2008 |

**QUESTIONNAIRE**

**Waste Water Management Project Towns**

INTERVIEWER: →→ PLEASE READ OUT THIS TEXT TO THE RESPONDENT CAREFULLY BEFORE YOU START WITH THE INTERVIEW!

In order to enhance the service quality in drainage and wastewater treatment for the inhabitants, therefore in the framework of waste water management project in Bac Ninh Town, we are conducting the baseline survey incorporating Knowledge-Attitude-Practice & Consumer-Satisfaction-Survey, related with the waste water, solid waste and sanitation, in different levels. On behalf of the project management we would like to thank you very much for your cooperation and having time to answer the questions. Every information provided by you will be considered for this study only and not used for any other purposes.

**PART 1: FAMILY STATUS**

1. **Name of respondent:** .....
2. **Age** . . . . . .
3. **Gender** . . . . . .
   1 □ Male
   2 □ Female
4. **Ethnicity**
   1 □ Kinh
   88 □ Other

**5. Education level**

1 □ Illiterate
2 □ Primary (1-5) / Grade 1
3 □ Secondary (6-9) / Grade 2
4 □ High school (10-12) / Grade 3
5 □ Worker
6 □ College
7 □ Bachelor, master degree and higher
88 □ Other .....

**6. Profession**

1 □ Employee, official
2 □ Worker
3 □ Small private business (restaurant (pho, rice, ...), beer restaurant, grocery, ...)
4 □ Farming
5 □ Business (company, ...)
6 □ House duties
88 □ Other .....

**7. Number of members resident in the household (always at home):** ..... head

**8. Do you possess a television?**

1 □ Yes
2 □ No →→ GO TO QUESTION 10
99 □ Don't know / Don't answer →→ GO TO QUESTION 10

**9. If "Yes", how often do you watch the central and local program such as VTV and BTV? Interviewer: →→ Ask for VTV and BTV watching frequency separately!**

| Program | Every day | 4-6 days | 1-3 days | never | Don't know/Don't answer |
|---|---|---|---|---|---|
| **VTV** | | | | | |
| **BTV** | | | | | |

**10. Do you possess a radio?**

1 □ Yes
2 □ No →→ GO TO QUESTION 12
99 □ Don't know / Don't answer →→ GO TO QUESTION 12

**11. If "Yes" how often do you hear the radio (local)?** (Pls. mark X in the suitable one)

1 □ Every day
2 □ 4-6 days
3 □ 1-3 days
4 □ Never
***99 □ Don' know / Don't answer***

## PART II: KAP RELATED TO SANITATION, SOLID WASTE AND WASTE WATER

### A. WATER SUPPLY

**12. What is your main source of water for drinking and cooking?** (Pls. mark X in the suitable one)

1 □ Rain water

2 □ River

3 □ Pond

4 □ Drilled well

5 □ Shallow well

6 □ Buying water

7 □ Piped water

88 □ Other .....

**13. Why do you use this water source for drinking and cooking?** (Pls. mark X in the suitable one)

1 □ Habit

2 □ Affordable

3 □ No alternative source

4 □ Free of charge

5 □ Good quality water

88 □ Other .....

**14. Is the quality of this water used for drinking/cooking?** (Pls. mark X in the suitable one)

1 □ Good quality

2 □ Acceptable

3 □ Poor

**15. What are the main sources of water <u>for washing</u>?** (Pls. mark X in the suitable one)

1 □ Rain water

2 □ River

3 □ Pond

4 □ Drilled well

5 □ Shallow well

6 □ Buying water

7 □ Piped water

88 □ Other .....

**16. Why do you use this water source for washing?** (Pls. mark X in the suitable one)

1 □ Habit

2 □ Affordable

3 □ No alternative source

4 □ Free of charge

5 □ Good quality water

88 □ Other .....

**17. If you are connected to a piped water system how much do you pay for the water per month?** (last 12 months)

1 □ Under 10.000 VND/month

2 □ From 10.000 – 20.000 VND/month

3 □ From 21.000 – 30.000 VND/month

4 □ From 31.000 – 40.000 VND/month

5 □ From 41.000 – 50.000 VND/month

6 □ From 51.000 – 60.000 VND/month

7 □ From 61.000 – 70.000 VND/month

8 □ From 71.000 – 80.000 VND/month

9 □ From 81.000 – 90.000 VND/month

10 □ From 91.000 – 100.000 VND/month

11 □ Over 100.000 VND/month

99 □ Don't know / Don't answer

**18. Your opinion about the water fee?**

1 □ Expensive

2 □ Light expensive

3 □ Moderate

4 □ Cheap

99 □ Don't know / Don't answer

**19. Do you know how many do you pay for 1 $m^3$ piped water?** (Pls. mark X in the suitable one)

1 □ Yes

2 □ No

99 □ Don't know / Don't answer

**20. If Company for water supply and sewerage Bac Ninh changes the water price. How many are you willing to pay for 1 $m^3$ piped water?**
INTERVIEWER USES THE BIDDING GAME IN BOTH DIRECTION AND REMARK WHERE THE INTERVIEREE IS WILLING TO PAY OR AGREEING

**Down direction**

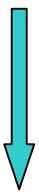
6.000 đồng/$m^3$ □

5.500 □

5.000 □

4.500 □

4.000 □



3.500 □

3.000 □

2.500 □

99 □ Don't know / Don't answer

## B. SANITATION

**21. Do you have a toilet?** (Pls. mark X in the suitable one)

1 □ Yes

2 □ No → GO TO QUESTION 34

99 □ Don't know / Don't answer → GO TO QUESTION 34

**22. If "Yes", what kind of toilet?** (Pls. mark X in the suitable one)

1 □ Pit toilet →→→→ GO TO QUESTION 35

2 □ Central (off-site) sewage system →→→→ GO TO QUESTION 35

3 □ Septic tank toilet

88 □ Other ..... →→→→ GO TO QUESTION 35

**23. Then how many chambers does your septic tank have?** (Pls. mark X in the suitable one)

1 □ One

2 □ Two

3 □ Three

99 □ Don't know / Don't answer

**24. How many m3 does the septic tank have?** ..... $m^3$

**25. Where Is your septic tank?**

1 □ Inside house

2 □ Outside house (yard, garden)

99 □ Don't know / Don't answer

**26. Which kind of waste water do you dispose into septic tank of household?** (Pls. mark X in the suitable one)

1 □ Toilet

2 □ Bathroom

3 □ Kitchen

4 □ Waste water from business/services

88 □ Other …….

99 □ Don't know / Don't answer

**27. To where do you discharge your wastewater (from toilet)?** (Pls. mark X in the suitable one)

1 □ Public drainage system

2 □ Public road

3 □ River, open channel, pond or lake

4 □ Infiltrate into the soil, flow into garden, ...

99 □ Don't know / Don't answer

**28. Do you experience bad odor in your house?** (Pls. mark X in the suitable one)

1 □ Yes

2 □ No →→ GO TO QUESTION 30

99 □ Don't know / Don't answer →→ GO TO QUESTION 30

**29. If yes, how often?** (Pls. mark X in the suitable one)

1 □ Usually

2 □ Sometime, rarely

3 □ Never

**30. Do you empty your septic tanks?** (Pls. mark X in the suitable one)

1 □ Yes

2 □ No →→ GO TO QUESTION 32

99 □ Don't know / Don't answer →→GO TO QUESTION 32

**31. If yes, how often?** (Pls. mark X in the suitable one)

1 □ Annual

2 □ 2-3 years

3 □ 4-5 years

4 □ >5 years

5 □ Any time if blocked or fully

99 □ Don't know / Don't answer

**32. Do you use "septic tank medicine" such as micro phot, or others?** (Pls. mark X in the suitable one)

1 □ Yes

2 □ Never →→ GO TO QUESTION 35

99 □ Don't know / Don't answer →→ GO TO QUESTION 35

**33. If yes, how often?** →→ GO TO QUESTION 36

1 □ Annual

2 □ Several years

3 □ If blocked

99 □ Don't know / Don't answer

**34. If "No", where do you dispose of human waste?** (Pls. mark X in the suitable one)

1 □ In the river

2 □ In the waste water system (canal system)

3 □ In the street / field

4 □ Use neighbor's latrine

5 □ Public Toilet

88 □ Other . . . . . .

**35. Do you think using the river or field as a toilet?** (Pls. mark X in the suitable one)

1 □ Spreads dangerous diseases?
2 □ Pollutes the water source?
3 □ Is not harmful?
88 □ Other .....
99 □ Don't know / Don't answer

## C. WASTE WATER / DRAINAGE

### C1. HOUSEHOLD

**36. To where do you discharge your wastewater (other not from toilet)?** (Pls. mark X in the suitable one)

1 □ Public drainage system
2 □ Public road →→ GO TO QUESTION 40
3 □ River, open channel, pond or lake →→ GO TO QUESTION 40
4 □ Infiltrate into the soil, flow into garden →→ GO TO QUESTION 40
99 □ Don't know / Don't answer →→ GO TO QUESTION 40

**37. If your house has drainage, what type of drainage do you have?** (Pls. mark X in the suitable one)

1 □ Open drain
2 □ Covered drain
3 □ Both, open and covered drain
99 □ Don't know / Don't answer

**38. Is your waste water discharge pipe blocked?** (Pls. mark X in the suitable one)

1 □ Yes
2 □ No →→ GO TO QUESTION 40
99 □ Don't know / Don't answer →→ GO TO QUESTION 40

**39. If "yes", how often?** (Pls. mark X in the suitable one)

1 □ Usually
2 □ Sometime, rarely
99 □ Don't know / Don't answer

### C2. NEIGHBORHOOD

**40. How is the drainage and sewage situation around your home/street?** (Pls. mark X in the suitable one)

1 □ Good →→ GO TO QUESTION 42
2 □ Bad →→ GO TO QUESTION 42
99 □ Don't know / Don't answer

**41. If "bad" what are the problems?** (Pls. mark X in the suitable one)

1 □ Mosquitoes breeding
2 □ Spread diseases

3 □ Bad odors

4 □ Polluted water source

5 □ Flooding

88 □ Other .....

**42. In the case of broken-down of the local drainage system (pipe, closed canal), steal manhole cover ... is , what did the people do?**

1 □ Repaired by the whole neighborhood

2 □ Inform the Company

3 □ Do nothing

99 □ Don't know / Don't answer

**43. As a general principle do you agree that waste water should be treated (cleaned) before it returns to the river or sea?** (Pls. mark X in the suitable one)

1 □ Yes

2 □ No →→ GO TO QUESTION 45

99 □ Don't know / Don't answer

**44. If "YES" why?** (Pls. mark X in the suitable ones)

1 □ To protect health of household, people and community

2 □ This is obligation of all people to keep the green, clean and bountiful environment

3 □ Collection and treatment of wastewater is very costly and citizen should have financial contribution

88 □ Other .....

99 □ Don't know / Don't answer

**45. If "No" why?**

.....
.....
.....
.....
.....
.....

**46. As a general principle do you agree that the community (households, and other institutions e.g. industry, hospitals, markets etc) should pay for waste water treatment?** (Pls. mark X in the suitable one)

1 □ Yes

2 □ No

99 □ Don't know / Don't answer

**47. Should the household pay for wastewater treatment?**

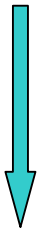
1 □ Yes

2 □ No

99 □ Don't know / Don't answer

**48. How much would you be willing to pay for treating waste water per $m^3$?**
INTERVIEWER USES THE BIDDING GAME IN BOTH DIRECTION AND REMARK WHERE THE INTERVIEREE IS WILLING TO PAY OR AGREEING

**Down direction**



5.000 đồng/$m^3$ □
4.500 □
4.000 □
3.500 □
3.000 □
2.500 □
2.000 □
1.500 □
1.000 □
Other .....□
Don't know / Don't answer □

**49. After starting operation of waste water treatment system would you connect with the system?** (Explain that the connection will be written down as a agreement / contract) (Pls. mark X in the suitable one)

1 □ Yes
2 □ No
99 □ Don't know / Don't answer

**50. What are some possible solutions to existing waste water management problems?**

……
……
……

## D. SOLID WASTE

**51. Do you dispose solid waste into the public drainage system (if exists)?** (Pls. mark X in the suitable one)

1 □ Usually
2 □ Sometime
3 □ Never
99 □ Don't know / Don't answer

**52. What are some possible solutions to existing solid waste management problems, especially which are affecting the drainage system?**

……
……
……

## PART III: INFORMATION, EDUCATION & COMMUNICATION PRACTICE

**53. Did you receive any information on water, waste water or sanitation in the last six months?** (Pls. mark X in the suitable one)

| No | Information about | Yes | No | Don't know / Don't answer |
|---|---|---|---|---|
| 1 | Piped water | | | |
| 2 | Wastewater | | | |

**54. If yes, how often?** (Pls. mark X in the suitable one)

| No | Information about | 1 time | 2-3 times | 4- 5 times | > 5 times | Don't know / Don't answer |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 99 |
| 1 | Piped water | | | | | |
| 2 | Wastewater | | | | | |

**55. If yes, what kind of information did you receive?**

1 □ The right in discharging wastewater

2 □ The obligation in discharging wastewater

3 □ Other (in details) .....

**56. If yes, from what sources did you get the information?** (Pls. mark X in the suitable one)

1 □ Neighbors / Friends

2 □ Company for water supply, wastewater Bac Ninh

3 □ Health communicator / volunteer

4 □ Respected people in the ward

5 □ TV

6 □ Radio/Newspaper/Loudspeaker

7 □ /Newspaper/Loudspeaker

8 □ /Loudspeaker

6 □ Other and write the name of mass organization ……

**56a. Do you get and read the following information:**

| Thông tin về | Yes | No | Read: Already | Read: Not yet |
|---|---|---|---|---|
| The regulation of piped water supply | | | | |
| Flyer "Water and Wastewater" | | | | |

**57. Who is the most influential person to communicate about water, waste water & sanitation?** (Pls. mark X in the suitable one)

1 □ Head of ward
2 □ Head of
3 □ Company for water supply, wastewater Bac Ninh
4 □ Health worker
5 □ Member of Women's Union
6 □ Member of Youth Union
7 □ Member of Youth Union
88 □ Other .....

**58. How often are public meetings on the services provided by company held in your ward?** (Pls. mark X in the suitable one)

1 □ Never
2 □ < 1 month
3 □ Every 2 months
4 □ 2-6 months
5 □ > 6 months
99 □ Don't know / Don't answer

**59. Is there a loudspeaker system in your ward?** (Pls. mark X in the suitable one)

1 □ Yes
2 □ No GO TO QUESTION 61
99 □ Don't know / Don't answer GO TO QUESTION 61

**60. If "Yes", What is the most suitable time for listening to broadcasts?** (Pls. mark X in the suitable one)

1 □ Early Morning
2 □ Mid Morning
3 □ Noon
4 □ Afternoon
5 □ Evening

**61. Ranking exercise: What are the most effective channels for the Company to communicate with you (the households)?** (1 - Ineffective, 2 - effective, 3 - Very effective) (Pls. cycle the suitable one)

| No | Chanel | Ineffective | Effective | Very effective | No answer |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 99 |
| 1 | Home visit | | | | |
| 2 | Neighborhood, ward meeting | | | | |
| 3 | Loud speakers | | | | |
| 4 | Poster | | | | |
| 5 | Leaflet | | | | |
| 6 | Notice Board | | | | |
| 7 | Radio | | | | |
| 8 | TV | | | | |
| 9 | Newsletter | | | | |
| 10 | Publicity Campaign | | | | |

88 Other (Please specify)
.....
.....
.....
.....

## PART IV: CUSTOMER SERVICE SATISFACTION ON WASTEWATER, SOLID WASTE

### SATISFACTION

**62. Are you satisfied with following services provided by company?** 1- Not satisfied 2 - Satisfied, 3 - Very Satisfied) (Pls. cycle the suitable one)

| No | Services | Not satisfied | Satisfied | Very satisfied | DK/DA |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 99 |
| 1 | Water supply | | | | |
| 2 | Wastewater/drainage Service | | | | |

**COMPLAINS ABOUT WATER SUPPLY**

**63. Have you been any problems with water supply and did you complaint about that?** (Pls. mark X in the suitable one)

| No | Problem | Problem? | | Complanted | Still not |
|---|---|---|---|---|---|
| | | Yes | No | | |
| 1 | Billing/Charges | | | | |
| 2 | Incorrect Meter reading | | | | |
| 3 | No water and/or discontinuity of supply | | | | |
| 4 | Theft of water meter | | | | |
| 5 | Faulty meter | | | | |
| 6 | Leaks (before the meter) | | | | |
| 7 | Water Quality | | | | |
| 8 | Poor pressure | | | | |
| 9 | Poor installation | | | | |

88 □ Other

.....

**64. How would you rate the courtesy of Company staff who handled your complaint?** (Pls. mark X in the suitable one)

1 □ Poor

2 □ Faire

3 □ Good

99 □ Don't know / Don't answer

**65. How effectively did they resolve your complaint?** (Pls. mark X in the suitable one)

1 □ Poor

2 □ Faire

3 □ Good

99 □ Don't know / Don't answer

**66. Speed of resolution: From the date that you made your complaint, how long did it take for the Company to resolve it?** (Pls. mark X in the suitable one)

1 □ 1 day

2 □ 2 – 3 day

3 □ 4 – 7 day

4 □ 8 – 14 day

5 □ over 14 day

99 □ Don't know / Don't answer

## COMPLAINS ABOUT WASTE WATER / DRAINAGE

**67. Have you been any problems with waste water / drainage and did you complaint about that?**

| No | Problem | Problem? | | Complanted | Still not |
|---|---|---|---|---|---|
| | | Yes | No | | |
| 1 | Poor Drainage | | | | |
| 2 | Blocked Pipes | | | | |
| 3 | Open manhole | | | | |
| 4 | Flooding | | | | |
| 5 | Bad odour | | | | |
| 88 | Other ..... | | | | |

**68. How would you rate the courtesy of Company staff who handled your complaint?** (Pls. mark X in the suitable one)

1 □ Poor

2 □ Faire

3 □ Good

99 □ Don't know / Don't answer

**69. How effectively did they resolve your complaint?** (Pls. mark X in the suitable one)

1 □ Poor

2 □ Faire

3 □ Good

99 □ Don't know / Don't answer

**70. Speed of resolution: From the date that you made your complaint, how long did it take for the Company to resolve it?** (Pls. mark X in the suitable one)

1 □ 1 day

2 □ 2 – 3 day

3 □ 4 – 7 day

4 □ 8 – 14 day

5 □ Over 14 day

99 □ Don't know / Don't answer

**Before ending the interview, the interviewer asks the respondent about the household situation (Pls. very polite)**

**71. Household income per month in last 12 months (estimated)** (Pls. mark X in the suitable one)

1 □ Under 1 mill. VND
2 □ From 1-2 mill. VND
3 □ From 2.1-3 mill. VND
4 □ From 3.1-4 mill. VND
5 □ From 4.1-5 mill. VND
6 □ From 5.1-6 mill. VND
7 □ From 6.1-7 mill. VND
8 □ From 7.1-9 mill. VND
9 □ From 9.1-10 mill. VND
10 □ From 10.1-11 mill. VND
11 □ Over 11 mill. VND

**72. Do you know the daily food expenses of your household?**

1 □ Yes
2 □ No
99 □ Don't know / Don't answer

**73. If "YES" would you tell us about the food expenses per day?**

1 □ Under 20 thousand VND
2 □ From 21-30 thousand VND
3 □ From 31-40 thousand VND
4 □ From 41-50 thousand VND
5 □ From 51-60 thousand VND
6 □ From 61-70 thousand VND
7 □ From 71-80 thousand VND
8 □ From 81-90 thousand VND
9 □ From 91-100 thousand VND
88 □ Other .....

**74. Generally in the region, to which category does your household belong?**

1 □ Rich
2 □ Moderate
3 □ Poor
99 □ I Don' know / No answer

**75. If your household belongs to poor category, are you living officially under the poverty line?**

1 □ Yes

2 □ No

**76. Do you have something to add or suggest related to the above issues**

.....
.....
.....

***Living standard of household (evaluation of the interviewer)***

*1 Rich*

*2 Moderate*

*3 Poor*

***House has stocks:*** .....

***The main assets of household:***

| No | Assets | Quan-tity | Year of buying | | | Mark of product | | | Buying price (mill. VND) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Tivi | | | | | | | | | | |
| 2 | Fridge | | | | | | | | | | |
| 3 | M-Bike | | | | | | | | | | |

**The interview ended at** ..... hour ..... minutes

**END OF INTERVIEW**

**Thanks for your cooperation!**

**Signature of controller** **Signature of interviewer**

**b) In-depth interview guideline**

**Interview Guideline for Vice Chairman/Chairwoman**

**of Ward People Committee**

## I. General information

1. How is the social-economic development situation of the ward (summary – can refer to annual report of 2007)
2. How is the general situation re environmental sanitation in your ward?
3. How is the situation of wastewater treatment and environmental sanitation in your ward area?

## II. Specific information

### 1. Infrastructure and services related to wastewater/solid waste collection:

1.1 How do you think of wastewater/solid waste treatment system in your city?

1.2 How is the non-domestic wastewater/solid waste treatment managed (wastewater and solid waste from hospitals, manufactory etc)?

1.3 How is your opinion about the management of wastewater/solid waste and environmental sanitation – green parks and public lighting system?

### 2. Public information and education campaign

2.1 What are public information (communication) activities related to wastewater/solid waste and environmental sanitation carried out by the ward?

2.2 Is there any guidance on the cooperation structure between relevant agencies and mass organizations in public information of water supply and environmental sanitation?

2.3 What is the impact (benefit) of public information? How can the impact be measured?

2.4 What is the cooperative role of communities in wastewater treatment as well as environmental sanitation?

2.5 How can community participation in environment/public works protection be increased?

## III. Orientation for wastewater/solid waste treatment

1. What is your opinion of company's customer-oriented operations under market mechanism?
2. Are there similar projects funded by other external organizations in the ward area? If any, what organizations? What are the main activities supported by these organizations?
3. What are supporting activities of ward PC provided to the company to carry out public information in cooperation with other organizations and agencies?
4. What is the proposal of ward PC for the treatment of wastewater/solid waste discharged from hospitals and production bases etc?
5. What is the policy of community participation to maintain these public works after construction? (i.e. household connection to public sewerage system, do not dispose waste freely anywhere)

***Thank you very much!***

**Interview Guideline for Officials of Urban Management Department**

**(City Urban Management Department)**

## I. General information

1. What is general situation of city urban management department operations (summary- can refer to annual report of 2007)?
2. What are the function and duties of this department in environmental sanitation management?
3. What is your general assessment of environmental sanitation in the city area?

## II. Specific information

### 1. Infrastructure related to wastewater/solid waste treatment:

1.1 What is your opinion of infrastructure conditions related to wastewater/solid waste treatment in the city?

1.2 How is the treatment of wastewater/solid waste from hospitals, manufactory etc managed?

1.3 How is community's opinion about the department's operations in wastewater treatment and environmental sanitation?

1.4 How is your opinion about the management of wastewater/solid waste and environmental sanitation by the company?

### 2. Public information and education campaign

2.1 What public information (communication) activities related to environmental sanitation are carried out by local authorities?

2.2 What is the cooperative role of communities in wastewater treatment as well as environmental sanitation?

## III. Orientation for wastewater/solid waste treatment/green parks/public lighting system

1. How do you think of wastewater fee payment? (the necessity, rate of wastewater fee, collection procedure: who and when to collect wastewater fee)
2. Is the plan of environmental sanitation system planning prepared by city urban management department? (method and period of implementation
3. How is your opinion of the company's role in socialization and its market-oriented operation plan?
4. Does the city urban management department have a plan to support the company in coming time?
5. What are your proposals for improving the current situation?

***Thank you very much!***

## Interview Guideline for Leaders of City People Committee

### I. General information

1. What is the social-economic situation of the city? (summary – can refer to annual report of 2007)

### II. Specific information

#### 1. Infrastructure related to wastewater/solid waste treatment

1.1 What is your opinion of infrastructure conditions related to wastewater/solid waste treatment in the city?

1.2 How is the treatment of wastewater/solid waste from hospitals, manufactory etc managed?

1.3 How is your opinion of the management of wastewater/solid waste and environmental sanitation?

#### 2. Public information and education campaign

2.1 How is the public information of wastewater/solid waste treatment and environmental sanitation carried out by other relevant agencies?

2.2 Is there any guidance on the cooperation structure between relevant agencies and mass organizations in public information on water supply and environmental sanitation?

2.3 What is the impact (benefit) of public information? How can the impact be measured?

2.4 What is the cooperative role of communities in wastewater treatment as well as environmental sanitation?

2.5 How can community participation in environment/public works protection be increased?

### III. Orientation for wastewater/solid waste treatment/green parks/public lighting system management

1. What is your opinion of company's customer-oriented operations under market mechanism?
2. Are there similar projects funded by other external organizations in the ward area? If any, what organizations? What are the main activities supported by these organizations?
3. What are supporting activities of CPC to the company? (policies, legal framework, human resources training, facilitating the company to cooperate other relevant agencies in the implementation of public information)
4. How is the orientation for the treatment of wastewater/solid waste discharged from hospitals and industrial parks etc?

***Thank you very much!***

**c) Focus Group Discussion Guideline**

**GUIDELINE FOR GROUP DISCUSSION**

**I. Behavior related to water/solid waste and sanitation**

1. What is the current situation of wastewater/solid waste treatment in your living place? Is there any sewerage system for wastewater collection and treatment in your place?
2. Is there any enterprise/manufactory in your place?
3. How is wastewater/solid waste treated? Is your daily life affected by this wastewater/solid waste treatment? (health, transport, daily activities, business etc)
4. How is the environmental situation in your living place?
5. How are sanitation services provided?
6. What is the operation cost of sanitation services?
7. How do you think of wastewater fee payment? (the necessity; rate of wastewater fee, collection procedure: who and time to collect wastewater fee)
8. How do you think of the current situation of public green trees and public lighting system?

**II. Public communication**

1. What are public communication activities related to wastewater/solid waste treatment and environmental sanitation carried out in your area?
2. What are methods/means of public communication used? Who takes responsibility for public communication?
3. What is the effect of this public information to wastewater/solid waste treatment and environmental sanitation?
4. What kind of communication is suitable for you family and your neighborhood conditions (in terms of information content and method of communication)?
5. What method of communication do you think that suitable for your and family and neighborhood conditions?
6. What is the role of communities in environmental sanitation communication? (focusing on how to encourage people not to discharge waste into canals and sewers)

**III. Improvements**

1. What is the most important issue to be improved?
    - Improvement and development of water supply system
    - Wastewater treatment area
    - Improvement and establishment of solid waste collection services
    - Other structures (if any).
2. Why do you think this is the most important issue?
3. How is your opinion of existing wastewater treatment and environmental sanitation?
4. What is your recommendation/proposal for situation improvement?
5. What are solutions of community contribution to wastewater treatment and environment sanitation improvement?

***Thank you very much for your answering!***