



GENERAL ASSESMENT OF THE WATER
SUPPLY SECTOR AND ITS HUMAN
DEVELOPMENT FUNCTION IN BOSNIA AND
HERZEGOVINA

Prepared within the MDG-F DEG programme in BiH by
HEIS and Prism research

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General assessment of the water supply sector and its human development function in Bosnia and Herzegovina – WSS Assessment

Book 1. Main document

Book 2. Annexes



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**Consultants: Hydro-engineering Institute Sarajevo
PRISM Research, Sarajevo**

Project team

Team Leader

(HEIS) Dr. Admir Ćerić

National Technical Experts

(HEIS) Mr. Selma Čengić

National Financial Expert

(HEIS) Mrs. Erna Zildžović

National Social Protection Expert

(PRISM) Mr. Dino Đipa

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Pool of support staff



Used abbreviations

WSS	General assessment of the water supply sector and its human development function in Bosnia and Herzegovina
BiH	Bosnia and Herzegovina
EC	European commission
EU	European union
FBiH	Federation of Bosnia and Herzegovina
MDG	Millennium development goals
MDG-F	Millennium development goals Fund
MoFTER ili MVTiEO	Ministry of foreign trade and economic relations
ODV/WFD	Water framework directive
RS	Republic of Srpska
UN	United nations
UNDP	UN Development programe UN
ViK	Water utility
JP	Public company
KP	Communal utility
JKP	Public communal utility
GIS	Geographic information system
4 SPPS	Software program for social sciences
NEAP	National Environmental Action Plan
USAID	United state agency for international development
EBRD	European bank for reconstruction and development
WB	World Bank
IPA	Pre-accession financial assistance



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1 Background information

General assessment of the water supply sector and its human development function in BiH (herein called the WSS Assessment) is a part of the wider UNDP Programme within the Millennium Development Goals, project called „Securing Access to Water through Institutional Development and Infrastructure“.

1.1 Millennium Development Goals in BiH

The Millennium Development Goals (MDGs) are eight international development goals that all 192 United Nations member states and at least 23 international organizations have agreed to achieve by the year 2015.

Millennium Development Goal (MDG) 7 addresses environmental sustainability, with one of the targets (target 10) to “halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation”. Progress towards target 10 contributes significantly to the reduction of child mortality (target 5), major infectious diseases (target 8), maternal health (target 6) and quality of life of slum populations (target 11). It also contributes to gender equality and empowers women, and is linked to school enrolment and attendance, especially of girls (goal 3). Meeting the target would contribute to reducing poverty (target 1) and hunger (target 2) through use of water supply in industry and agriculture, saving productive time in accessing closer water sources and sanitation facilities, and contributing to workforce health. Importantly, improved water supply and sanitation promotes economic equity since the unserved tend to be the poorer and more vulnerable. (source: <http://www.un.org/millenniumgoals/>)

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In working towards the MDG target for water and sanitation, understanding resource requirements, resource gaps and where resources need to be deployed are critical. Corresponding assessments need to be based on reasonable estimates at global, regional and country levels. Furthermore, comparing estimated finances required to existing funding levels helps to mobilize resources and to direct efforts to specific contexts (e.g. rural or urban) and to countries that are not meeting the MDG targets.

The adoption of the Millennium Declaration by 189 members of the United Nations in September 2000 was an important moment for global cooperation in the twenty-first century. The Declaration outlined the crucial challenges that mankind faces at the threshold of a new millennium; articulated responses to these challenges; and established specific indicators to assess progress towards interrelated goals and tasks in development, governance, peace, security, and human rights.

Bosnia and Herzegovina is facing a turning point. After the destruction of the 1992-1995 war and the subsequent, massive international reconstruction support, the country now finds itself at a crossroads between economic, social and political dependency on one side and the sustainability and local ownership of its development on the other. The Human Development/Millennium Development Goals Report for Bosnia and Herzegovina for the year 2003 is forward-looking and proposes policies in specific sectors that will help



achieving sustainability and ownership. It also contains quantitative forecasts for the implementation of the Millennium Development Goals (MDGs) by 2015.

More details about MDFs for BiH may be found in the "MDG Update Report for BiH" and "BIH Human Development report on MDG's 2003" at www.undp.ba .

2 Project introduction

The aim of the WSS assessment project is to undertake assessment of the water supply sector and its human development function in Bosnia and Herzegovina under the guidance and supervision of the MDG-F DEG National Programme Manager & coordinator.

The MDG-F Economic Governance named Securing Access to Water through Institutional Development and Infrastructure is supported through the Millennium Development Goal Fund financed by the Government of Spain, with planned duration of 3 years with an estimated budget of 4,450,000 USD. The Programme is jointly implemented by UNDP and UNICEF in partnership with the BiH Ministry of Foreign Trade and Economic Relations, BiH Ministry of Civil Affairs, the FBiH and RS Ministries of Agriculture, Forestry, and Water Management, the participating municipalities and their associated water utility companies, and civil society organizations.

Project will use a participatory approach, with a desk-based and field survey component that uses semi-structured interviews and feedback sessions, to collect and cross-check information, data, opinions, impressions and attitudes of relevant stakeholders in water sector, amongst other things, as seen fit to meet the objectives of the baseline research.

Researches will be held in four levels as follows:

- Water utility companies in each municipality;
- Municipality level; competent administration for utility affairs, costumers, local population, competent administration for refugees and returnees,
- Entity level; water and environmental sector, social welfare sector, associations of water utilities, etc.
- State level, competent authority for water and environment (MOFTER).

The focus of researches is 20 municipalities which have been selected respecting the following criteria:

- To equally cover whole territory of BiH,
- To equally represent municipalities from RS and F BiH,
- To have representative sample of bigger and small settlements.

Table 2-1 Proposed municipalities included in the research

Group	Municipality
Group I	1. KAKANJ F BIH 2. TRAVNIK- FBIH 3. VITEZ-FBIH 4. BUSOVAČA-FBIH 5. NOVI TRAVNIK- FBIH
GROUP II	6. KOSTAJNICA RS 7. DERVENTA RS 8. MODRIČA RS 9. SRBAC RS 10. ORAŠJE F BIH



Group	Municipality
	11. DOMALJEVAC FBIH
GROUP III	12. PRIJEDOR RS 13. V. KLADUŠA FBIH 14. BIHAĆ F BIH 15. BUGOJNO F BIH 16. TREBINJE RS
GROUP IV	17. SREBRENICA RS 18. ROGATICA RS 19. SOKOLAC RS 20. FOČA RS

The aim of the assessment is to asses:

- Organizational status of water utility companies,
- Current municipal, cantonal, entity and state level legislative of water supply sector,
- Available structure in social protection/welfare systems and the public health systems, to ensure equitable and safe water supply and
- Capacities of municipal governance systems.

All issues will be gender sensitive.

3 Project's tasks

The four levels of baseline research were:

- **Water utility companies** in each municipality;
- **Municipality level**; competent administration for utility affairs, costumers, local population, competent administration for refugees and returnees, ...
- **Entity level**; water and environmental sector, social welfare sector, associations of water utilities, etc.
- **State level**, competent authority for water and environment (MOFTER).

3.1 Task description

In this chapter are presented planed tasks and their present status on the date of this report preparation. Documents like: list of reference documents, interview structure and content etc... are annexed.

Task 1. Preparatory activities

Based on the objectives of the assignment and the envisaged scope of analyses the Consultant prepared detailed work plan.

Plan components among others were:

- List of stakeholders to be interviewed and contacted, with contact details,
- Structure and content of the interviews per each group of stakeholders
- Structure and content of the questionnaires for specific topics and/or stakeholders),
- Prepared invitation letter for the municipalities and water utilities,
- Identification and collection of reference documents,
- Updated implementation schedule.

Task status: Finalised

Task 2- Desk analyses

The Organization conducted the review of the existing strategic documents and technical reports of the water sector in BiH and region, the MDG-F DEG Programme Document, BiH MDG Report and other relevant documentation.

Core set of documents with reference to water sector are:

- Federal strategy for environmental protection 2008-2018
- Federal strategy for water management
- Plava voda regional Water Supply- interim and progress report
- Rehabilitation of Urban Water Supply in the Sava River basin-Background reports
- Institutional Strengthening of Water utilities in Upper and Middle Vrbas River Basin, final report
- Institutional strengthening of Water Utilities, assistance to WU on BiH, Pilot WU Doboje, Konjic, Orašje, Tuzla –Final report, and
- Any other reference document identified

Based on information presented in available reference documentation Consultant prepared background report (in Book 2.-annexes) field survey and for the final report. The documentation was collected mainly from Consultant internal sources, although Strategic documents and Policy papers are also publically available on relevant ministries web sites.

Background report includes assessment of present situation in water sector, relation to other sectors and positioning of water supply priorities within the BiH sustainable development framework and EU integration framework.

Assessment of legislative framework governing social protection/welfare and public health and those related to water sector were subject of the desktop study.

The Consultant conducted the research of information on internet sources with reference to annual governmental and other donor's allocation of budget. Additional meetings and interviews were conducted as necessary.

Task status: Finalised

Task 3- Field survey

The field survey was divided into survey at water utility companies and municipal level and survey at entity and state level. Data needed for the assessment was gathered using semi-structured interviews, water utility companies' surveys and/or meetings with representatives of each of the four research levels. Respondents were those listed in the stakeholder lists (all collected data are gender sensitive).

In order to be able to analyze sufficiently a situation in each of 20 municipalities, the municipalities were grouped into four groups based on regional approach. The team leader assigned teams responsible for field survey in each region. This allowed parallel work of the teams thus, giving enough time for conducting field survey in each municipality. The teams followed stakeholder list and field visit plan for each municipality that was developed by the team leader. The questionnaires were developed by national technical and national financial experts. They were responsible for development of the questionnaires for:

- Assessment of the organizational status of the water utilities
- Assessment of the tariff systems and revenue generation

Each team was trained by the national experts prior to the field visit.

The survey at the state level, municipal and entity level was conducted by the national experts and the team leader. They followed the stakeholder list and field visit plan that was developed by the team leader. A method of interviews with targeted questions was implemented. Beside the water issues to be addressed at the municipal level, the team



conducted interviews with relevant stakeholders in order to assess capacities of social welfare, public health and municipal systems, to ensure equity in access to quality water supply, including available best practices.

For the social aspect, the Consultant developed the questionnaire - up to 20 closed ended questions to measure:

- Capabilities and attitudes of local communities towards water sector and potentials to ensure equal access to quality water supply;
- Assessment of the customer satisfaction on water supply services in selected municipalities;
- Assessment of awareness and knowledge on water related issues;

A CATI – computer aided telephone interviews method was implemented. Special software program randomly selected household telephone numbers from the database of fixed line telephone numbers of all 3 telephone operators. Interviewers were reading questions and response options from the screen and entering answers directly into the database. All skipping patterns and administration of questionnaire were controlled by the program.

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A random stratified sample representative of the current population of 20 municipalities was designed for the purpose of this survey. The sample is representative for each municipality.

The sample size is not smaller than 100 respondents per each municipality, in total 2000 respondents. In this survey the technique of random selection by Last Birthday was used.

Upon first contact, the interviewer inquired about the number of families or households residing in one apartment or house, and the number of members of each household. Interviewers then carried out selection of the household to be included by selecting the household with fewer members, and at the next encounter chose the household with more members. Interviewers will keep a record of the number of households/family units at each address. The interviewer asked to speak to the selected household member whose birthday was closest to the date she is interviewing. If that person was not at home, interviewer arranged to recall that house if possible. Interviewers were directed to call to the next unit if they were not able to reach the appropriate respondent after five attempts. This method ensured random selection of respondents. In the final analysis, weights were determined to ensure representation by type of settlement in each of 20 municipalities.

The interviewer recorded all incidence of refusal of participation in the survey (including data on gender, estimated age, and reason given for refusal). The response rate was over 50% (50% of those randomly selected and contacted participated in this survey).



Task status: Finalised

Task 4- Data analyses

The complete data entry and processing was conducted in Sarajevo. The team worked on analyses of data collected following the structure of the final report, and assessments specified by TOR. The focus was on gap analyses. In case some data was missing, teams paid one additional visit to the relevant stakeholder.

For the purpose of data entry of social aspect a special mask within the Survey System software program was used. Once the data was entered, it was transferred and data analysis was conducted utilizing SPSS (Software Program for Social Sciences) - a professional polling software package. SPSS was used for data cleaning and logical control and the production of cross tabulations of results. At least two sets of tables for each survey were produced, based on the different selection of variables.

Task status: Finalised

Task 5- Preparation of the report

The baseline research provided key information and data on the existing and potential improvements/interventions of water sector in BiH, for the future programme implementation.

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Task status: Finalised



4 Background report

This reports deals with finding of existing documents analyses and water utility service development within last 15 years.

4.1 Previous assistance

Intervention in the environment and water sector by various donors was significant over the past period.

4.1.1 Poverty Reduction Strategy Paper (Mid-term Development Strategy)

The preparation of the BiH Medium-Term Development Strategy (PRSP) started in April 2002 and lasted approximately eighteen months. Definition of proposals of priorities and of the strategy itself was the task of 20 working groups, composed of the representatives of the Council of Ministers and of the entity governments, as well as of the lower levels of government (Brčko District, cantons, municipalities). Among others, one of the working groups covered the water management sector.

The main recommendations included in PRSP regarding water sector are: Water management will be organized on the level of river basins. A regulatory mechanism will be established for monitoring the work of municipal councils on setting tariffs and for ensuring the preservation of the quality of water and protection of the environment. The autonomy and management capacity of water utilities will be reinforced, and the degree of cost-recovery of utility services will increase to reflect real costs, with the tendency to prepare these segments for privatization. Investment in expansion of water supply and sewage systems will increase, as well as in regulation of watercourses and protection from harmful effects of waters. More efficient utilization of water for irrigation and power generation, exploitation of mineral and thermal waters, as well as restarting of navigation on the Sava River will respectively receive increased attention.

4.1.2 National Environmental Action Plan (NEAP)

National Environmental Action Plan (NEAP) for Bosnia and Herzegovina was completed in 2003. The goal of the NEAP is identification of short and long-term priority actions and measures providing the basis for preparation of a long-term environmental protection strategy in accordance with the economic, social and political situation in Bosnia and Herzegovina.

The plan presents the state of the environment in eight key sectors and proposes measures to address the crucial environmental problems, and defines institutional and technical requirements for implementation, updating and supervision of the NEAP.

One of the thematic areas which were identified as the key environmental issues was water. Based on the analysis of the current situation in all fields of environmental protection it was determined that the area of water resources and wastewater represents the first priority of the NEAP.



Concerning water supply, priorities are:

- Implementation of long-term water supply projects in the most endangered regions in BiH;
- Identification and minimization (rehabilitation) of water losses in water supply systems where losses are up to 60 %.

Concerning waste water treatment and construction of sewage systems, priorities are:

- Preparation and execution of projects for construction of new and rehabilitation of existing waste water treatment systems;
- Rehabilitation of existing and construction of sewage systems in endangered regions of BiH.

4.1.3 Donor Programs in water and sanitation sector in the BiH

During the early stages of reconstruction of the newly independent country, the international donors agreed that rehabilitation of the water and wastewater sector would be given a very high priority. The international donor community prepared and supported an Emergency Water Construction Program in 1996, in order to repair war damages, to restore the basic services and then to improve the service level. Various donors agreed to fund a wide variety of emergency capital improvement and rehabilitation projects throughout the country.

It was recognized at an early stage that fundamental reform of the sector would be required, both at the national and local levels. Generally, the European Union funded programs designed to assess and make recommendations for sector reform at the national level in both entities of Bosnia and Herzegovina. USAID funded programs for strengthening the water and wastewater utilities at the local, municipal level.

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4.1.3.1.1 Summary of USAID Efforts to reform in the sector – Programs for Strengthening of Water and Wastewater Utilities

The overall objective of USAID program was to strengthen the institutional and financial capacity of the Water Utilities to the extent required to achieve the financial sustainability and operational efficiency necessary to qualify for commercial credits from the World Bank or other lenders.

USAID founded a series of workshops for municipal and Water Utilities officials, to introduce them to basic principles of cost-recovery based financial planning, and computer-based cost recovery models as following:

- Unaccounted for Water and Water Demand Management – serial of trainings for water utilities, World Learning Inc. & USAID project, 2003;
- Water and environment-wastewater treatment plants – s serial of trainings for water utilities and government representatives, World Learning Inc. & USAID project, 2002;
- Accounting / Budgeting / Tariff System and Reporting for Water Utilities, serial of trainings for water utilities, World Learning Inc. & USAID project, 2001;



- Management for water utility companies, serial of trainings for water utilities, World Learning Inc. & USAID project, 1999;
- Cost Recovery for water utility companies – serial of trainings for water utilities, World Learning Inc. & USAID project, 1998-1999.

In 1999, elaboration of a Study on the “Ten Selected Pilot Water Utilities in BiH” was funded by USAID aiming at determine the existing conditions in the Water Utilities, based on the results obtained from field trips to ten Water Utilities, including basic administrative and physical conditions; and to assess the existing institutional and financial capacity of the Water Utilities. The specific recommendations for strengthening the institutional and financial capacity of the Water Utilities were done within this study.

Based on recommendations from this study, in 2002, USAID funded detailed program “Assistance to Water Utilities in BiH-Pilot Water Utilities: Dobož, Konjic Orašje and Tuzla for strengthening these Water Utilities in seven priority areas: Increasing Autonomy of the Water Utilities; Increasing Rate of Revenue Collections; Developing an Effective Metering Program; Reducing Unaccounted-for-Water; Developing an Effective Accounting System; Developing an Effective Budgeting System; Developing water and waste water tariff model for general use by all Water Utilities. Latter on, in 2004, USAID funded this program with reduced scope of work for Water Utilities in Srebrenik, Cazin and Sokolac.

4.1.3.2 Summary of EU efforts to reform in the sector

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4.1.3.2.1 Study Phase: Water Sector Institutional Strengthening, Phase I: (institutional, legal, human capacity, financial and water quality) – 1998-2000, PHARE Program

The European Union (and later the Finnish, Swiss and other governments), funded project studies to evaluate the water sector at the national level and two entities, the Federation of BiH and the Republic of Srpska. The report of Federation of BiH was completed in 1999, and that for Republic of Srpska was completed in 2000. The studies evaluated existing conditions and made recommendations for broad reforms in the management of all aspects of the water recourses in each entity. The proposal for reforms was based on European models, which stress allocation of responsibilities to areas defined by river basins borders. Some of the principle recommendations of the phase I was:

- Establish River Basin Boards (and Bodies) (RBBs) to facilitate inter-cantonal co-ordination, and to conform to EU practices.
- Encourage delegation of sector tasks from the cantons to the RBBs so as to (a) integrate environmental and water matters, (b) permit co-ordination between cantons sharing river basins, and with counterpart RBBs in the RS, and (c) respond to EU-related obligations.
- Adopt EU principles related to water management and administration, and
- Establish the principle that water utilities (at the municipal level) should be owned by the municipalities, but should be autonomous and financially independent.



4.1.3.2 Implementation Phase: Water Sector Institutional Strengthening, Phase II (River Basin Management Programme) – 2003 – 2005, CARDS Program

Project was implemented in F BiH and RS. This implementation phase took into account recommendations from Study phase, but also some modifications were made in terms of organizational set-up and the new Water Laws (for both entities – F BiH and RS) were drafted and later adopted by Governments. The other activities implemented within this project are the following:

- Bylaws preparation;
- Establishment of autonomous, impartial licensing units/bodies a conceptual framework for the enforcement of water-related legislation;
- Financing model for all water-sector-management levels;
- Public participation program preparation;
- Unified water information system at State level
- Human capacity building.

4.1.3.2.3 Water quality management at River Basin Level in BiH (April 2005 – March 2007)

The purpose of the project was 'to support the water sector institutions in Bosnia and Herzegovina in reaching a "good water status", as defined in the Water Framework Directive, via the introduction of water management principle according to EC practice'.

The main activity of the WQM Project was the preparation of the Water Protection Plan, which focuses on urban waste water pollution problems and in turn provides the preliminary basis for the development of a Programme of Measures (i.e. institutional instruments and technical measures).

The Water Protection Plan as the main output of the WQM Project was complemented with work on the development of a Decision Support System and provision of support towards improving the Water Agencies' management and operation of the river water quality monitoring network and the respective water quality laboratories.

WQM Project outputs can be summarized as follows:

- Water Protection Plan drafted with indication of measures needed to address urban waste water pollution in the surface waters of Bosnia and Herzegovina
- Decision Support System for water quality management developed
- Water Quality Monitoring Network conceptualized
- Scope and set-up of Water Quality Laboratories identified

Additional Services to the Support to Water Quality Management in BiH were contracted in September 2007 with one year project duration. The main task of the WQM II Project was to facilitate funding of EU/IPA and International Financing Institutions (IFIs) infrastructure investments in the water and wastewater sector in BiH and consists of the following two components:

- the continuation of the EC initiated institutional strengthening of the water sector in BiH ensured by focusing on the further development of the water management process
- availability of quality environmental investment projects for IFI financing increased through improved project preparation capacities of BiH authorities and improved cooperation with IFIs



4.1.3.2.4 Pilot River Basin Plan for the Sava River Basin (September 2004 – September 2007)

The project provided assistance to Croatia, Bosnia and Herzegovina, Serbia and Montenegro with the objective to enhance water management cooperation among Sava countries using an integrated water management approach as outlined in the WFD and ICPDR issue papers, through:

- strengthening national capacities on Water Framework Directive (WFD) oriented, transboundary water management (via information, awareness raising and various trainings on WFD guidance)
- developing pilot projects in selected sub-basin areas (for BiH in the Vrbas river) to test the implementation of the EU WFD, and to develop a harmonized methodological approach for river basin management in the Sava region
- strengthening the capacities of the Sava Commission (joint information system, coordination under its strategic group for Sustainable Water Management)

The BiH pilot project 'Characterization report for the Vrbas river basin' elaborates characterization of the surface and underground waters, gives analysis of the pressures and impacts, economic analysis, as well as the risks assessment. Monitoring system has been reviewed in terms of the existing automatic and laboratory monitoring of surface water within the Vrbas river basin. Special attention has been also given to information and consultation of the public, with comparison between current activities and those predicted by the Water Framework Directive.

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4.1.4 EBRD activities in Bosnia and Herzegovina

During 2004, the Bank initiated a dialogue with the state authorities on the need for greater investment in the municipal infrastructure sector and to specify the legal and regulatory reforms that would facilitate financing on a decentralized and fully commercial basis. As a result, the Bank signed a Protocol in December 2004 with the government indicating its interest in providing up to €30 million in loans directly to municipal/cantonal companies for a range of infrastructure services but focusing on water and wastewater.

The government in return agreed to provide a sovereign guarantee for such loans. A guarantee is required because tariff levels and legal and institutional reforms are at an early stage of transition. The Bank anticipates moving gradually from sovereign to non-sovereign business as the market matures and specifically as municipal and cantonal finance becomes more secure and predictable.

A key factor for success is the willingness of companies and local authorities to discuss their financial and operational practices in an open and transparent manner. Potential municipal infrastructure projects have been identified in Tuzla and Banja Luka, and other cities are currently under consideration. The emergency investment needs in Tuzla concern a new water purification plant which will ensure safe supply of quality drinking water to the city. In order to implement the project, merging three local municipal companies into a single water company may be required. Currently most of the



population has running water available six hours a day. In Banja Luka the priority investments required are for water supply, including for one part of the city which does not benefit currently from running water.

4.1.5 World Bank activities in Bosnia and Herzegovina

The Water Quality Protection Project (GEF) aimed to further strengthen the capacity of local utilities and reduce pollution from municipal sources into the Neretva and Bosna Rivers. The project consist of the following five components: Component 1) will provide the basis for all further actions for a Wastewater Improvement Plan for reducing river pollution. Component 2) will finance some main sewage collectors and upgrade of a sewage treatment plant in Bosna and Neretva River basins (Mostar, Živinice, Trnovo, Odzak) Component 3) a feasibility study will be prepared on low cost natural treatment of wastewater taking into account conditions such as climatic, hydrogeological (sensitive karst area) and land management relevant to the Bosna and Neretva Rivers. Component 4) will include management and monitoring of the project; and training for Utilities and local governments on project implementation. Component 5) will finance financial management training for institutional strengthening and capacity building for the utilities and drafting of annual Business Plans for each Utility.

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Urban Infrastructure and Services Delivery Project

The objectives of the Urban Infrastructure and Services Delivery Project are threefold: a) improve the availability, quality, and reliability of basic municipal services, in particular, water supply and sanitation; b) strengthen the ability of cantonal, and municipal governments to improve management, and institutional capacity for infrastructure development through Urban Management Development Plans, and, c) as possible, foster deeper social cohesion, through improvements in living conditions. Project components aim at: 1) supporting financial management, and training to strengthen, and build institutional capacity; drafting annual business plans for each utility; training for the preparation of Urban Management Development Plans. A study on the institutional capacity and Government's role will focus on appropriate capacity building; 2) financing the preparation of Urban Management Development Plans in selected areas (Banjaluka, Livno Kanton, Mostar, Sarajevo Kanton, Srebrenica, Tuzla Kanton), to identify priorities, improving operations and maintenance, and maximizing investment benefits. These Plans would analyze current operational efficiency; detail existing maintenance; identify physical assets to be rehabilitated; and, determine service demands. Also financed will be investments in selected service sectors; 3) financing least-cost priority investments, based on system improvements, lowering energy usage, including related investments to water supply and sanitation utilities. The Utilities will be grouped in three categories: Group A (Banjaluka, Lukavac, Posušje, Cazin), will consist of Utilities that have undergone financial, institutional, technical, environmental and social work during project preparation; Group B Utilities, will be expected to reach financial viability, and cover all operation and maintenance costs, by 2009; and, Group C (Stolac, Srebrenica, Vareš) would target areas lacking social cohesion, or affected during the postwar period,



provided with small amounts of IDA credit, in addition to grant financing from other donors; 4) financing the planning and design, engineering for the preparation of final designs and bidding documents, and, assistance with procurement and supervision of construction for investments; and, 5) financing incremental operating costs, salaries, audits, as well as guidance and training for Utilities and local governments on project implementation. A stakeholder education campaign on linkages between improved service and willingness to pay will be supported.

4.1.6 Other Donor Projects relevant for Water Utilities in BiH

4.1.6.1 Activities of Norwegian Agency for Development Cooperation (NORAD)

Since 1998, the Norwegian Agency for Development Cooperation (NORAD) has been supporting the water and sanitation sector in Bosnia and Herzegovina, in both entities, F BiH and RS. Support have been given to 14 municipalities; Brcko, Trebinje, Srbac, Gradiska, Modrica, Kotor Varos, Novi Grad, Kalesija, Mostar, Odžak, Krešovo, Kiseljak, Fojnica, Donji Vakuf, Jajce, Gornji Vakuf-Uskoplje, Bugojno and Bosanska Krupa. Some of actual projects are:

- Institutional Strengthening of Water Utilities in Upper and Middle Vrbas River Basin (Donji Vakuf, Gornji Vakuf, Bugojno and Jajce, NORPLAN Norway Project, 2003-2005;
- Program for Strengthening of the Water Supply Companies in Kresevo, Kiseljak and Fojnica, NORPLAN Norway Project, 2003.

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4.1.6.2 Establishment and Institutional Strengthening of Water Works Association in BiH (BHWVA), EC LIFE Third Countries Project, 2002-2004

This project was aiming at establishment of Water Works Association in BiH (BHWVA) and its future strengthening (www.bhwva.org).

During implementation period, BHWVA was established and 72 water utilities, 7 private companies and 1 individual from both Entities (FBiH and RS) become its members. BHWVA Training Center was established and several workshops were held on water losses, UFW, GIS, privatization issues, benchmarking, water audit, etc., and Handbook on Best Management Practices in Water Utilities was issued and distributed to all members. One of the primary activity was information dissemination to public and stakeholder on EU Water directive and EU best practice on water resources management.

4.2 Ongoing Assistance

4.2.1 Support to BiH Water Policy-IPA 2007 programme



The overall objective of the project is to ensure the protection and rational use of water resources in BiH by application of integrated water management principles in accordance with standards of the European Union.

The project will further support the development and implementation of Entity Water Laws, in accordance with the principles of the European Union's Water Framework Directive and other water sector related directives. In addition, the project will strengthen BiH capacities' for the coordination and implementation of international conventions to which BiH is party to.

Expected results were:

- Water policy and corresponding implementing strategy developed in accordance with Entity Laws, harmonized at the level of BiH, and agreed between key stakeholders.
- Secondary legislation to Entity Water Laws developed and in line with the EU *acquis communautaire*, harmonised and agreed between key stakeholders.
- Mechanism of public consultation and information exchange is established and public and stakeholders are actively involved in planning procedure

4.2.2 Plava voda regional water supply system

A major investment project of the Plava Voda Regional Water Supply is being considered for financing by a parallel loan from the European Bank for Reconstruction and Development (the "EBRD") and Council of Europe Development Bank (the "CEB"). The main purpose of these loans would be to finance eligible costs for the construction of the water intake structures at the Plava Voda spring in the Municipality of Travnik, the construction of the main transport pipeline from the spring (approximately 30 km long) to Municipality of Zenica, and facilities to enable connections to the existing water distribution networks in these municipalities. The pipeline would be designed to be able to service other municipalities located along its route, namely Novi Travnik, Vitez and Busovaca.

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The goal of the project is to extend water exploitation from the Plava Voda spring, located in the town of Travnik (which currently uses it to a limited extent for local water supply), to serve other three municipalities in the Central Bosnia Canton, as well as the Municipality of Zenica, in the neighboring Zenica-Doboj Canton.

The ultimate objective of the project is to provide reliable long term water supply system for the concerned population through joint effort of the involved Municipalities.

The main objective of this assignment is to provide the assistance on two main groups of tasks. First group of tasks relate to provision of assistance with the remaining elements of due diligence and project preparation to the Banks and assistance to the Company at



its establishment phase. The second group of tasks relate to provision of assistance with the project implementation to the Company.

4.2.3 Neretva and Trebišnjica management project

The project is implemented in B&H and Croatia. It includes the following four components: (1) Improved transboundary water resource management; (2) Improved management and use of wetlands ecosystems and biodiversity; (3) High-priority investments for water pollution control; and (4) Public participation and management of project implementation.

- COMPONENT 1: IMPROVED TRANSBOUNDARY WATER RESOURCE MANAGEMENT

The objective of this component is to improve water resource management capacity in both countries and to strengthen the transboundary mechanisms (institutional, technical, and regulatory) and tools for effective water resource management. This component would support national and interstate institutions for transboundary river basin management; support transboundary management tools including basin-wide measurements, monitoring, modelling and database management systems along with training and capacity building; and develop an NTRB IWRM plan, following the WSSD POI and the EU WFD, which would include full consideration of nutrient reduction needs, and of maintenance of environmental flows.

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- COMPONENT 2: IMPROVED MANAGEMENT AND USE OF WETLANDS ECOSYSTEMS AND BIODIVERSITY

The objective of this component is to maintain and conserve water-dependent ecosystems and their associated biodiversity in the coastal area of the NTRB, which has been identified in the MED TDA and SAPs as critical for the health of the Adriatic-Mediterranean ecosystem. These are the wetlands in the lower part of the NTRB. The component balances conservation, mitigation, and prevention in supporting activities to maintain the wetlands, including those under protected area status in both countries; and to mitigate the impacts of saline water intrusion, which is a major threat to water quality and ecosystems in the delta region.

- COMPONENT 3: HIGH-PRIORITY INVESTMENTS FOR WATER POLLUTION CONTROL

The objective of this component is to reduce water pollution, mainly nutrients, of the NTRB, through high-priority investments in low-cost, appropriate wastewater technology improvements in three municipalities, and small improvements of wastewater collection and treatment infrastructure in other two municipalities and one industrial sector in BiH.

Each selected site discharges into the NTRB at a particularly environmentally sensitive area. The municipalities and local industry will contribute a minimum of 50 percent of the investment costs. The project will also finance capacity building for monitoring and enforcement of industrial wastewater effluents by developing effluent standards and by developing enforcements guidelines and through training.

- COMPONENT 4: PUBLIC PARTICIPATION AND MANAGEMENT OF PROJECT IMPLEMENTATION



The objective of this component is to increase civil society participation in the decision making process for water resource management. The subcomponent will finance increased dissemination of scientific findings and activities to strengthen that goal. There are three subcomponents: Scientific Community Involvement, Civil Society Participation, and Project Management.

4.2.4 Preparation of Feasibility Study for Dubrava Plateau Water Supply System

The overall objectives of the project of which this contract will be a part are to support Bosnia and Herzegovina in implementation of Drinking Water Directive and specific objective is to prepare a Feasibility Study for the Čapljina Municipality priority water supply projects:

- Dubrava Plateau Water Supply System
- Water Supply System for settlements Trebižat, Zvirovići i Prćavci

Feasibility Study Report should include the following:

- Introduction describing the background to the overall project and to the preparation of this report.
- Geographical, Socio-economic and administrative background of Capljina/Dubrave region.
- Assessment of existing water supply and wastewater infrastructure, service levels, operational and financial performance of the utility and environmental review of existing situation.
- Long term strategic plan for investment requirements for water and wastewater services for a planning horizon to 2035.
- Project justification including evaluation of alternative development options, financial appraisal and risk analysis, economic justification and environmental assessment of proposed developments.
- Description of the proposed project.
- Implementation arrangements.

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; Municipalities included are Čapljina, Stolac and Mostar City; Bosnia and Herzegovina



5 Legal, institutional and financial framework

5.1 Legal framework

This chapter contains an overview of applied legal regulations related to water supply and public health sectors. It can be said that Bosnia and Herzegovina has reached a framework that is a good base for future developments on approximations of national regulations with EU legislation requirements.

5.1.1 State level

The bases for the legal system of Bosnia and Herzegovina were established by the Constitutions of Bosnia and Herzegovina that is the Annex IV of the General Framework Agreement for Peace in Bosnia and Herzegovina.

Article III of the Constitutions, paragraph 1 I, contains the responsibilities of the institutions of Bosnia and Herzegovina, that are as follows:

- Foreign policy;
- Foreign trade policy;
- Customs policy;
- Monetary policy;
- Finances of the institutions and for the international obligations of Bosnia and Herzegovina;
- Immigration, refugee, and asylum policy and regulation;
- International and inter-Entity criminal law enforcement, including relations with Interpol;
- Establishment and operation of common and international communications facilities;
- Regulation of inter-Entity transportation;
- Air traffic control.

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Article III, paragraph 3. a), of the Constitutions fixes that "All governmental functions and powers not expressly assigned in this Constitution to the institutions of Bosnia and Herzegovina shall be those of the Entities."

Article III, paragraph 5. a), fixes that "Bosnia and Herzegovina shall assume responsibility for such other matters as are agreed by the Entities..." as well as other responsibilities necessary to "...carry out international responsibilities that Bosnia and Herzegovina undertook".

The above said clearly indicates that responsibilities for natural resources management, including water and environmental protection belong to the Entities.

Responsibilities of BIH related to defining of policy, main principles, coordination of activities and harmonization of plans of the Entities' administrative bodies and institutions on the international level in the area of environmental protection are defined by the Law on ministries and other administrative bodies of BIH ("Official Gazette" of Bosnia and Herzegovina, 5/03).



Law on the procedures for the conclusion and implementation of international agreements ("Official Gazette" of Bosnia and Herzegovina, 29/00), defines responsibilities of the State in preparation of international contracts, agreements and other documents related to the area of environmental protection.

There is no law on water management on the State level. It has been prepared Law on environmental protection, where responsibilities were defined as "Unification of environmental protection policy determined by the Entities and Brčko District of BiH, with the aim to create a common policy".

When it would be adopted it will be the first legal framework treating sectors of environment and waters.

The legal act (Rulebook) published in the may 2010 was Rulebook on health safety of drinking water ("Official Gazette" of Bosnia and Herzegovina, No. 40 from May 17th 2010), that are in accordance with European Directive 80/778/EEC (Directive on the quality of water intended for human consumption).

5.1.2 Entity level

The main regulations related to the area of water supply are basically the same in the both entities. The main differences refer to the institutions for the law enforcement, which have been raised from the different organisation of the Entities. The text below contains short overview of the Entities' laws and syb-laws.

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Law on water

In both entities, F BiH and RS, the new Water laws were adopted in 2006, and in more than 95% percent approximated with requirements of the European Union Water Framework Directive¹.

According to those entity laws "public water supply" means all activities related to water intake, treatment, transport and distribution to users, if daily quantities are larger than 10 m³.

Main concern of entity laws is prohibition of exhaustion of water resources and in that sense public water supply systems are mentioned.

Entity laws regulate main issues regarding drinking water quality for public supply systems: water quality itself, protection of water sources and proper evidence and reporting on quantities used for public water supply.

The regular progress monitoring reports on transposition of European environmental legislation also compare the level of transposition of requirements of the Drinking Water

¹ Progress monitoring for potential Candidate Countries and the Former Yugoslav Republic of Macedonia



Directive 98/83/EC as amended by Regulation (EC) 1882/2003, that is transposed in the national legislation on the level of about 60%.

The report states: „Segments of public water supply and standards for water protection are in accordance with requirements of this Directive. Monitoring system has been established by water supply companies and institutes for public health and functioning in the way to provide regular tests of samples of water used for public supply“.

Law on health protection

Law on health protection in F BiH

Health protection measures according to the Article 9 of the Law on health protection ("Official gazette of F BiH", No 46/10) include among others:"...measures on health protection from harmful environmental impacts, that provide population with healthy foodstuffs and drinking waters, waters for recreational purposes and other waters....,.

Measures from the Paragraph 2 of this Article, are implemented in accordance with measures for the health protection from the harmful environmental factors which is enacted by the federal minister on the proposal of the Federal institute for public health with the consultation with federal minister for environmental protection.

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This law states planning and implementation of cantonal programs for preserving and protecting health from polluted environment as social care for health on cantonal and municipal level, as well as performing of systematic tests of mineral drinking waters, drinking waters and other waters used for production and processing of sustaining food and sanitary-hygienic and recreational purposes, due to identification of their health and hygienic propriety and prescribed quality.

Law on health protection in RS

Article 68 (Official gazette of RS 106/09) defines activities of the Institute for public health, where is mentioned that among other things it performs:"... tests related to production and market of sustaining foods, water, air, ...that fall under the domain of public health“.

Law on public enterprises

In 2005, both entities adopted Laws on public enterprises. This law place the utility enterprises (water supply and sewerage) together with other public services (electricity, telecommunication, etc.).

Law on public enterprises in F BiH

Law on public enterprises, adopted in 2005, regulates methods of managing and operating public enterprises. According to this law a public enterprises is "enterprise employing at least 50 employees" and carry out activities of public interest, and in which municipality, city, canton or federation of BiH is owner of at least 50% plus one share.



Law on public enterprises in Republic of Srpska

Law on public enterprises, adopted in 2005, regulates methods of managing and operating public enterprises. According to this law, Republic of Srpska or its self-governance unit is responsible for founding public enterprise which carry out activities of public interest. Decrees of this law are applied on enterprises where Republic of Srpska or their self governance is owner of at least 50% plus one share, and where are employed more than 50 workers.

Rulebooks

Rulebook on Conditions for Defining of Sanitary Protection Zones and Protective Measures for Water Sources Used or Intended to Be Used for Drinking Water Supply ("Official Gazette of FBiH", No. 51/02),

Rulebook on Protective Measures, Methods for Defining and Preserving Sanitary Protection Zones, Areas with water sources, and Water facilities and Waters intended for human use ("Official Gazette RS", No. 7/03),

These rulebooks define methods of defining sanitary protection zones of the water sources used for domestic supply. In general, there are three zones of protection (directly around the source, wider zone around the source and the third zone that presents whole watershed area). For each of three zones there are prescribed allowed measures and activities that will not jeopardize quality and quantity of available drinking water. After developing studies on protection zones, the municipality issues a decision on their enforcement.

Still, there are significant number of water sources that do not have studies and/or decisions on their protections. Implementing measures are one of the main causes of this status, because they requires significant financial means for their implementation.

Within the project IPA 2007, „Support to water policy in BiH“ the new Rulebook on defining protection zones and measures for drinking waters has been drafted.

In the chapter 5.1.1 was mentioned the new Rulebook on health safety of drinking water, that replaced the existing Rulebook (from the ex SFRJ) that has been used in F BiH, and the Rulebook on health safety of drinking water ("Official gazette RS", br. 40/03) in Republic of Srpska.

5.1.3 Municipal level

The law on principles of local self-government in Federation of Bosnia and Herzegovina

Article 8. of this law ("Official gazette of Federation BiH", no. 51/06), defines competences of self-government local unit, that are among others, management,



financing and improvement of the operations and facilities of the local public infrastructures for water supply, wastewaters disposal and treatment, etc.

The law on local self-governance of RS (Official gazette of RS 101/04)

Organization and ensuring of utility services together with production and delivering of waters are the competences of the municipality.

5.1.4 Necessary steps in the legislation development in the water supply sector

The requirements of the EU Water Framework Directive are transposed 90 % in the FBiH, i.e. 100% in RS in the entities water laws.

Concerning water supply issue, the key request is to identify economic price of water, that is the main task within the Water management Plan. The deadline for the first management plans is year 2012.

Referring to the requirements of the Drinking water Directive there is administrative system for assuring delivering of safe drinking water, but there is still need to:

- Identify all drinking water sources with quantity of 10 m³/day or those supplying more than 50 people,
- Establish drinking water monitoring system in its full capacity (referral and/or certified laboratories), that has been partially done,
- Implement overall assessment of water quality in the urban areas,
- Establish regular system for informing of public on quality and safeness of delivered water.

5.2 Institutional framework

This chapter contains the short overview of the institutional organization of water sector in BIH on all levels of the administrative organization of Bosnia and Herzegovina.

The responsible bodies for water management are defined, in accordance with the competencies division defined by Constitution of BIH, i.e. administrative organization of the country:

- At the state level: Ministry of foreign affairs, Ministry of foreign trade and economic relations (domain of navigation);
- At the entity level:
 - Federal ministry of agriculture, water management and forestry
 - Federal ministry of health
 - Ministry of agriculture, forestry and water management of Republic of Srpska.
 - Ministry of health and social protection of republic of Srpska
- At the level of Brčko District:
 - Department for agriculture, forestry and water management of the Brčko District Government.

5.2.1 State level

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The institutions at the state level that have competencies regarding water issues are as follows:

Ministry of foreign affairs

The signing of bilateral and multilateral agreements and contracts, as well as carrying out procedures for their ratification are the main duties and tasks of the Ministry of foreign affairs.

Ministry of foreign trade and economic relations is responsible for defining policy, basic principles, coordinating activities and plans that will serve for harmonization of competencies of entities administrations and institutions in the following sectors:

- agriculture;
- energy;
- environmental protection, energetics and natural resources;
- tourism.

Department for water resources and tourism is one of the organizational units of the sector.

Ministry of communication and transport is responsible for international and inter-entity transport and infrastructure and international and inter-entity agreements, contracts and other acts, planning and strategic documentation, etc.

Within this ministry there is department for roads, railways, navigable lines, ports and pipe lines.



Food Safety Agency of Bosnia and Herzegovina has been established by the law on food of BiH (adopted in September 9th 2004, Official gazette of BiH 50/04)

According to the law on food the term of food also includes water, namely:

- water that is used for public supply as drinking water,
- water that is used in the processes of food production and processing,
- water packed in the original package form as table water, mineral water and spring water.

The Council of ministers of Bosnia and Herzegovina, on the proposal of Food safety agency of Bosnia and Herzegovina in the cooperation with responsible bodies of entities and Brčko district adopted the Rulebook on health safety of drinking (Official Gazette of BiH, no. 40/10).

Also, this rulebook defines that testing laboratories have to be certified according to the norm BAS EN ISO/IEC 17025.

5.2.2 Entity level

Federation of Bosnia and Herzegovina (FBiH)

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Federal ministry of agriculture, water management and forestry

Federal ministry of agriculture, water management and forestry executes administrative and professional tasks related to sectors of agriculture, water management, forestry and animal health set out by the federal laws.

Within the water management sector there are two departments: for water management and development projects related to the water domain.

Water management sector is responsible for

- Preparation of strategies and development policies;
- Proposing development documents for the integrated water management and monitoring the implementation of aforesaid documents;
- Preparation of legislation and regulations and institutional arrangement in the field of water management within the competence of the Federation BiH;
- Participation in the process of drafting of budget proposal of the Ministry in the fields as covered by the Sector;
- Coordination of monitoring activities in water resources and preparation of information material in the field of water management;
- Guiding the development of water regime and water status through the identification and implementation of development projects and cooperation with units and services for the implementation of projects in the Ministry and with Federal Ministry of Finance, water management institutions and other institutions;
- Carrying out concession granting procedures within the competence of the Ministry in this field;



- Supervision of the activities undertaken by water management institutions at the Federation level (Water Agencies) and control of legality of documents issued by cantons and these agencies in administrative procedure;
- Other activities within the competence of the Sector.

Federal ministry of health

Federal ministry of health is responsible for ensuring quality of drinking water. Main functions and tasks of this Ministry related to water are as follows:

- Ensuring drinking water quality in accordance with the corresponding laws, regulations and standards;
- Organization of monitoring of drinking water quality.

Institute for public health of Federation of Bosnia and Herzegovina is health institutions that carry out public-health activities on the territory of Federation. According to the law on health protection its founder is Parliament of F BiH, and it was founded as institution of special importance for implementation of secondary and tertiary level of public health activities.

The activities of the institute are aimed at preserving and improvement of health of population. Among the other things the Institute is responsible for monitoring, analyzing, observing and assessing health status of drinking water, waters for recreational purposes, surface and wastewaters, status of the water supply, health accuracy of sustaining food and articles for public utilization, as well as those intended for international trade. Also, the institute proposes and performs activities on improvement of system of health accuracy of drinking waters, with the aim to decrease risk from diseases and other harmful consequences on health.

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Federal agencies for Sava river basin district and Adriatic river basin district (Sarajevo and Mostar)

The agencies were established in accordance with Federal water law from 2006. According to this law Ministry of agriculture, water management and forestry delegates the main competencies for preparation and planning of strategic decisions, decrees, rulebooks and permits necessary for the implementation of the Water law to the agencies.

Cantonal level

The Federation of BiH consists of ten cantons. According to the Federation Constitution, the cantons exercise their self-government through their own legislatures, executives and judiciaries. The main functions and tasks related to water and assigned to the cantons include licensing and allocation of water resources under their competence (drainage, irrigation, water supply, waterways for navigation, hydropower, and water protection).

Cantons define the methods and content of utility activities performances. In the context of water management, the cantons have an important role in tasks related to assuring of



water for needs of citizens, social and economical entities, and other users. Also the cantons regulate the areas of collecting, treatment and drainage of wastewaters.

The cantons specify responsibilities and duties of the municipalities as local self-governance units.

Municipal authorities

The municipal authorities are responsible for establishment and managing of water utility enterprises, except Sarajevo water utility in Sarajevo, that is under competencies of cantonal authorities and Mostar water utility that is under competencies of Mostar city administration.

The municipality has a statute that has to be in accordance with Constitution of Federation of BiH, Constitution of canton and cantonal legislation.

The law on principles of local self-governance precisely (Official gazette of FBiH 49/06) strictly defines the emplacement and the role of the municipality in the system of achievement of local self-governances rights.

Republic of Srpska

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Considerable difference observed from the aspect of organizational structure, between two entities lies in the fact that the Republic of Srpska (RS) is organized as a centralised entity (no cantons).

Ministry of Agriculture, Water Management and Forestry RS

Regarding water issue, the Ministry conducts administrative and other professional work according to the RS Water Law from 2006.

Ministry of health and social protection of RS performs administrative and other expert activities related to, among others, preserving and improving public health, and monitoring of health status and health needs of population, as well as health accuracy of drinking waters and other tasks in accordance with the laws and other regulations of Republic of Srpska and Bosnia and Herzegovina.

Public Health Institute of the Republic of Srpska is an agency having, among other things, the independent department named "Service for sanitary chemistry" within Service for hygiene. Its primary task is measuring of different physical, chemical and physico-chemical parameters in waters, sustaining foods and articles for general use. The institute is in charge of monitoring quality of surface watercourse intended for water supply, as well as those intended for sport and recreational purposes and underground waters intended for water supply.



The agencies for waters of the Republic of Srpska

The Ministry of Agriculture, Forestry and Water management of Republic of Srpska has established the Agencies for Water within the relevant watersheds (Trebinje and Bijeljina). The work of the Agency is controlled by the resources of Ministry and Government, in terms of realization of Agency's public function, as well as in terms of financial means spending, as these financial means are budgetary means and ensured from the water management reimbursement and other taxes.

Establishment of RS Water Agencies for Sava river basin district and Adriatic river basin district are prescribed by RS Water Law from 2006.

Municipal authorities

The law on local self-government of Republic of Srpska (Official gazette of RS No. 85/03) defines position, activities and responsibilities of the local self-government authorities.

The local self-government authorities are obliged to offer direct services providing in the areas of water supply and collection and drainage of waste waters. With this purpose local self-government bodies may establish a separate enterprise or these activities consign to an economic company.

The local self-government authorities prepare plans and perform activities within their responsibility in the case of natural disasters and floods.

Republic of Srpska and self-government units, within their responsibilities, manage water resource as resource of public interest and protect it from damages, destructions or malpractice and illegal use, in accordance with law on waters and other relevant laws.

Water utility companies

There are more than 130 water utility companies in BiH. Some of them are responsible only for water supply and sewerage (mostly big and medium size Municipalities), but in smaller municipalities, water utilities are responsible for wide range of municipal services including: solid waste management, water and sewerage, public lighting, markets, cemeteries, parks, etc.

Water utilities are usually organized as public companies, owned by Municipalities, Cantons (F BiH, Sarajevo Water Utility) or Cities (Mostar and Banjaluka in F BiH and RS respectively). All physical assets are owned by the Municipalities (Cantons or Cities), but managed by Water Utilities.

The most common form of Municipality -Water Utility relationship is such that Water Utility reports to a management board appointed by the Municipal (Cantonal) parliament.

In practice, Water Utilities manage and operate water supply and sewerage systems often without support of Municipality, but Municipalities are those which mostly decide upon water tariff rates and some other key management decisions. In such situation, Water Utilities are not in position to consider them self as the key entity for efficient provision of water services and for development of self sustainable enterprises.

However, there are some exceptions, where Water Utilities are partially privatized (stakeholders enterprises). This is typical for utilities in RS.

Municipalities are administrative units that include urban parts and suburbs (cover by public utility services) and surrounding settlements and villages. In some case settlements and villages close to municipal center (apprx up to few kilometers) might be also covered by water supply network.

Common cases for settlements and villages are single, separate water supply systems, which are also managed by central Water Utility.

If not managed by Water Utility, these areas usually have their own local wells and water supply networks, which are under their own control. It often presents a problem, as managing of these systems is not fully regulated, particularly from the point of view of drinking water quality control.

Generally, in big and medium size Municipalities (more than 50 000 inhabitants) percentage of households which are connected to public centralized water supply system is more than 85 % and in smaller Municipalities (up to 50 000 inhabitants) percentages of households which are connected to centralized water supply system vary from 40-60 %.

5.3 Financial framework

According to the Entity Water Laws (FBiH and RS), the resources for improvements in the water sector are to be ensured through “general” and “special” water fees in the Federation of BiH, and “special” water fees in RS.

In FBiH, these charges/fees are divided among the following institutions:

- 40% to the relevant Water Agency;
- 45% to the Canton; and
- 15% to the Environmental Protection Fund.

In RS, the division of charges/fees is generally as follows:

- 70% for special water purposes;
- 30% for local authorities.

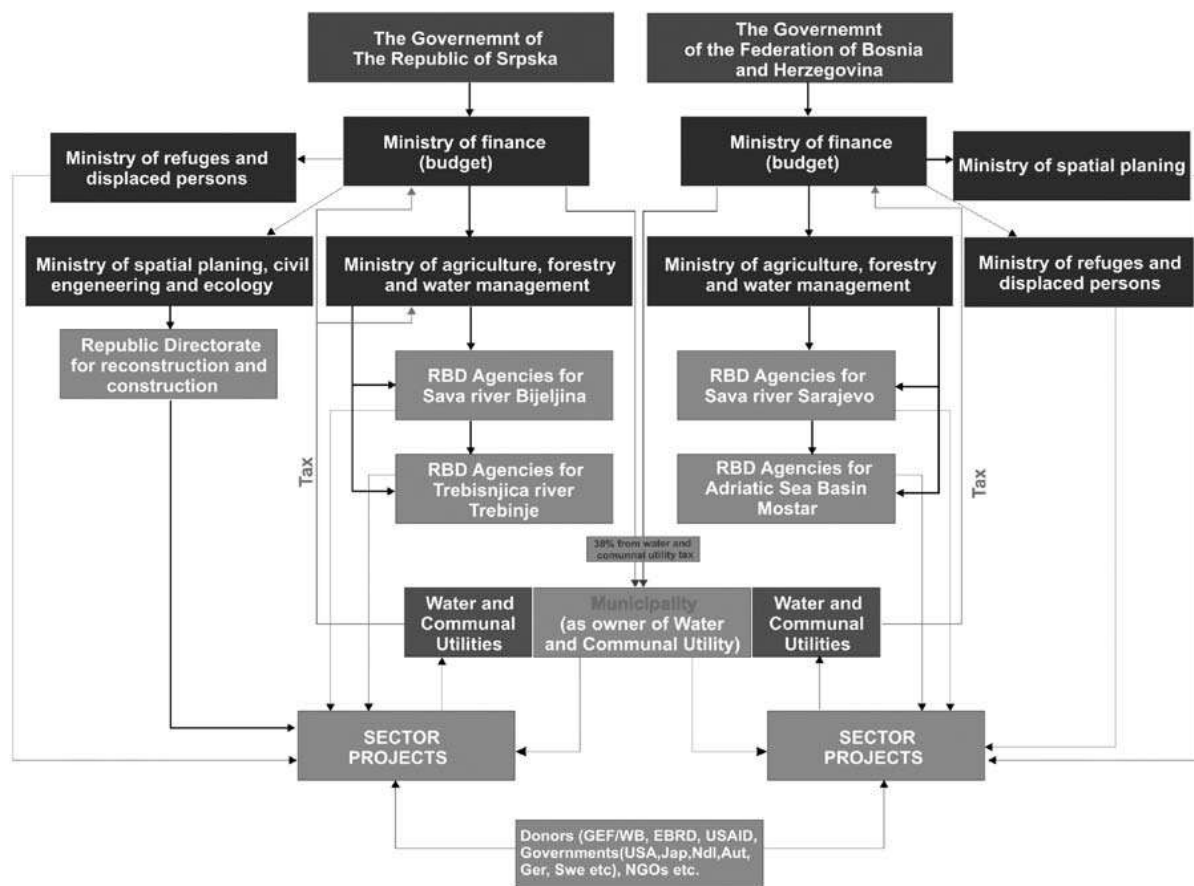


Figure 1 Financial framework for the water supply and sewerage system in BiH²

The main difference in financing of the water sector between RS and FBiH is in the manner of use of collected resources from fees. In FBiH, the situation is more favourable since the money is, in legally prescribed amount, paid directly to the account of Water

² Source: UNDP Goal Wash: Country Assessment Report

Agencies, which provides the Agencies with the stable source of income even in situations when entity governments take loans to fulfil the needs of certain categories of budget users.

The text below provides an overview of income and expenditures for all levels respecting the water sector.

5.3.1 Federation of BiH

FBiH Government

The Government, upon the proposal of responsible ministry, participates in financing of projects in the water sector. In the last several years, the value of investments in the water sector was around 2 mil or about 1.3%..

FBiH Ministry of Agriculture, Water Management and Forestry

In 2009, the capital investment in the water sector amounted to 765,000 KM, or 1.35 % of the overall budget. In the previous years, the investment in the water sector amounted to approx. 1-2 mil. KM per year.

38 Investments in the water supply sector at the level of entities (government and responsible ministry) are listed in the budgets under the items of "capital grants". Overall, these are resources of 2-5 million KM and are related to all types of activities in the water sector, and not only water supply.

Water Agencies

In FBiH, the annual income on the basis of collected water fees, which is directed to the account of the Agency for the Sava River Basin District, amounts to approx. 14.5 mil KM³, of which around 10% is for the water supply sector (for development of water source protection studies, reconstruction and construction of water supply system facilities).

Agency for the Adriatic Sea Basin District, in 2009, had the income of 4.1 mil. KM, on the basis of collected water fees, which makes 87% of the overall income of the Agency.⁴ 10% of the Agency's overall budget was spent in the sector of water supply and sewerage.

Cantons

Cantonal budgets, depending on their size, have from approx. 5 mil KM (Tuzla and Sarajevo Cantons), to approx. 300,000 KM (Bosnia-Podrinje and Posavina Canton) at

³ Business report of the „Agency for the Sava river basin district“ Sarajevo, for the year 2009.

⁴ Report on the review of financial reports of the „Agency for the Adriatic sea basin district, for the year 2009.



their disposal. The money is mostly used for purposes of the water sector, mainly for the segment of water supply and wastewater collection.

Under the expenditure items of financial reports of some cantonal governments, it is said that they finance the "non-economic price of water".

5.3.2 Republic of Srpska

In the Republic of Srpska, the Agency, through the single account of the Government, transfers the funds to the Water Agency, therefore the RS Government may, according to its needs and decisions, transfer a part of money to other sectors.

In 2009, the income from water fees for water use and fees for extraction of gravel from watercourses amounted to 10.4 mil. KM⁵.

The budget of the Agency for the Sava River Basin District amounted to approx. 9 mil. KM, of which around 2.1 mil. KM was used to cover the costs of reconstruction and investment maintenance of water supply infrastructure, which amounts to approx. 23%.

Municipalities

The municipal budgets for the year 2009 were analysed for all utility companies polled in this part of the project. In Book 2 are provided details of investments in the sector of utility services, i.e. water supply and wastewater collection.

There is a large difference in available budgets that range from 0.5 mil. KM to 36 mil. KM.

In percentages, the investments into water supply and sewerage range from 0.1% to 21%, depending on the available budget.

It is interesting that the indicator of good business performance of utility companies is not the overall investment amount, but the percentage of investments from the budget.

Those utility companies with larger investments in relation to the available budget, have better performance. If it is presumed that the Municipality invests more in the fields considered as priority, then this larger degree of attention directed toward utility companies, i.e. water supply and wastewater collection, may be explained.

5.4 General conclusion regarding the legal, institutional and financial framework

⁵ Budget of the Republic of Srpska for 2009.



5.4.1 Legal framework

Legislation of the European Union regulates the issues related to water management within the community of independent states. The basic purpose is to oblige the member states to achieve joint objectives. Water Framework Directive or Drinking Water Directive represent the joint framework (minimum requirements) that the member states must fulfil. This enables the coherence of implementation by all member states, but at the same time allows each country the possibility to set more stringent requirements when water protection is concerned.

It may be said that the transposition of the requirements of Water Framework Directive and to a large extent Drinking Water Directive into the national legislation (state, entities) has almost completely been done.

None of the requirements of the European Union regarding the institutions responsible for implementation of legislation is exclusive. Each member state, depending on its institutional set-up, delegates responsibilities for implementation of requirements stipulated in the above mentioned Directives or national legislation that must fully be harmonised with the Directives.

The only requirement is the existence of "one address", meaning one responsible body for communication with joint institutions of the EU regarding the scope and timing of implementation of EU legislation.

40 For Bosnia and Herzegovina, this means that the larger part of activities, when the technical aspect of water management is concerned, would be at the level of entities (and/or cantons in FBiH and/or municipalities). The strategic plans and measures that are being adopted, should be the task of state authorities.

Specifically, in the segment of water supply, the standards required when the quality of drinking water, preserving water as a resource and its management are concerned, have largely been fulfilled. This can clearly be seen from the overview of existing legislation.

5.4.2 Institutional framework

The efficiency of institutions directly depends on:

- Clearly defined competences and responsibilities,
- Available human resources.

There is a general opinion that the existing institutional framework in BiH may not fully meet the requirements in the field of environment and/or water. In some cases, there is no clear division of competences among different levels of authority.

Even in cases when the competences are clearly defined, due to a large number of laws, legislative bodies and differences in provisions, there are different interpretations and misunderstandings.



Starting with the state level, through entity and cantonal levels, there is a lack of human resources in institutions, caused by the fact that the administration, that could meet the requirements of the water sector, is still insufficiently developed, and at the same time the lack of financing restricts the necessary development of administration. Almost as a rule, in all ministries, directly or indirectly related to the water sector, the planned number of employees is larger than the actual number of employees.

The lack of capacities at the local level (in the first place) and resources (in the second), for development and provision of efficient water supply service, is a significant restriction in municipalities.

There is a large difference between large water supply companies (which mainly have sufficient numbers of qualified employees and are equipped with necessary equipment) and the smaller ones, which have poor organisational structure, small number of qualified experts, limited capacities of their staff, even when the use of computers is concerned.

5.4.3 Financial framework

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Economic instruments applied in the water sector include fees for water abstraction, water collection and irrigation, water use fees, water protection fees (costs for discharge of wastewater), and fees for extraction of materials from watercourses.

Introduction of economic price of water is the main precondition for achieving sustainable use of this resource. The price of use should include not only costs of water supply, maintenance and development of infrastructure facilities of the system, but also environmental and resource costs, which basically represents implementation of the "polluter pays" principle.

Establishment of the economic price of water must take into account the local conditions as well, and the needs of different users. According to one of MDGs, which requires universal access to clean water, the price of water may not impose a compromise between personal hygiene and impossibility to pay for the water used.

The items such as "co-financing of water utility companies due to non-economic price of water", may still be found in cantonal budgets.

Economic price of water

The first report of the European Commission on the progress in implementation of Water Framework Directive in the EU was prepared and submitted to the Parliament, Council of Europe and the public on 22 March 2007.

⁶Communication (COM(2007) 128 final) "Towards Sustainable Water Management in the European Union"



This report, among other things, included the assessment of implemented economic analyses that were supposed to be conducted by the member states, including the calculation of costs return for the water supply services. Most of the countries have not even clearly identified the water services, which only confirm that further analyses will not be easy.

All countries had mainly used the "traditional" methods and based their analyses on the water supply of people, industry and agriculture. Exactly in this order grows the complexity of calculations in each of these sectors. Even in the cases of economic price of water, which does not include environmental costs, it will be interesting to wait for the report in accordance with Article 9 (water pricing policy). The deadline for implementation is 2010. The report will generally follow one year after submission of individual reports, at the soonest.

The most recent report of the European Commission toward the European Council and Parliament⁷ has shown that the introduction of tariff systems according to the principle of cost recovery causes increase of water prices for people.

42 It would be necessary to start, as soon as possible, the development of the cadastre of water use (type of sources, abstracted quantities, losses, number of people supplied, quantities used by the industry, agriculture etc.), which could provide a clearer picture about the actual quantities of water abstracted for different purposes and users. These are all input parameters for the calculation of the economic price of water, and at the same time the indicators of the situation in the sector of water supply, which are calculated sporadically and most often exclusively for purposes of some reports and studies.

This is why it happens that the planning documents for development of water supply system, in which estimates are made, imply growth, i.e. increase of water needs in public water supply systems, but do not include analyses of the economic price of water, which directly affects the reduction of the abstracted quantities, or more efficient use of water as a resource. For now, water is still not the limiting factor of development, and the quantities range (this may be said for all users), within the standard limits of the neighboring countries and the EU.

Water utility companies are usually financially dependent on their own collected income. Most of the small water utility companies can hardly cover the basic costs of operation and maintenance (O&M) from the collected fees for water. In larger municipalities, the situation is even worse and water utility companies in most of the cases cannot cover the above mentioned costs from the collected income.

⁷ Brussels, 18.5.2010, COM(2010)228 final



Poor financial situation in most of the water utility companies does not allow investments in maintenance at the level necessary for extension of life of existing facilities. Due to limited financial resources, water utility companies can only do emergency repairs of the network, which means that many needs originating from the age of infrastructure may not be fulfilled. Still, the operators are doing their best to provide their services in most efficient way, and they are generally successful in maintaining a 24-hour water supply of adequate quality.

Lack of resources for water supply companies is largely due to the lack of autonomy and dependence on municipalities, which are generally not eager to increase the tariff rates. Through history, the water price was used as an instrument for social peace and as a political weapon, and it is the same today. Inadequate organisational structure and capacities within water utility companies are also part of the problem related to lack of resources. BiH Waterworks Association emphasised the following operational problems to lead to financial problems:

- Enormous daily water consumption per capita;
- Insufficient calculations of water consumption;
- Insufficient level of income collection and inadequate use of that which was collected;
- Inefficient budgeting and planning system;
- Inadequate water prices;
- Difficulties in management of water utility companies due to multiple services within the same company (e.g. water supply, wastewater collection and treatment, solid waste etc.).
- Inadequate capacities of local authorities (municipalities and water utility companies).

5.5 Drinking water quality

Quality of drinking water in FBiH⁸

On the territory of FBiH, about 73% of population is connected to the central water supply system, where water is mainly continually controlled when the health standards are concerned. The -chemical and microbiological analyses of water samples taken from 70 local water utility companies indicate that 21% of samples do not fulfil the conditions of the Rulebook on Sanitary Standards for Drinking Water. On the territory of Una-Sana, Herzegovina-Neretva, Zenica-Doboj, Tuzla, West Herzegovina, Canton 10 and Posavina Canton, the hygiene and sanitary state of the water facilities and the system of public health control of drinking water is not satisfactory. Most of the water sources of central water utility companies have regulated the first and second zone of sanitary protection, and use modern method of chlorination. However, in a large number of local water utility companies, the chlorination is performed manually, or not at all. The second zone of sanitary protection has mainly not been defined, and in individual water supply structures (non-tapped sources, wells, truck-water tanks, concrete water tanks), even the zone of strict sanitary protection has very often not been defined.

⁸ Source of data: HEALTH CONDITIONS OF THE POPULATION AND HEALTH PROTECTION IN THE FEDERATION OF BiH, Public Health Institute FBiH



Laboratories for control of sanitary standards of drinking water are equipped for standard analyses, while the periodic analyses may not be done due to lack of equipment. Because of that, it is not possible to determine the parameters such as heavy metals, pesticides, phenols, mineral oils etc. Control of drinking water is mainly composed of the analysis of basic chemical and microbiological parameters, number of tested samples is insufficient, therefore, adequate opinion about its quality may not be given. In Bosnia-Podrinje Canton, the town's water utility company Goražde represents the largest part of the water supply infrastructure, meaning that it supplies 80% of population in the Canton with drinking water. The first zone of sanitary protection is regulated, while in the second zone there is the largest number of potential polluters (septic tanks, illegal waste dumps, fish farms etc.).

The quality of water supply may be judged by the epidemiological situation related to diseases that might be caused by polluted water, and these are in the first place intestinal diseases. In 2008, the number of people suffering from the intestinal diseases (231.52/100,000 people) was somewhat lower than in 2006 (246/100,000) and 2007 (265/100,000 people).

For the implementation of complete monitoring of the risk factors (polluted water, air and land, contaminated food, waste substances, mines etc.), the existing equipment and human resources are insufficient.

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Drinking water quality in RS⁹

In 2008, 58 central water supply systems were controlled. Sanitary standards (chemical and microbiological) were not fulfilled in 34% of the cases, i.e. in 20 water supply systems.

Of 278 tested local utility companies, in 34 companies (2.9%) both chemical and microbiological standards were not fulfilled, while 41% of water utility companies did not fulfil chemical standards, and 29% of them did not fulfil the microbiological standards.

Two water borne epidemics were registered in the Banja Luka region.

⁹ Publication of health situation of the RS population for 2008, Institute for Public Health of the Republic of Srpska



6 Water Supply Situation

6.1 Operation of water supply systems

6.1.1 Population Covered by Water Supply Services

- a. Unreliability of Population Data All available information on the number of population is based on estimates. Frequent shifting of a large number of population during the war have resulted in the situation in which refugees significantly affect the increase or decrease of population, as well as population structure per municipalities, even in those municipalities where the population number has been relatively unchanged. The data applied for the purpose of this study are the data, or estimates, of the BiH Agency for Statistics (BiH Agency for Statistics BHAS, Federal Institute for Statistics and RS Republic Institute for Statistics), as well the data collected during visits to water utility companies and municipalities included in this project.
- b. Population and Service Activities Throughout collection of data, the questions referred to the total number of population per visited municipalities and data on the number of population connected to water supply and waste water network. Municipalities are administrative units consisting of a number of smaller inhabited settlements or villages, as well as central parts of a municipality comprising a water utility for provision of water supply and waste water discharge services. The assumption is that a water utility provides services on the overall municipal territory. However, in reality, majority of water utilities serves only central, urban parts of the municipality and one or several settlements within the municipality. The study, as much as feasible, attempts to give an assessment for the following:
 - (1) Total number of population on the overall municipality (including all populated centres)
 - (2) Total number of population currently covered by water supply services.

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Brief Overview of Collected Data on Population and Services According to the data obtained in the municipalities, water utilities and from the Institutes for Statistics, 61.7% of population out of the total surveyed sample is provided by public water supply services, or is connected to public water supply system. Coverage rate varies from 95% to 30%. Discrepancies in certain percentages have been identified in comparison of these data with the results of the survey on the number of population, what additionally indicates to the lack of accurate records. Detail overview of the accomplished results concerning total population and services in water sector for 20 selected municipalities are presented at the end of this chapter in Table 6-1.

6.1.2 Assessment of Water Sources, Water Quality, Plants and Systems

- a. Types of Water Supply Systems Table 6-1, at the end of this chapter, gives brief description of water sources and other information on water systems.
- b. Water Quality Regardless of the regulations, the practice of regular water quality testing exists only in large water utilities, and even such utilities provide standard testing of a limited number of parameters. Those are the conclusion of the analysis „HEALTH SITUATION OF THE POPULATION AND HEALTH PROTECTION IN FBiH“. Concerning water testing, majority of water utilities relies on work of the institute



for medical protection. On the other hand, survey results indicated a very positive perception of the population regarding drinking water quality, or no doubts in the quality of drinking water from public water supply system. Approximately 89% out of the total sample of surveyed population indicates no health problems caused by the quality of water they use at any of their household occupants. Concerning satisfaction with the water quality, average grade of 7 has been obtained on scale from 1 to 10.

- c. Water Treatment and Disinfection In all analyzed water utility supplied from wells (ground water sources), the only applied treatment is chlorine disinfection. There is no data on dosing and only one water utility indicated chlorine dosing control. In water utilities supplied from intakes on open water courses, water is treated at the plants.
- d. Reservoirs and Pipelines in the Distribution System Majority of water utilities possesses reservoirs and pumping stations, therefore, the electricity consumption is generally the most significant item within the budget of a water utility. In the majority of water utilities, distribution pipes, especially the secondary network, are the weakest link within their water supply systems. In principle, large defects are repaired in a relatively short period of time, but large number of smaller defect (leakages) occurs in the secondary network and cumulatively results in high percentage losses within the system. There is no leak detection programme; defects are repaired mainly per demands. The age of pipelines is 30 years and older.
- e. Water Production The best possible estimates obtained based on surveys and utility visits concerning produced water are presented in Table 6-3 Water losses on the territory of the observed municipalities are high;
- Losses in the FBiH are in average 64%
 - Losses in the RS are in average 52%
 - Losses on BiH level are in average 60%

Differences between produced and delivered water, or losses, vary from 9,7% which is a feature of water utilities in developed EU countries, through 19% to over 80%.

Total balance of intake, delivery and losses for the 20 observed municipalities is presented in Table 6-2.

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Table 6-1. Sources and Water Quality Control

Municipality	Water Supply System		
	Water Sources	Water Treatment /Chlorination	Comments
KAKANJ	Combined water supply system, 2 wells, catchment and surface intake of water	Water Treatment Plant, Intern Daily Control, Monthly Quality Control	Defect repair only per demand, very old pipes
TRAVNIK	Pressure water system, 3 catchments	Disinfection	Very old pipes
VITEZ	Gravity and combined system, source-well	Injection and chlorination	
BUSOVAČA	Gravity water system, surface water intake	Conditioning filtration and disinfection, daily chlorine control, quality control – 2x per week	Network losses, defects are repaired only per demand, new pre-sedimentation tank is



Municipality	Water Supply System		
	Water Sources	Water Treatment /Chlorination	Comments
			necessary because of water turbidity
NOVI TRAVNIK	Gravity water system, two sources (catchment and well)	Disinfection and filtration, weekly water quality control	Very poor secondary network (35 years), no water treatment plant
ORAŠJE	Well, Pressure at source, distribution – gravity	Disinfection	Existence of only one well at source is a problem as in case of the well defect, an interruption in water supply can occur, plenty of iron in water
DOMALJEVAC			
VELIKA KLADUŠA	Combined water supply system, 7 wells and one catchment	Disinfection, daily water quality control	Water Utility has internal laboratory
BUGOJNO	Combined water supply system, two catchments	Disinfection, monthly water quality control	
BIHAĆ			
KOSTAJNICA	Well, Catchment, on two sources	Disinfection, monthly water quality control	
DERVENTA	3 wells, Combined water supply system (both pressure and gravity)	Disinfection, weekly water quality control	Average pipe age is 30 – 40 years
MODRIČA	Combined water supply system, well	Disinfection	Defect repair only per demand
SRBAC	2 wells, Pressure	Disinfection, quality control 3x per month	
PRIJEDOR	Combined water supply system, 7 wells and two catchment	Disinfection, weekly water quality control	
TREBINJE¹⁰	Underground well, Combined water supply system	Disinfection, control according to the Rulebook	Poor pipeline condition, pipes age from 40 to 50 years, low reservoir volumes
SREBRENICA	Surface intake on river, gravity	Disinfection and filtration, monthly biological sampling	25 km of secondary pipeline is changed, main pipeline old 30 years

¹⁰ There is a design „Preliminary Design for Trebinje Water Supply System“ with two investment phases: Urgent Measures on Rehabilitation and Reconstruction of the Existing System and System Development Phase.

Municipality	Water Supply System		
	Water Sources	Water Treatment /Chlorination	Comments
ROGATICA	Combined (both pressure and gravity) system, 2 wells and one catchment	Chlorination, monthly quality control	Poor pipeline condition, average pipeline age is 50 years, no leakage detection
SOKOLAC	1 well, 4 catchment, 4 pressure water systems, one gravity	Disinfection, water quality control 2x per month	Very poor pipeline condition, age from 30 to 50 years, Defect repair only per demand
FOČA	1 well, catchment	Chlorination, water quality control 3 x per month	Pipelines are old 50 years, catchment rehabilitation necessary

Table 6-2. Total Intake, Delivery and Losses

Billed water (m ³)	23.438.810
Water intake (m ³)	60.193.269
Unbilled water (m ³)	35.839.915
LOSS IN WATER PRODUCTION (%)	59,5

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Detail overview of intakes, delivery and losses for all 20 municipalities is given in Table 6-3.

Table 6-3 Intake, Delivery and Losses for 20 Municipalities

In m ³ /year	Water Intake (Production)	Delivered Water (Billed Production)	Unbilled Production (Losses)	Losses in Percentage
KAKANJ	3.955.408	1.364.204	2.591.204	65,5%
TRAVNIK	8.500.000	1.550.000	6.950.000	81,8%
VITEZ	4.099.680	2.459.808	1.639.872	40,0%
BUSOVAČA	250.000	100.000	150.000	60,0%
NOVI TRAVNIK	1.576.800	376.325	1.200.475	76,0%
ORAŠJE	469.481	424.025	45.456	9,7%
DOMALJEVAC				
VELIKA KLADUŠA	3.991.771	1.698.291	2.293.480	58,0%
BUGOJNO	4.058.800	1.380.000	2.678.800	21,8%
BIHAĆ	9.623.607	3.689.646	5.933.961	61,66%

In m ³ /year	Water Intake (Production)	Delivered Water (Billed Production)	Unbilled Production (Losses)	Losses in Percentage
FEDERATION OF BIH	36.525.547	13.042.299	23.483.248	64,3
KOSTAJNICA	914.544	197.608	717.393	78.0%
DERVENTA	1.968.000	1.594.000	374.000	19.0%
MODRIČA	1.874.020	1.051.745	822.275	43,8%
SRBAC	1.293.202	785.771	507.431	39.0%
PRIJEDOR	5.500.000	2.267.108	3.232.892	58,8%
TREBINJE	4.750.000	1.900.000	2.850.000	60.0%
SREBRENICA	2.091.804	477.499	1.614.305	80.0%
ROGATICA	268.193	155.180	113.013	42.0%
SOKOLAC	1.854.359	620.208	1.234.151	66,6%
FOČA	3.153.600	1.545.000	1.608.600	51.0%
REPUBLIC OF SRPSKA	23.667.722	10.396.511	12.356.667	52.2
BOSNIA AND HERZEGOVINA	60.193.269	23.438.810	35.839.915	59,5

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6.1.3 Assessment of Water Consumption Measurements

- Measurement of Water Consumption at Water Source Over half of the water utilities possess flow meters on sources. Eight water utilities provide no measurements of water intake at sources. In several cases with water meters, only "partial" measurement is provided, providing certain number of water meters is out of function. In cases with no water meters, assessment of water intake is based on pump capacity data and the number of operational hours, or is provided in another way. The accuracy of estimates on water production is approximately 80%.
- Consumption Measurement for Customers There are serious defects concerning measurement of consumption for customers in all water utilities included in this study. Only some of the municipalities are fully supplied with water meters, some have a larger number of non-functional water meters, while some are provided with only a low percentage of water meters. Table 6-5 at the end of this chapter, presents conditions in all 20 municipalities concerning customers' consumption reading.
- Understanding Importance of Meter Readings In all official talks, a desire for improvement of the situation concerning consumed water reading has been indicated, with "new water meters" on all priority lists.
- Own Possibilities concerning Repairs, Replacement and Calibration of Water Meters Eleven (11) water utilities provides regular calibration of water meters, while calibration in one water utility is provided only at the customer's request. Only several utilities have (relatively modest) water meter repair and calibration



capacities. Even in such cases, it is limited only to small diameter water meters and only a couple of meters can be tested at the same time. Only one out of 20 observed water utilities possesses its own calibration station.

Table 6-4 Total number and number of supplied inhabitants

Municipality	Total Number of Municipal Population	Water Utility Services		Population Survey Results
		Number of Population	Percentage ¹¹	Percentage
KAKANJ	43.300	27.279	63,0%	52,9%
TRAVNIK	54.878	32.927	60,0%	73,8%
VITEZ	25.109	17.576	70,0%	84,3%
BUSOVAČA	16.068	11.248	70,0%	63,3%
NOVI TRAVNIK	24.884	9.954	40,0%	66,7%
ORAŠJE	19.594	7.838	40,0%	46,5%
DOMALJEVAC	4.252	0	0,0%	13,7%
VELIKA KLADUŠA	46.759	44.421	95,0%	90,9%
BUGOJNO	37.209	24.186	65,0%	93,0%
BIHAĆ	61.358	52.768	86,0%	100%
KOSTAJNICA	7.438	6.694	90,0%	21,9%
DERVENTA	41.873	12.562	30,0%	64,7%
MODRIČA	32.000	18.560	58,0%	63,7%
SRBAC	23.588	15.568	66,0%	66,3%
PRIJEDOR	94.824	60.000	60,0%	76,1%
TREBINJE	30.832	27.749	90,0%	96,1%
SREBRENICA	21.371	1.160	5,4%	96,3%
ROGATICA	14.347	10.330	72,0%	79,4%
SOKOLAC	16.943	12.707	75,0%	97,1%
FOČA	24.584	8.481	34,5%	79,8%
Total	641.211	395.513	61,7%¹²	71,4%

¹¹ Percentage assessment of the number of population in central urban and surrounding communities.

¹² Percentage is presented as service coverage rate for the overall observed population.

Table 6-5 Condition of Meters, Water Production and Customers

Municipality	Measures		Daily Water Production		Number of customers /households ¹³	Water Meter Coverage % ¹⁴
	At source	At customers (number or % of water meters)	(m ³)	l/apartment		
KAKANJ	There are flow meters on all 4 sources with total yield of 255 l/s, but 1 flow meter at the source with yield 45 l/s is out of function	94% consumers have water meters	3.738	137	8.342	94
TRAVNIK	There are flow meters on all 3 sources, total intake is 295l/s, but at intake of 25l/s flow meter is not in function	4500 small and 1000 bulk water meters, average age 5 years	4.247	129	10.069	55
VITEZ	2 sources with total capacity of 780 l/s, there are functioning flow meters on both sources	4800 small and 620 bulk water meters, average age 10 years	6.739	383	5.375	101
BUSOVAČA	3 main sources with total intake of 60 l/s, no flow meters, flow meter exists and is in function only at the filtering station	1200 small and 250 bulk water meters, average age 10 years	274	24	3.440	42
NOVI TRAVNIK	Only one non-functioning flow meter on two sources of total yield of 92 l/s	678 water meters average age 10 years	1.031	103	3.044	22
ORAŠJE	Electromagnetic flow meter exists, is functioning, and measures the total yield of 75 l/s	3088 small and 68 bulk water meters, average age 3 years	1.162	148	2.397	132
DOMALJEVAC						
VELIKA KLADUŠA	6 sources with 8 flow meters, all in function, total yield 300 l/s	10987 small and 618 bulk water meters, average age 4 years	4.653	104	13.584	85
BUGOJNO	There are flow meters on both sources but they are not in function, total yield 351 l/s	4251 small and 84 bulk water meters, average age 10 years, 95% individual houses have water meters	3.781	156	7.396	59
BIHAĆ	7 sources	Around 20000 water meters	10.109	191	16.137	124
KOSTAJNICA	2 sources with total yield of 29 l/s, both with functioning flow	1539 small and 6 bulk water meters, average age 15 years	542	81	2.047	75

¹³Number estimated (number of inhabitants divided by average number in household 3,27)

¹⁴Estimation



Municipality	Measures		Daily Water Production		Number of customers /households ¹³	Water Meter Coverage % ¹⁴
	At source	At customers (number or % of water meters)	(m ³)	l/apartment		
	meters					
DERVENTA	There are flow meters on 3 sources, but only one is in function, measured intake is 27,5l/s yield, while unmeasured intake is of 47l/s yield	2243 small and 20 bulk water meters, average age 10 years	4.367	347	3.842	59
MODRIČA	1 source, total yield 120 l/s, with non-functioning flow meter	5500 small and 100 bulk water meters, average age 25 years	2.881	155	5.676	99
SRBAC	2 sources, total yield 200 l/s, both have functioning flow meters	4369 small and 16 bulk water meters, average age 10 years	2.153	138	4.761	92
PRIJEDOR	10 sources with total capacity of 353 l/s, only 3 have flow meters which are in function at 85 l/s	8000 small and 900 bulk water meters, average age 4 years	6.211	103	18.349	49
TREBINJE	There is flow meter at source with total yield of 800 l/s	5702 small and 105 bulk water meters, average age 20 years	5.205	187	8.486	68
SREBRE-NICA	Central flow meter at source with total yield of 100 l/s is not in function, but 2 flow meters are functioning at filtering stations	750 small water meters, average age 10 years	1.308	1.127	1160	65
ROGATICA	At two sources with total yield of 79 l/s, there are functioning flow meters	800 small and 15 bulk water meters, average age 5 years	425	41	3.159	26
SOKOLAC	Out of 5 sources with total yield of 324 l/s, flow meter exists and is in function only at one source with yield of 56 l/s	3287 small and 25 bulk water meters, average age 10 years	1.699	133	3.886	85
FOČA	One source, total yield 150 l/s with functioning flow meter	847 small and 10 bulk water meters, 200 water meters are 5-year-old, others are older	4.233	499	2.594	33

6.2 Institutional organisation

6.2.1 Differences in Provision of Water Supply and Waste Water Services

a. Water Utilities – Departments of Utility Companies Water supply and waste water services in municipalities are provided either by a water utility, a company providing only water supply and waste water services, or a utility company, which provides various activities (street maintenance, central heating, park and cemetery maintenance, collection of solid waste and other similar services). In some municipalities, utility companies still provide different types of services. Utility companies in the Federation of BiH, within the observed sample, are limited operations companies 100% owned by the municipalities.

Utility companies in the Republic of Srpska, within the observed sample, are all shareholder companies, with combined ownership, but mostly “state” or with over 50% of shares owned by the RS Share Fond.¹⁵

Nine companies provide only water supply and waste water services, while eleven companies provide several services, as follows:

- Collection, treatment and distribution of water to customers,
- Removal, collection and treatment of waste water, solid waste disposal, sanitary and other activities,
- Collection and treatment of other waste, waste recycling,
- Funeral and accompanying activities,
- Market services: green groceries, goods and animal market,
- Other accompanying activities for completion of listed utility services including decoration and maintenance of green and recreational surfaces, and other.

Providing the above stated, it is difficult to define the exact number of employees in charge of water supply services.

Furthermore, in most cases, there is a lack of clear job descriptions for employees. It makes an impression that “everyone does everything”.

Concerning qualification structure, generally, there is a very small number of highly qualified staff.

b. Implications of These Differences to the Improvement of the Sector Approximately half of visited utility companies provide only water supply and waste water services, while the other half of them, in addition, provides many other services. Now the question is whether the decision on separation of water supply and waste water services from other services shall be made in the near future, prior to implementation of other more significant sector strengthening efforts.

¹⁵ RS Share Fund a.d. Banja Luka was formed by the RS Government based on the RS Law on Share Fund („Official Gazette of RS”, No 56/06, 1/07). In its portfolio, the Fund has shares and dividends, as well as state capital in companies which, by the enactment date of the Law on Privatisation of State Capital in Companies („Official Gazette of RS”, No 51/06, 1/07, 53/07, 41/08), have not been constituted in compliance with the Law on Companies or the Law on Public Companies.

6.2.2 Ownership of Assets

All infrastructural physical public assets in the Federation of BiH are owned by the municipality. Except the donor projects, only several municipalities have made significant progress in development of their systems when compared to the pre-war situation. Assets in the Republic of Srpska are owned by water utilities.

6.2.3 Autonomy and Relations between Municipalities and Utility Companies

- a. Overview At the moment, none of the water utilities has such a level of autonomy which enables acceptable development. Each operational system is under strict control of the respective municipality, and such control is frequently implemented in the manner which opposes the utility's sustainability. The municipality (local community) defines water/waste water tariffs and performs as the investor of all new water and waste water facilities (budget/loan). The municipality issues the Decision on Water Supply to define rights and obligations of the Company and the customers.
- b. Municipal Organisation All municipalities are under the management of the municipal parliament (council), and the parliament members are selected on municipal elections. The councils are large. The council mostly consists of 50 to 60 council members. In most cases, the municipal mayor elected on municipal elections performs the executive function. The mayor has a very high impact on performance of public municipal services. Each municipality has a Secretary for Economic and Service Affairs, responsible for municipal economy and all service activities. In some cases, the secretary is a member of the Steering Board, and generally, this office has a significant impact on performance of all public service companies.
- c. Characteristic Relations between Municipalities and Water Utility Companies Joint characteristic of the relation between the utilities and municipalities is that the utilities submit reports to their Steering Boards appointed by the municipal council. However, some water utilities have additional levels of the municipal control. As described above, municipal mayors and secretaries for economic and service affairs have significant impact, even though they have not been directly involved in the organisation management chain.
- a. Membership in Municipal Steering Boards steering Board members are always appointed by the municipal parliament (council) and it is a common practice that they are appointed on a four-year mandate. Number of Steering Board members from water utilities is always less than half; however, all major decisions of the Steering Board must follow the procedure of council's revision and approval. And additionally, the council or the mayor on behalf of the council is responsible for appointment of the utility and utility company directors.
- b. Presented Problems of the Lack of Autonomy There are several potential (and many already existing) problems concerning such enormous municipal control which may negatively affect the ability of utility companies to perform efficiently. Examples of the noted problems are listed below:
- *Qualifications of the utility directors are not essential as the decision on the director's appointment is a political decision.*
Significant number of directors in twelve visited utility companies has not been provided either with training or experience in the respective sector prior to their appointment.
 - *Financial sustainability of a water utility is of secondary importance.*



Tariff increase requests are often rejected, and in some cases, tariffs are reduced rather than increased as the municipal officials use it to collect votes from voters (customers). Utility's requests for disconnection of water supply to commercial and industrial companies not covering their water expenses are most frequently rejected, supported by the explanation of taking care of business performance of such companies. Entity Governments make the same mistake, in imposing and rigorous collection of high taxes, calculated on billed revenues (instead of on collected revenues), which is unacceptable for the majority of water utilities. Military institutions, hospitals and other public users of the utility services mostly never pay for their bills. It can be stated that the situation with this regard is somewhat more convenient in the Republic of Srpska as the companies have been partially privatised, and such companies must consider their financial self-sustainability as the priority in their business performance.

- *Municipal officials sometimes "interfere" in the utility's activities.*

Visited utility companies indicated several cases when the municipal officials ordered them exactly which measures to undertake, though being under exclusive authority of the utility.

- Municipal denial of water utility rights to control their staff.

Salaries and benefits of the utility employees are restricted by the municipalities. Although several directors stated to have the power to discharge and employ staff and provide their benefits, it is not the case in each utility. They are very lack if given such rights, as municipal controls are generally very strict and they can act only with the consent of the municipality which is in most cases unofficial. It is very unlikely that any of the municipal mayors will allow water utilities to act differently to other municipal departments.

6.3 Water utility organisation

- a. Overview Principles of organisation of water utility and utility company departments are rather different. Differences have been noted not only in types or sizes, but even within the categories themselves. It mostly refers to main sectors responsible to the directors; however, it refers much more to departments within such main sectors. Diversity of main sectors is further described, but differences among departments within each main sector are rather complex for a brief overview. Certain divisions appear as rather reasonable, while some are rather illogical.
- b. Types of Organisational Forms of Utility Companies There are various models of utility company organisation. Based on one model, main division is per type of services, and there is a joint department which provides financial, personnel and other services to all other operational units. The only function of the unit responsible for water supply and waste water is to operate and maintain water supply and waste water facilities. The other model consists of a technical department (controlling all operational services), and economic-legal department. The third model is a combination, with the operational department instead of the economic-legal department. In some slightly larger companies there is a company Management in addition to the two departments. Water Utility of Trebinje, with 97 employees, represents a large company with a wider organisation scheme and 6 departments (water network maintenance, waste water network maintenance, legal, personnel and general activities, economic activities, billing and collection, water quality control) and management.



6.3.1 Management and Administration

- a. Management capacities appear to be very different. It would be necessary to spend much more time in companies than available within this project, to conduct a complete analysis. Some directors and expert associates have described procedures for allocation of assignments and reporting requests in a way which indicates their understanding of good management concepts. Meanwhile, in some cases, the directors have no identified priority problems; they present unreal plans for large investments or do not consider reality when conditions water utilities perform in are concerned. It is sure that all water utilities suffer from a lack of programmes to support management staff to become efficient managers and acquire capabilities to perform and manage businesses. In several water utilities, the director had no knowledge of basic system information, but had to inquire his technical and financial assistants.
- b. Administration Above described restrictions refer also to administrative capacities. Administrative departments within water utilities suffer from the lack of logical organisational solutions within their departments, vague identification of obligations and responsibilities and departments and employees, poor reporting systems and serious lack of appropriate office facilities and supplies.

6.3.2 Planning, Studies and Mapping

- a. Plans and Feasibility Studies Concerning plans, water utilities state to have none, and refer to plans of other agencies or describe how they understand a future management plan. Within the scope of information available about such plans, they appear with capital investment plans with cost estimates for required facilities, but without operational cost estimates. Moreover, such plans present a summary of all improvements they wish to achieve, without consideration of technical or economical feasibility in relation to the utility company needs (or their customer needs) and the investment payment possibilities. In fact, the utilities do have a budget, but the budget available in most of the utilities is very low.
- b. Mapping possibilities are rather different. Some utilities have had a good quality maps for all of their facilities, but most of such maps have been designed in the past and by someone else. The maps are often the only examples which cannot be reproduced and are outdated. Many directors complained about not knowing the locations of their pipes and valves and not being able to isolate the system in case of pipe bursts. Some of them are familiar with GIS (Geographic Information System), but only three utilities possess maps in GIS format.

6.3.3 Operational Procedures

- a. Facilities Many facilities within the water supply system have been constructed following the Yugoslavian government procedures and most of them date from 35 years ago. The plants are mostly simple, and in most cases, water supply systems consist of sources and wells.
- b. Operation Manuals In most cases, only donor supported recently reconstructed facilities are provided with operation and maintenance manuals. In case of the lack of manuals, most of the utilities manage facilities in accordance with procedures developed by former utility staff.

- c. Operational Efficiency Generally, it appears to be that the operators provide their services rather efficiently, despite their handicap caused by the system age and lack of spare parts.

6.3.4 Preventive Maintenance and Repairs

- a. Concept and Practice of Preventive Maintenance Most of the technical directors and operators understand the need for preventive maintenance and several of them have described existing preventive maintenance programmes. Visits and reviews have been too short to confirm whether such programmes are being implemented or not. Difficult financial situation of the majority of water utilities raises a question whether preventive maintenance have been implemented in the extent required for prolongation of the facilities life span. It has become clear in certain utilities that there is either poor or none preventive maintenance.
- b. Repairs Previous chapters contain information on water meter repairs. Repairs of water supply pipes represent serious problems for the majority of water utilities.

6.3.5 Personnel Issues

- a. Staff Level In most utilities, it has been stated that the current staff potential is 30-50% based on the pre-war level, thus, that is where the staff incompleteness derives from. However, the analyses show that almost all utility companies have more staff than similar West-European utility companies (which often have 4 or less employees per one thousand connections). As presented in Table **Error! eference source not found.** at the end of this chapter, staff level in most of the utilities varies from 2,2 to 26,3 employees per one thousand household connections. Of course, it must be noted that it is very difficult to estimate which staff members are engaged only in water supply activities. For table purposes, it has been estimated for all water utilities that 70% of the total number of employees works on water supply. The standard of 4 employees per 1000 connections is fulfilled in 6 water utilities. In case the number of employees is estimated to 100, the number of employees per 1000 households varies from 3,2 to even 23,3.
- b. Training None of water utilities currently conduct some training for their staff, except the training provided in cooperation with donor programmes.
- c. Staff Management Staff issues are most frequently within the department called "legal and other services". Development of human resources, led by trained experts, in sense of estimates, initiatives, training, definition of goals or other functions, has not been presented as high priority activity in water utilities.

6.3.6 Information Availability and Reporting

- a. Information Availability Time limits and incomplete answers disable accomplishment of a clear picture about the level of data collection, information availability and reporting practice. Based on the obtained information, there is sufficient space for improvement. In many cases, it appeared to be that the directors were unable to give answers which require certain data, which the directors in western water utilities have ready and most frequently saved in their office computers. In some utilities, the director does not have a computer at all. The data related to the number of supplied population, number and type of customers and connections, produced water and other absolutely basic data must



often be requested from other departments. It clearly points out to the existence of significant problems in collection of data and reporting procedures. There are also examples of well informed directors or excellently nominated liaisons who provided very relevant answers.

6.3.7 Customer Relations

- a. Customer Relations Utility's public relations programmes are mostly directed to responded complaints. In best cases, the customer bill contains a list of telephone numbers of the department managers for direct contacts or the utilities establish offices within their administration buildings and/or municipal headquarters for submission of customer complaints. The latter ones primarily serve for payment of bills. In other cases, according to the utility representatives, customers can submit complaints to meter readers as well (providing the customers possess functional water meters) or bill distributors, which is a frequent practice. One utility complained that the customers communicated with the director, while in other case customers would complain to the mayor and not to the utility and the mayor would contact the utility to undertake certain steps. It all indicates that the focus is on the procession of complaints, and not on how to improve customer relations.

Table 6-6 Number of Customers and Employees in Relation to the Number of Connections

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Municipality	Number of Supplied Population	Number of Employees	Number of Households	Number of Employees per 1,000 Water Connections
KAKANJ	27.279	144	7.190	12,1
TRAVNIK	32.927	142	77.700	9,9
VITEZ	17.576	17	5.200	2,2
BUSOVAČA	11.248	15	1.500	3,1
NOVI TRAVNIK	9.954	24	4.031	5,5
ORAŠJE	7.838	18	2.784	5,3
DOMALJEVAC	0			0,0
VELIKA KLADUŠA	44.421	59	11.273	3,0
BUGOJNO	24.186	32	6.372	3,0
BIHAĆ	52.768	133	23.445	5,8
KOSTAJNICA	6.694	23	1.545	7,9
DERVENTA	12.562	42	5.349	7,7
MODRIČA	18.560	38	5.500	4,7



Municipality	Number of Supplied Population	Number of Employees	Number of Households	Number of Employees per 1,000 Water Connections
SRBAC	15.568	52	4.285	7,6
PRIJEDOR	60.000	113	14.900	4,3
TREBINJE	27.749	97	8.505	8,0
SREBRENICA	1160	27		16,3
ROGATICA	10.330	30	1.800	6,6
SOKOLAC	12.707	65	3.760	11,7
FOČA	8.481	29	3.200	7,8

6.4 Financial assessment

- a. Specific Problems in Giving the Financial Assessment – Assessment of the financial data is complex, primarily due to impossible insight into all financial reports and indicators. For many RS utilities, it is possible to access some financial reports online on Banja Luka Stock Exchange website, but not for all utilities although all of such utilities as shareholder companies are obliged to publish their reports publicly. The situation in FBiH is worse due to no public presentation of financial reports, as well as due to non-willingness of many directors to allow review of such reports (although it refers to public companies). Of course, in the majority of cases, main accounting techniques and internal controls have turned to be responsible and consistent. Detail review would probably result in certain imperfections within the financial system which require elimination.

6.4.1 Financial Politics and Controls

- a. Introduction Many water utilities have ascertained policy consisting of daily monitoring of financial transactions. Utility employees are well introduced into the system.
- b. Annual Control of Financial Reports Water utilities are obliged to provide audit of their financial reports by an independent auditor, but it cannot be fully confirmed that all water utilities fulfil this obligation regularly. The results of such audits, for the FBiH, are hardly available to public, while the results for RS can be found on the stock exchange website.
- 60 c. Authorised Control Except independent accountants authorised by the governmental institutions in both entities, in some cases, authorised accountants are employed in the utilities or municipalities.

6.4.2 Accounting Practice

- a. Type of Applied Accounting Systems In all studied water utilities, one of the two accounting systems is used. Accounting systems and procedures are regulated by FBiH and RS laws.
- b. Accounting Procedure and Practice in Water Utilities Accounting records in all water utilities are based on International Accounting Standards and International Financial Reporting Standards.
- Accounting procedures in RS are closely regulated by the following accounting laws and regulations:
- Law on Accounting and Auditing („Official Gazette of the Republic of Srpska“ No 67/05),
 - Rulebook on Use of Chart of Accounts for Companies and Communities, Other Legal Entities and Entrepreneurs with Separate Bookkeeping („Official Gazette of the Republic of Srpska“ No 120/06),
 - Rulebook on Balance Sheet and Income Statement Forms for Companies and Communities, Other Legal Entities and Entrepreneurs with Separate Bookkeeping („Official Gazette of the Republic of Srpska“ No 120/06) and
 - Rulebook on Contents and Forms of Financial Reports for Companies, Communities, Other Legal Entities and Entrepreneurs („Official Gazette of the Republic of Srpska“ No 84/09).



In the Federation of Bosnia and Herzegovina, accounting procedures are closely regulated by the following accounting laws and regulations:

- Law on Accounting and Auditing („Official Gazette of FBiH“ No 32/05),
- Rulebook on Use of Chart of Accounts for Companies and Communities, and
- Rulebook on Balance Sheet and Income Statement Forms for Companies and Communities, Other Legal Entities and Entrepreneurs with Separate Bookkeeping.

All water utilities follow the regulations. They are obliged to prepare and provide “banks” with insight into semi-annual reports, prepared in standard form and based on above listed laws. “Independent accountant” authorised to prepare such reports must co-sign them. Finally, Financial Control, in charge of verification of the reports validity, provides periodical overview of reports. Generally, accounting laws are adequate in sense of fulfilling the control needs. The standards include tax control and provision of appropriate closing of transactions.

6.4.3 Financial Systems and Documents

- a. Separation of Services Unless water utilities operate exclusively as water supply and/or waste water companies, the activities and expenditures cannot be separated from other public service providers. Namely, revenues and expenditures from water supply and waste water services are not recorded separately, but are combined with other utility services. Therefore, donors and loaners supposed to be reviewing the financial situation of a water utility can hardly check the ability of the water utility in sense of donated funds sustainability, or loan repayment possibility.
- b. Unique Chart of Accounts Water supply and waste water companies do not have separate, unique chart of accounts. Current chart of accounts applied in water utilities is a modified system used by all public utility companies in both entities. There is no unique chart of accounts which observes water supply and waste water function separately from other public service functions.
- c. Management Information Systems Some water utilities face the lack of computerised accounting systems which would enable differentiated monitoring of costs and revenues in relation to the type of work. In larger and better equipped water utilities, there are very good information systems able to provide adequate information.

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6.4.4 Tariff Policy

- a. Introduction Project water utilities apply very different tariffs. One utility uses monthly flat rate per person for all households and unique tariff for commercial and industrial customers. Another utility uses different calculation for a m³ of water for different customers, and adds monthly rate whose amount is larger for larger water meters. Many utilities share one joint thing: total income achieved through existing tariffs would not cover annual costs, not even when all bills were paid.
- b. Tariff Structure Majority of water utilities apply tariff structures which require modifications and tariffs which shall be increased to become cost covering. Several utilities has alternatives to the basic tariff and if water meter replacement programme was implemented, the tariffs would have two components:
 - 1) Flat rate part per customer or water meter; and
 - 2) Consumption rate per the amount of consumed water.



Customers are differently billed, based on water meter size or type of service. The majority of water utilities bill their customers based on volumes, where one tariff is applied to each consumed cubic (this situation is usual in the majority of utilities). None of the water utilities uses decreasing tariffs (reduction of unit tariffs per m³ for certain customer structures). On the other hand, none of the water utilities uses increasing tariffs either (increase of unit tariffs per m³ for certain customer structures). Several utilities use one form of increasing tariffs based on which large consumers, such as industry, has higher (although uniform tariffs per m³ of water for their category) than for example households. Different tariff for consumed water may be used by the water utility as a signal to customers (to encourage higher water consumption, to preserve water, or to provide subsidised tariff for customers with low income).

Almost all water utilities measure the consumption of large commercial/industrial¹⁶ customers. For households, if the utility does not have functional water meters for private houses or apartment buildings, the tariff is based on the assessment. The bill is based either on the expected consumption assessment, pre-war consumption or flat rate per person, based on the assessment of consumption per person.

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- c. Tariffs or Utility Service Prices are obligatorily approved by the local self-government unit, or the municipality, per proposal of the utility company. Current tariffs are not real cost covering tariffs as they do not cover the overall costs. Water utilities mainly manage to cover their basic operational costs and ensure funds for necessary investments, basic repairs and maintenance. The problem which may occur in future is that service tariffs for water supply and waste water discharge are subsidised from revenues from other services, such as civil works and new connections. Although it becomes acceptable at the moment being, it may not be sustainable in a long-term sense. Utility companies shall allocate their costs separately for each major activity and produce reports to show profitability of different business segments. Water utilities almost never receive any subsidies from municipalities or other authorities for their operational activities. Municipalities should accept the need for gradual increase of tariffs directed towards cost covering tariffs.

Another problem is determination of tariffs for customers. Tariffs are determined in a way to cover basic maintenance and operation costs of the company, and not on the basis of a cost covering principle. Therefore, the utilities "subsidise" poor payment ability of their customers through unsustainably low water tariffs.

- d. Water Bill In most cases, VAT (17% to the total amount), water protection and water abstraction fee are added to the existing bills, and thus directly ceded to customers. In addition to the fee based on the amount of consumed water, there is a monthly fee for water meter maintenance for all customers, defined on the basis of water meter diameter.
- e. Calculation of Additional Services Many utilities provide collection for connections. No other charges for additional services have been noted. For example, fire protection, water connection/disconnection and default interests for late payments.

6.4.5 Water Meter Reading, Billing and Collection

¹⁶ Water utilities include „public“ customers into the list of industrial customers. Public customers include large consumers, such as the army, schools, hospitals and public buildings.



- a. Water Meter Reading and Billing Currently only in some water utilities read their water meters and issue bills each month.
- b. Collection Problems The most important financial issue, according to the opinion of directors and financial directors of water utilities, is their collection inability. Their relation towards this issue varies from the overall frustration to unwillingness to accept such situation. Table Error! Reference source not found. presents estimated collection rate for each water utility.

In many cases, the companies have not been able to give precise information for water supply sector only.

Billed water production for 2009 in BAM for the observed 20 companies is BAM 25.731.505 or:

- BAM 15.968.973 in 9 companies in the Federation of BiH and
- BAM 9.762.532 in 10 companies from the Republic of Srpska.

Collectability of outstanding receivables, according to this data, is relatively good and is 79.6% in average.

Detail overview of billed water production and collection rate is given in table below.

Table 6-7 Water billing

	Revenue from Water Collection (BAM/year)	Collection Efficiency (%)
KAKANJ	4.171.865	115
TRAVNIK	1.696.852	69
VITEZ	775.000	62
BUSOVAČA	300.000	75
NOVI TRAVNIK	389.927	76
ORAŠJE	345.767	96
DOMALJEVAC	-	-
VELIKA KLADUŠA	2.430.253	94
BUGOJNO	934.000	92
BIHAĆ	4.925.308	95
FEDERATION OF BIH	15.968.973	86
KOSTAJNICA	157.340	58,7
DERVENTA	568.706	95
MODRIČA	808.119	94
SRBAC	1.154.015	84
PRIJEDOR	2.406.500	83
TREBINJE	2.198.349	69.5

	Revenue from Water Collection (BAM/year)	Collection Efficiency (%)
SREBRENICA	157.400	66
ROGATICA	565.190	91
SOKOLAC	1.088.163	80
FOČA	658.750	70
REPUBLIC OF SRPSKA	9.762.532	73.25
BOSNIA AND HERZEGOVINA	25.731.505	79.63

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- c. Collection rate on annual level is relatively high, providing many companies have improved their collection procedures and strengthened the respective activities. However, almost all companies deal with outstanding receivables from previous years, which in most cases result in "disputable receivables". Such disputable receivables mostly refer to receivables from public institutions. Concerning the slowness of court procedures, some of the utilities offer their debtors certain agreements on debt repayment, however respected by domestic customers. Anyhow, payments of large amounts from for example the army, hospitals and similar customers are awaited for years.
- d. Policy and Practice In several utilities, there is no clear collection policy. Even those who do have it, do not publish it, therefore the customers and the utility staff are often ignorant of the collection. Most utilities have specific payment deadline, however, the exact data on the maturity date are not included in the customer bill. In many utilities, customer bills present only current debts. Previous sum of debts is not presented on the last bill distributed by the utility; therefore, the customer cannot define the total debt sum. Furthermore, if the total debt is presented on the bill, the utility lacks the data on the debt age. All debts are accumulated and as such result in time issues. In case on one utility, a person reads the water meter on site and performs manual calculation of the customer bill for households. The bill is produced in three copies and collection is required on the spot. If collected, the customer receives one copy of the bill. Otherwise, the meter reader keeps all three copies and carries the bill back to the financial director of the utility. The customer will not receive another bill for such billing period unless he/she goes to the utility self initiatives and makes the payment. In water utilities with clear collection policy, commercial customers receive two warnings for late payments. Domestic customers receive three warnings. Lawsuits are raised against the domestic customers in apartment buildings and industrial customers, unless the payment took place after the last issued warning letter. Disconnections are applied to domestic customers in private houses and commercial customers.
- d. Collection from Government Institutions Collection from this group of customers is significantly lower when compared to the collection from other customers. The highest receivables in almost all utilities are from the army and/or hospitals. It appears to be that the utilities are not able to collect such money from the government as well as that they face the lack of support from municipal government in collection of debts which derive even from the beginning of the war period.



- e. Lack of Water Meter Replacement Programmes Significant number of water meters does not function properly. The largest number of defected water meters is within the group of domestic customers. Some water meters are old mostly defected during the war. Some utilities apply intensive water meter replacement programmes. Inability of water utilities to do the measurements has both financial and institutional consequences on the water utilities.

6.5 Recommendations for water utilities

6.5.1 Institutional aspect

First priority within the institutional strengthening programme and these recommendations is the increase of the autonomy of water utilities.

Implementation of a successful measurement programme has been described as the second priority. In order to become really successful, it is insufficient for the measurement programme to have only functioning meters on all sources and all customer connections. The programme must contain elements such as establishment and implementation of the programme for following issues:

- Early identification and fast elimination and replacement of non-functioning water meters,
- Periodical (from six months to one year for large water meters and approximately five years for small household water meters) replacement and recalibration, or repair of small and large water meters,
- Selection (from minimum two different manufacturers, due to competition reasons) of the water meter type suitable for local conditions and of reasonable price,
- Calibration, repair and/or reinstallation of the water meter, type and capacity equivalent to the existing ones within the system and
- Reading and recording of data from all water meters in due course and accurately (with the possibility of supervision for accuracy purposes).

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The use of data collected through customer meter readings is analyzed in the financial recommendations.

Third priority are the Development Programmes for water consumption management and reduction of the unaccounted for water.

6.5.1.1 Other Institutional Strengthening Programmes

- a. Separation of water supply and waste water services from other utility services
- b. Internal reorganisation
- c. Development and implementation of Management Information Systems (MIS)
- d. Development and implementation of successful customer relations
- e. Staff management and training At the moment, staff management is undeveloped and current financial situation in all water utilities excludes the possibility of major



staff training. That must be changed. It would be useful to prepare basic, appropriate management and staff training programmes. Recommendations shall give minimum components for one such programme. It includes types of staff data which shall be preserved, persons in charge of data updates, confidentiality measures, periodical verification procedure, stimulation and promotion system, identification of training needs and all other similar components which may be appropriate for autonomous sector organisations within the local surrounding.

- f. Energy consumption control
- g. Improvement of mapping capacities
- h. Development of operation and maintenance improvement programmes
- i. Development of Planning Capacities
- a. Water quality tests

6.5.2 Financial recommendations

6.5.2.1 Priority Needs for Financial Strengthening

- a. Identification of Leading Needs for Financial Strengthening Priority problem of the majority of water utilities is low collection rate. A problem with the public sector is related to this issue (military institutions, hospitals, schools and government institutions) as the public institutions are the poorest payers and the utilities do not provided with any support in sense of collection of such outstanding receivables. Other problems related to finances are analyzed in the institutional recommendations, including general lack of water meters as basis for an accurate calculation of consumed water and inability of water utilities to deny service to their defaulting customers. Other financial problems include lack of reliable and comprehensive billing system; unsuccessful identification of the real budget and, even if prepared, the inability to monitor it; overburdening of bills with high taxes (not only to the collected amounts); water tariff for customers us relatively low and it is difficult to increase it.
- b. Collection Strategy for Customers in Apartment Buildings Preparation of this strategy would mitigate collection for such cases when more customers are connected to one water meter. Identification of a way to deliver one bill to an apartment building owner, or apartment building council, in case of different owners of apartments within a building. This solution is much better than the delivery of individual bills to each family. In such a way, the responsibility is transferred to the apartment building owner or council.
- c. Recommended Priority Areas for Financial Strengthening Chapter VIII about the institutional recommendations aligns many institutional weaknesses of water utilities, as well as the lack of autonomy in their performance. The same issue is applicable to the control of their financial performance, but this problem is presented as an institutional problem which shall be resolved. The following parts of this chapter will give specific recommendations concerning below listed priority needs:
 - Collection rate increase,
 - Development of efficient accounting systems,
 - Development and use of real budgets,
 - Reduction of existing taxes,
 - Introduction of more realistic tariffs.

6.5.2.2 Collection Rate Increase

- a. Adoption of a More Aggressive Policy Aimed at Collection of Outstanding Bills
- b. Unsettlement of Debts by Public Customers Water utilities will require government's support in collection of post-war debts of the army and hospitals. Water utilities should write off debts of public customers which occurred during the war period, but the government must settle the debts which have accumulated after the war in a very short period. The alternative to transfer those debts to other customers is neither feasible nor fair. The government which aggressively deals with water utilities when taxing is concerned must have the obligation to settle its own debts.
- Local support shall provide definition of revenue collection strategy for services supplied to public customers (army, government, hospitals and schools).

6.5.2.3 Development and Implementation of Efficient Accounting System

- a. Introduction of a Uniform Accounting System for Utility Water Companies Such uniform accounting system may consist of one billing diagram which fully divides water supply and waste water. As an alternative, there is the possibility to develop two separate uniform diagrams, one for water supply and the other for waste water. Billing system shall include the non-operational group of positions as well. Those positions refer to water utility services not related to water supply or waste water. This billing system may be taken over from international organizations dealing with accounting issues which apply developed water supply and waste water billing system or may be taken over from the State Association of Commissioners for Utility Companies – USA organization or similar European organizations.
- It is necessary to provide support in development of models for basic billing diagram to be used in water supply organisations,
 - Additionally provide support in preparation of billing models for selected water supply organizations and assist them in the model implementation It will require local staff training in the use of a new billing system.

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6.5.2.4 Development and Implementation of Efficient Budget System

- a. Budget Development Based on Responsibility Support and training shall be provided in sense of development of a budget and accompanying policies and procedures. It is necessary to provide additional support for selected water utilities to enable integration of this process into the computerized accounting system.
- b. Budget Development per Main Departments (finances, water supply, distribution) and adjustment of budget costs with actual costs minimum four times a year. It will provide fund management and enable to utility companies to stay within the estimated cost limits and maintain appropriate revenue inflow. Department managers will undertake to responsibility on reporting on these flows and keeping business within the budget estimates. In many cases, if the department manager is able to submit the report in due course, it will help the director to monitor costs and undertake any corrective measures if needed. Department managers shall prepare



explanations four times a year in case of major deviations from budget guidelines. Management body shall approve these reports and present them to the Steering Boards for their approval and board records.

6.5.2.5 Reduction of Encumbrance with Existing State Taxes

- a. Development of Possibilities to Grant State Tax Advantages to Water Utility Companies FBiH and RS shall change their policy applied to state tax in sense of taxing the collected instead of billed. It will significantly reduce financial encumbrance of water utility companies. Current tax policy is based on the cash sum recorded on the customer bill, which is a totally different amount from the amount possessed by water utility companies via collection from their customers in all studied cases. Water utilities manage to collect only 10 to 80 percent of the total amount. In most cases, government agencies (army and hospitals) significantly contribute to this collection issue.
- Provide help and support to change the laws on state taxes for utility companies and introduce a more just tax mechanism,
 - Additional advising and support to water utility organizations to develop practice of supporting their joint interests.

6.5.2.6 Establishment of Cost Covering Water Tariff

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- a. Prepare Studies on Fully Specified Service Costs Almost all visited water utility companies apply tariffs which require changes and increase to cover the costs. The study on cost coverage for the provided services shall be prepared for the majority of water utility companies including development a more just tariff defining mechanism. If water meters are available and functioning, the tariff structure shall have two components: (1) customer or fixed amount; and (2) amount related to consumed water volume. Customer amount can be a fixed amount or based on water meter size or type of service. The tariff identified on the consumption basis may be uniform (most visited utilities use it), reducing (lower unit amounts with increasing consumption) or increasing (higher unit amounts with increasing consumption).
- The support is required in preparation of service cost studies and staff training in field of tariff defining methods and increase of their capability to be granted the tariffs.
- b. Form Separate Tariffs for Additional Services Water utilities shall consider tariffs for additional services related to water supply and waste water and provided to their customers. Additional services include (1) fire protection, (2) office service costs (costs caused by late payments, collection costs), (3) connection and system extension costs; and (4) site service costs (disconnections/connections, water meter testing). These additional services produce significant costs when work force and material are concerned, but are provided only to some customers. Therefore, these special costs shall be a burden to the customers who cause them. With this approach, the utility companies reduce necessary costs for all other customers.
- Provide support in identification and development of tariffs for additional services for each water utility.



- c. Government Support for Families with Low or Fixed Income Issue political decision to subsidise customers with low or fixed income by means of donors. Municipality, Canton or Federal Government/RS Government shall provide funds to cover the difference. This will improve collection via collection of the amount affordable to a customer and coverage of a part of costs by those responsible for social benefits. Lower tariffs for such new customer class shall be a part of the newly proposed tariff structure for all water utilities.
- Provide support in dividing customers with low or fixed income, and in developing special tariffs for such customer class,
 - Develop strategy and legal framework for requests to responsible government agencies to compensate costs to water utilities for subsidized customers.

6.5.2.7 Complementary Programmes for Financial Strengthening

Following programmes are of a lower priority but the utilities will eventually require reaching the desired goal in efficiency and equivalency with similar European utility companies.

- b. Maintaining Separate Accounting for Water Supply and Waste Water Services Half of observed utility companies provides other municipal public services in addition to water supply and waste water discharge. Activities and costs related to water supply and waste water services shall be recorded separately from other public services until such other services are transferred under the authority of special municipal companies. Revenues and costs of water sector shall be recorded separately for the donors and creditors to have insight into the capacities of a utility to manage the donated investment or repay loan funds.
- Provide support to water and waste water sector in existing utility companies to introduce separate accounting for this type of utility services.
- c. Tax Costs to Services on Customer Bills as a Separate Item All water utilities shall consider the list of all taxed services (excluding profit), but shall separate water supply and waste water services as a special part. Water utilities may use that to present their customers the impact of tax, imposed by different governmental authorities, on the amount of their bills.



for
UNDP

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PUBLIC OPINION POLL FINDINGS
General Assessment of the Water Supply Sector
and its role in Human Development
in Bosnia and Herzegovina

PROTECTION OF RESPONDENT PERSONAL DATA CLAUSE

Prism Research, in accordance with ESOMAR and AAPOR rules and regulations is obliged to protect the anonymity of respondents. All questions / variables that contain any type of information about the identity of respondents are removed from the report and the final database. This means that the answers given by respondents are physically separate to data that relates to their identity. Any purposeful attempt to come by the identifying data of respondents, whether by the Client, Prism Research, or any third party will be considered a serious violation and will be treated as such.



1. Introduction

For the purposes of the project 'General assessment of the water supply sector and its role in human development in Bosnia and Herzegovina, Prism Research, agency for social, market and media research, conducted quantitative research with the aim of collecting data on the opinion, experiences and attitudes of members of the general public in relation to water supply.

The research survey was conducted using computer-assisted telephone interviews in the period from 20-30 October, 2010. Respondents were citizens of 20 municipalities in Bosnia and Herzegovina – 10 municipalities in the Federation B&H and 10 municipalities in the Republika Srpska. Respondents in this survey were household members primarily responsible for paying the bills in their households. There were 100 respondents interviewed within each sample municipality.

This report presents the main findings of this survey.

2. Key Findings

In the total sample, 71.4% of respondent households have a water supply connection. In this regard there are significant differences between municipalities, settlement types, education levels of respondents, The majority of respondents of the total sample (61.9%) state that they do not use alternative sources for drinking water and of those that do report using alternative sources of drinking water cite natural water springs as the alternative. Certain differences were identified according to the demographic variables of education level, settlement type. The vast majority of respondents of the total sample (91.5%) do not use alternative sources for non-potable technical water.

64.1% of respondents of the total sample report that they do not have experience of interruptions in water supply. The significant demographic variables identified for differences are total monthly household income. Of the respondents that are faced with interruptions to water supply, a large majority (82.6%) report that water supply interruptions occur **sometimes**. 51.3% of respondents from the area of the Rogatica Municipality state that they are faced with water supply interruptions **daily**. Total monthly household income is a significant demographic variables relating to this question. The average duration of interruption to water supply reported by respondents who reported this experience is 17 hours. Respondents with higher levels of education tend to report lower average duration of water supply interruptions and reductions, and there are also differences in regard to the variables of settlement type y.

Assessed on a scale of 1 to 10, respondents in the total sample evaluated the quality of water supply with an average grade of 7. Of the demographic variables, significant differences were identified according education, total monthly household income. The large majority of respondents in the total sample (89.1%) state that neither they nor members of their household have had any health problems caused by poor quality of the water they use. About half of all respondents (49.3%) state that they are generally satisfied with water supply, while a further 38.1% state that they are very satisfied. Interesting differences in this regard were identified relating to the variables education, settlement type, employment status and total monthly household income.

The average amount of water usage reported by respondents in the total sample is 3.4 cubic meters. 65.6% of respondents in the total sample state that they are obliged to pay for water supply to their household. In regard to the obligation to pay for water supply, it is interesting to note that there are significant differences according to the demographic variables education, employment status, settlement type. The average amount of money that respondents in the total sample pay monthly for water supply is 21 KM. About half of respondents in the total sample (51.4%) consider that the price of water is as it should be, while 42.8% of respondents consider that the price of water is too high. Significant demographic variables in relation to this question are education level and total average household income. About half of the total sample of respondents (49.3%) would be prepared to pay more for water supply if this would result in a significant improvement in the quality of water supply. In this regard, there are significant differences in the variables education level and total monthly household income. More than half of respondents in the total sample (60.3%) pay for water supply based on an individual water meter, while 23.7% pay a fixed service charge and a further 14.1% based on a shared water meter.

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The largest percentage of respondents in the total sample (41.5%) considers that there is not a water supply problem in their community. Of those that do consider that there is a problem with water supply in their community, 17.3% of respondents consider the biggest problem to be the poor quality of water. In terms of demographic variables, the most significant differences are evident based on the level of education variable. About half of respondents (49.6%) of the total sample state that all categories of the population of their community have equal access to water supply and connection, while 27.0% of respondents state that not all categories of the population have equal access. 80.3% of respondents who consider that not all categories of the population have equal access to water supply and connection consider that those residing in certain parts of the municipality are disadvantaged. Over half of respondents in the total sample (66.2%) consider that it is necessary to improve the water supply system in their community, while 20.5% of respondents consider that the existing system in their community is not in need of improvement. An interesting variable in this regard is settlement type and total monthly household income. In relation to the question of what improvements to the water supply system are necessary, the highest percentage of the total sample argue for the following improvements: broadening the water supply/connection network (26.1%), water quality protection, control and improvement (25.8%), replacement of



installation/reconstruction of water supply infrastructure (20.2%). Significant differences were identified relating to the demographic variables gender and settlement type.

Methodology

Overview

Period of survey administration	From 20 to 30 October, 2010
Data collection methodology	Personal telephone interviews – computer assisted telephone interviews (CATI)
Instruments	The survey instrument used in this research was developed by Prism Research in close consultation with UNDP
Sampling	Members of the general population in 20 municipalities in Bosnia and Herzegovina
Sample size	2000 respondents; 100 respondents within each municipality included in the sample
Representativity	Equal representation of municipalities in the Federation B&H and the Republika Srpska. The sample is also representative of settlement size.

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Method

A quantitative research method was used in order to make a general assessment of the water supply sector and its role in human development in Bosnia and Herzegovina. The quantitative methodology used in this research was personal interviews administered by telephone – CATI.

Personal interviews conducted by telephone - CATI

Personal interviews conducted by telephone with computer assisted random dialling – CATI is the most advanced form of telephone interviewing. This method incorporates computer assistance in terms of random number selection and questionnaire administration and control linked into a local network. Utilising a dedicated software program control is conducted during sample selection and interview administration. Interviewers key in respondent answers directly during the interview administration. In this survey, the parameters set for the computer sample selection was random selection of telephone landline numbers in the 20 sample municipalities.



The sample for this survey is 2000 respondents from 20 municipalities in Bosnia and Herzegovina, of which 10 are in the Federation Bosnia and Herzegovina and 10 municipalities in Republika Srpska. The following municipalities in the Federation B&H were included in the sample: Kakanj, Travnik, Vitez, Busovača, Novi Travnik, Orašje, Domaljevac, Velika Kladuša, Bihać and Bugojno. The following municipalities in the Republika Srpska were included in the sample: Kostajnica, Derventa, Modriča, Srbac, Prijedor, Trebinje, Srebrenica, Rogatica, Sokolac and Foča. Within each of the 20 municipalities there were 100 respondents interviewed. .

In this survey we used a random stratified sample for the 20 selected municipalities. Also, the sample is representative for each municipality individually. Within the randomly selected households, a household member primarily responsible for the payment of bills was interviewed.

The results of this survey are presented in relation to the total sample, on the individual municipality level, and according to certain demographic variables.



4. Findings

4.1. Water sources

Respondents in this survey were asked whether their household has a water supply connection, and whether they use any alternative sources of water.

For the total sample, 71.4% of respondents stated that their household is connected to the water supply system. The municipalities with the highest percentage of households that report connection to the water supply system are Bihać (100%), followed by the municipality of Sokolac (97.1%), Srebrenica (96.3%) and Trebinje (96.1%). The lowest percentage of reported connection to the water supply system was found in the municipalities of Domaljevac (13.7%) and Kostajnica (23.9%). Detailed data on connection to the water supply system by municipality is presented in Table 4.1.1.

Table 4.1.1. *Data on having water supply connection – by municipality*

	Does your household have a water supply connection?					
	Yes		No		Total	
	N	%	N	%	N	%
Total sample	1428	71.4	572	28.6	2000	100.0
KAKANJ - FBIH	53	52.9	47	47.1	100	100.0
TRAVNIK - FBIH	74	73.8	26	26.2	100	100.0
VITEZ - FBIH	84	84.3	16	15.7	100	100.0
BUSOVAČA - FBIH	63	63.3	37	36.7	100	100.0
NOVI TRAVNIK - FBIH	67	66.7	33	33.3	100	100.0
KOSTAJNICA RS	24	23.9	76	76.1	100	100.0
DERVENTA RS	65	64.7	35	35.3	100	100.0
MODRIČA RS	64	63.7	36	36.3	100	100.0
SRBAC RS	66	66.3	34	33.7	100	100.0
ORAŠJE FBIH	47	46.5	53	53.5	100	100.0
DOMALJEVAC FBIH	14	13.7	86	86.3	100	100.0
PRIJEDOR RS	76	76.1	24	23.9	100	100.0
VELIKA KLADUŠA FBIH	91	90.9	9	9.1	100	100.0
BIHAĆ FBIH	100	100.0	0	.0	100	100.0
BUGOJNO FBIH	93	93.0	7	7.0	100	100.0
TREBINJE RS	96	96.1	4	3.9	100	100.0
SREBRENICA RS	96	96.3	4	3.7	100	100.0
ROGATICA RS	79	79.4	21	20.6	100	100.0
SOKOLAC RS	97	97.1	3	2.9	100	100.0
FOČA RS	80	79.8	20	20.2	100	100.0

In relation to the demographic variable of settlement type, a significantly higher percentage of respondents in urban settlements report that they have a water supply connection (96.2%) than do those in rural areas (49.6%). There is a higher percentage of respondents that have a water supply connection among those with higher education (88.5%) compared to those that have elementary or lower levels of education (57.5%), and those that have secondary level of education (74.5%). Further data relating to water supply connection by demographic variables is presented in Table 4.1.2.

In relation to usage of alternative sources of water, such as wells, natural springs, etc. The majority of respondents in the total sample (61.9%) state that they do not use alternative sources of water. 29.9% of respondents that report using alternative sources of water state that they use natural water springs, while 8.0% report using wells as a water source. The highest percentage of respondents that use natural springs as a water supply source was found in the municipality of Kostajnica (65.2%) and Busovača (61.2%), and more than 50% of respondents use natural springs as a source of water in the municipalities of Kakanj, Novi Travnik and Domaljevac, while the lowest usage of natural springs as a source of water was found in Bihać (3.4%), Prijedor (4.5%) and Trebinje (6.8%). Detailed data on the usage of alternative water sources in presented in Table 4.3.1 later in this report.

Based on data analysis we can conclude that higher level of education indicates a lower level of use of alternative sources of drinking water. Namely, a somewhat higher percentage of respondents with elementary or lower levels of education report using natural springs as a source of drinking water (41.6%) compared to those with secondary education (27.7%), and those with higher education (13.6%). A higher percentage of respondents that live in rural settlement report using wells (13.1%) and natural water springs (45.5%) as a water source compared to those in urban areas (2.3% and 12.1% respectively

Table 4.1.2. *Demographic data on having a water supply connection*

		Does your household have a water supply connection?					
		Yes		No		Total	
		N	%	N	%	N	%
TOTAL		1428	71.4	572	28.6	2000	100.0
Sex	Male	530	69.7	231	30.3	760	100.0
	Female	899	72.5	341	27.5	1240	100.0
Age in years	15-40	337	69.4	149	30.6	486	100.0
	41-65	823	72.5	312	27.5	1135	100.0
	66-90	265	70.7	110	29.3	374	100.0
	Does not wish to answer	4	78.9	1	21.1	5	100.0
Education level	Elementary or less	372	57.5	275	42.5	647	100.0
	Secondary	748	74.5	256	25.5	1004	100.0
	Tertiary / University	295	88.5	38	11.5	334	100.0
	Does not wish to answer	13	87.0	2	13.0	16	100.0
Employment status	Employed	457	80.2	113	19.8	569	100.0
	Unemployed	194	62.1	118	37.9	313	100.0
	Other	762	69.5	335	30.5	1096	100.0
	Does not wish to answer	16	74.5	5	25.5	21	100.0
Settlement type	Urban	901	96.2	35	3.8	937	100.0
	Rural	527	49.6	536	50.4	1063	100.0
Resident status	Domicile	1001	67.6	479	32.4	1480	100.0
	Displaced person	186	88.6	24	11.4	210	100.0
	Returnee	117	77.4	34	22.6	152	100.0
	Came from elsewhere	112	80.6	27	19.4	139	100.0
	Does not wish to answer	13	63.1	7	36.9	20	100.0
Total monthly household income	Up to 300 KM	306	62.2	186	37.8	492	100.0
	From 300 to 500 KM	328	74.9	110	25.1	438	100.0
	From 500 to 700 KM	199	74.7	67	25.3	266	100.0
	From 700 to 1000 KM	187	79.8	47	20.2	234	100.0
	From 1000 to 1500 KM	89	78.4	24	21.6	113	100.0
	From 1500 to 2000 KM	57	78.2	16	21.8	73	100.0
	From 2000 to 3000 KM	30	80.3	7	19.7	37	100.0
	Over 3000 KM	13	86.5	2	13.5	15	100.0
	Don't know/wish to answer	219	66.4	111	33.6	330	100.0
Ethnicity	Bosniac	468	79.2	123	20.8	591	100.0
	Serb	649	73.2	238	26.8	887	100.0
	Croat	229	55.0	188	45.0	417	100.0
	Bosnian	21	74.6	7	25.4	28	100.0
	Other	20	77.8	6	22.2	25	100.0
	Don't know/wish to answer	41	80.5	10	19.5	51	100.0
Member of majority/minority ethnic group in municipality	Majority	1009	68.8	458	31.2	1468	100.0
	Minority	184	84.2	35	15.8	219	100.0
	Don't know/wish to answer	231	75.5	75	24.5	306	100.0

Table 4.1.3. Data on water usage for drinking from other sources – by municipality

	Do you use drinking water from some other source of drinking wter?									
	Yes, well		Yes, natural water spring		No		Don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%	N	%
Total sample	160	8.0	597	29.9	1238	61.9	4	.2	2000	100.0
KAKANJ - FBIH	7	6.7	56	55.8	38	37.5	0	.0	100	100.0
TRAVNIK - FBIH	1	1.2	35	34.5	64	64.3	0	.0	100	100.0
VITEZ - FBIH	8	8.3	20	19.8	72	71.9	0	.0	100	100.0
BUSOVAČA - FBIH	2	2.0	61	61.2	37	36.7	0	.0	100	100.0
NOVI TRAVNIK - FBIH	0	.0	53	52.7	47	47.3	0	.0	100	100.0
KOSTAJNICA RS	15	15.2	65	65.2	20	19.6	0	.0	100	100.0
DERVENTA RS	16	15.7	30	30.4	54	53.9	0	.0	100	100.0
MODRIČA RS	17	16.7	25	24.5	59	58.8	0	.0	100	100.0
SRBAC RS	11	10.6	30	29.8	59	58.7	1	1.0	100	100.0
ORAŠJE FBIH	11	10.9	34	33.7	55	55.4	0	.0	100	100.0
DOMALJEVAC FBIH	24	24.2	53	52.6	22	22.1	1	1.1	100	100.0
PRIJEDOR RS	33	32.8	4	4.5	63	62.7	0	.0	100	100.0
VELIKA KLADUŠA FBIH	6	6.1	20	20.2	74	73.7	0	.0	100	100.0
BIHAĆ FBIH	0	.0	3	3.4	94	94.4	2	2.2	100	100.0
BUGOJNO FBIH	2	2.0	17	17.0	81	81.0	0	.0	100	100.0
TREBINJE RS	1	1.0	7	6.8	92	92.2	0	.0	100	100.0
SREBRENICA RS	3	2.8	25	25.2	72	72.0	0	.0	100	100.0
ROGATICA RS	4	4.1	19	18.6	77	77.3	0	.0	100	100.0
SOKOLAC RS	0	.0	12	11.7	88	88.3	0	.0	100	100.0
FOČA RS	0	.0	30	29.8	70	70.2	0	.0	100	100.0

In relation to the use of technical water that is not for drinking, the vast majority of respondents in the total sample (91.5%) report that they do not use any alternative sources of technical water. Of those respondents that do report using alternative sources for technical water, the highest percentage is in the municipality of Domaljevac (22.1%) and Prijedor (11.9%). Less than 10% of respondents in the other municipalities use some alternative source of technical water. There were no significant differences based on demographic variables on this question. Detailed data about the use of alternative sources for technical water by municipality is presented in Table 4.1.4.

Table 4.1.4. *Data on usage of other sources of technical water – by municipality*

	Do you use technical water, that is not drinkable, from some other water source?											
	Yes, well		Yes, natural water		Yes, stream/river		No		Don't know/wish		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Total sample	74	3.7	62	3.1	31	1.6	1829	91.5	4	.2	2000	100.0
KAKANJ - FBIH	4	3.8	5	4.8	1	1.0	90	90.4	0	.0	100	100.0
TRAVNIK - FBIH	2	2.4	2	2.4	0	.0	95	95.2	0	.0	100	100.0
VITEZ - FBIH	2	2.5	2	2.5	0	.0	95	95.0	0	.0	100	100.0
BUSOVAČA - FBIH	1	1.0	7	7.1	4	4.1	88	87.8	0	.0	100	100.0
NOVI TRAVNIK - FBIH	0	.0	1	1.1	2	2.2	97	96.8	0	.0	100	100.0
KOSTAJNICA RS	2	2.2	7	6.5	4	4.3	85	84.8	2	2.2	100	100.0
DERVENTA RS	5	4.9	1	1.0	2	2.0	92	92.2	0	.0	100	100.0
MODRIČA RS	3	2.9	4	3.9	4	3.9	89	89.2	0	.0	100	100.0
SRBAC RS	2	1.9	2	1.9	1	1.0	94	94.2	1	1.0	100	100.0
ORAŠJE FBIH	5	5.0	2	2.0	0	.0	93	93.1	0	.0	100	100.0
DOMALJEVAC FBIH	22	22.1	7	7.4	0	.0	69	69.5	1	1.1	100	100.0
PRIJEDOR RS	12	11.9	3	3.0	1	1.5	84	83.6	0	.0	100	100.0
VELIKA KLADUŠA FBIH	2	2.0	1	1.0	1	1.0	96	96.0	0	.0	100	100.0
BIHAĆ FBIH	2	2.2	2	2.2	2	2.2	93	93.3	0	.0	100	100.0
BUGOJNO FBIH	0	.0	0	.0	0	.0	100	100.0	0	.0	100	100.0
TREBINJE RS	5	4.9	2	1.9	3	2.9	90	90.3	0	.0	100	100.0
SREBRENICA RS	1	.9	5	4.7	1	.9	93	93.5	0	.0	100	100.0
ROGATICA RS	2	2.1	3	3.1	0	.0	95	94.8	0	.0	100	100.0
SOKOLAC RS	1	1.0	2	1.9	2	1.9	95	95.1	0	.0	100	100.0
FOČA RS	0	.0	3	3.2	2	2.1	95	94.7	0	.0	100	100.0

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4.2. Interruptions in water supply

Respondents that have a water supply connection were asked whether they have a constant water supply or whether they are faced with supply interruptions or reductions.

Two-thirds of respondents in the total sample (64.1%) state that they do not have any experience of interruptions in the water supply, while 35.6% of respondents report intermittent interruptions to water supply. The highest percentage of respondents that report interruptions to water supply is in the municipality of Srebrenica (78.6%). A detailed



presentation of data about whether respondents have a constant water supply or whether they are faced with interruptions or reductions by municipality is presented in Table 4.2.1.

Analysis of demographic data indicates that a higher percentage of respondents with total monthly household income of over 3000 KM (84.9%) report that they have constant water supply than do those with total monthly household income in the range from 2000 do 3000 KM (73.7%), and those with lower total monthly household income.

Respondents that reported having experienced interruptions in water supply or reductions were asked how often they have experienced such interruptions. The highest percentage of respondents in the total sample (82.6%) state that such interruptions occur only sometimes and under special circumstances. Respondents in the municipality of Domaljevac to the highest percentage (50.0%) state that they are frequently faced with interruptions in water supply, while 51.3% of respondents in the municipality of Rogatica state that they face water supply interruptions daily. Data on interruptions to water supply by municipality are presented in Table 4.2.2.

In regard to demographic variables, there are interesting findings related to total monthly household income. Namely, 100% of respondents that have a total monthly household income of more than 2000 KM state that they have experienced interruptions to water supply only in exceptional circumstances.

Table 4.2.1. *Data on experience with interruptions to water supply – by municipality*

	Do you always have water, without limitations or are there intermittent interruptions in supply, disconnections, reductions etc.?							
	Constant water supply		Intermittent interruptions in supply		Don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%
Total sample	915	64.1	509	35.6	5	.3	1428	100.0
KAKANJ - FBIH	45	85.5	8	14.5	0	.0	53	100.0
TRAVNIK - FBIH	57	77.4	17	22.6	0	.0	74	100.0
VITEZ - FBIH	42	50.0	41	49.0	1	1.0	84	100.0
BUSOVAČA - FBIH	38	59.7	26	40.3	0	.0	63	100.0
NOVI TRAVNIK - FBIH	54	80.6	13	19.4	0	.0	67	100.0
KOSTAJNICA RS	13	54.5	11	45.5	0	.0	24	100.0
DERVENTA RS	36	56.1	27	42.4	1	1.5	65	100.0
MODRIČA RS	40	63.1	23	35.4	1	1.5	64	100.0
SRBAC RS	45	68.1	21	31.9	0	.0	66	100.0
ORAŠJE FBIH	32	68.1	15	31.9	0	.0	47	100.0
DOMALJEVAC FBIH	12	84.6	2	15.4	0	.0	14	100.0
PRIJEDOR RS	39	51.0	37	49.0	0	.0	76	100.0
VELIKA KLADUŠA FBIH	72	78.9	17	18.9	2	2.2	91	100.0
BIHAĆ FBIH	90	89.9	10	10.1	0	.0	100	100.0
BUGOJNO FBIH	69	74.2	24	25.8	0	.0	93	100.0
TREBINJE RS	72	74.7	24	25.3	0	.0	96	100.0
SREBRENICA RS	21	21.4	76	78.6	0	.0	96	100.0
ROGATICA RS	39	49.4	40	50.6	0	.0	79	100.0
SOKOLAC RS	66	68.0	31	32.0	0	.0	97	100.0
FOČA RS	34	42.7	46	57.3	0	.0	80	100.0

Table 4.2.2. *Frequency of interruptions to water supply – by municipality*

	Are there interruptions in water supply daily, frequently or only sometimes?									
	Daily, regularly		Frequently		Sometimes in special situations		Don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%	N	%
Total sample	36	7.1	51	10.1	420	82.6	1	.2	509	100.0
KAKANJ - FBIH	2	25.0	0	.0	6	75.0	0	.0	8	100.0
TRAVNIK - FBIH	0	.0	2	14.3	14	85.7	0	.0	17	100.0
VITEZ - FBIH	2	4.0	6	14.0	34	82.0	0	.0	41	100.0
BUSOVAČA - FBIH	0	.0	4	16.0	21	84.0	0	.0	26	100.0
NOVI TRAVNIK - FBIH	0	.0	2	16.7	11	83.3	0	.0	13	100.0
KOSTAJNICA RS	0	.0	0	.0	11	100.0	0	.0	11	100.0
DERVENTA RS	0	.0	3	10.7	25	89.3	0	.0	27	100.0
MODRIČA RS	0	.0	3	13.0	20	87.0	0	.0	23	100.0
SRBAC RS	0	.0	0	.0	21	100.0	0	.0	21	100.0
ORAŠJE FBIH	2	13.3	2	13.3	11	73.3	0	.0	15	100.0
DOMALJEVAC FBIH	0	.0	1	50.0	1	50.0	0	.0	2	100.0
PRIJEDOR RS	1	4.0	1	4.0	34	92.0	0	.0	37	100.0
VELIKA KLADUŠA	0	.0	0	.0	17	100.0	0	.0	17	100.0
BIHAĆ FBIH	1	11.1	0	.0	9	88.9	0	.0	10	100.0
BUGOJNO FBIH	0	.0	0	.0	24	100.0	0	.0	24	100.0
TREBINJE RS	0	.0	1	4.0	22	92.0	1	4.0	24	100.0
SREBRENICA RS	7	9.9	14	18.5	54	71.6	0	.0	76	100.0
ROGATICA RS	21	51.3	8	20.5	11	28.2	0	.0	40	100.0
SOKOLAC RS	0	.0	0	.0	31	100.0	0	.0	31	100.0
FOČA RS	0	.0	3	7.0	43	93.0	0	.0	46	100.0

Respondents that face daily or frequent interruptions in water supply were asked how many hours a week on average was the duration of these interruptions or reductions in water supply. The average value stated by respondents in the total sample was 17 hours. The highest average value was given by respondents in the municipality of Kakanj (66 hours) and municipality Novi Travnik (50 hours). The shortest average total duration of water supply interruptions per week was reported in the municipality Derventa and Orašje (2 hours), and municipalities Busovača (3 hours) and Trebinje (5 hours), while in municipalities Kostajnica, Srbac, Domaljevac, Velika Kladuša, Bihać, Bugojno and Sokolac respondents were either unable to estimate the average duration of interruptions, or there are not such interruptions as the average duration for interruptions is the value 0 hours.

Respondents with higher levels of education report lower average durations of water interruptions and reductions. The longest average duration of interruptions to water supply was reported by respondents with elementary or lower levels of education (36 hours), followed by those with secondary level education (27 hours), and finally those with higher levels of education (18 hours). Longer average total duration of water supply interruptions was reported by rural respondents (38 hours), compared to those in urban areas (24 hours).

4.3. Water quality and satisfaction with water supply

Respondents in this survey were asked about the quality of water and satisfaction with water supply. Respondents were asked to grade the quality of drinking water, and to respond to the question of whether any member of their household had suffered any health problems as a result of poor quality of drinking water.

In response to the question of where, on a scale from 1 to 10, where 1 means very poor and 10 very good, would they rate the quality of the water that they drink, respondents in the total sample evaluated the quality of drinking water with an average grade of 7. However, somewhat less than one-third of respondents (N=28.9%) assess the quality of water with the maximum grade of 10. The lowest grade for water (grade of 6) was given by respondents in the municipality of Derventa, Orašje, Srebrenica and Sokolac.

In terms of demographic variables, there were no significant differences identified in relation to the assessment of the quality of drinking water. We found that respondents with completed elementary education or less, those in rural areas, and those that live in households with total monthly income of less than 300 KM, evaluate the quality of water one grade higher on a scale of 1 to 10 compared to other respondents.

The highest percentage of the total sample of respondents (89.1%) stated that neither they nor members of their household had suffered any health problems as a result of poor quality of drinking water. There were no significant differences identified between municipalities in regard to reported poor water quality health problems. Additional data on health problems resulting from poor quality drinking water, by municipality, are presented in Table 4.3.1. In regard to health problems related to poor quality water supply, there were no significant differences by demographic variables found.



Table 4.3.1. *Data on health problems in households caused by poor water quality – by municipality*

	Have you or a member of your household had any health problems due to the poor quality of water that you use?							
	Yes		No		Don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%
Total sample	157	7.8	1781	89.1	62	3.1	2000	100.0
KAKANJ - FBIH	9	8.7	89	89.4	2	1.9	100	100.0
TRAVNIK - FBIH	10	9.5	87	86.9	4	3.6	100	100.0
VITEZ - FBIH	9	9.1	86	86.0	5	5.0	100	100.0
BUSOVAČA - FBIH	7	7.1	89	88.8	4	4.1	100	100.0
NOVI TRAVNIK - FBIH	9	8.6	88	88.2	3	3.2	100	100.0
KOSTAJNICA RS	2	2.2	98	97.8	0	.0	100	100.0
DERVENTA RS	12	11.8	82	82.4	6	5.9	100	100.0
MODRIČA RS	5	4.9	91	91.2	4	3.9	100	100.0
SRBAC RS	6	5.8	90	90.4	4	3.8	100	100.0
ORAŠJE FBIH	7	6.9	90	90.1	3	3.0	100	100.0
DOMALJEVAC FBIH	13	12.6	85	85.3	2	2.1	100	100.0
PRIJEDOR RS	6	6.0	91	91.0	3	3.0	100	100.0
VELIKA KLADUŠA FBIH	2	2.0	97	97.0	1	1.0	100	100.0
BIHAĆ FBIH	11	11.2	87	86.5	2	2.2	100	100.0
BUGOJNO FBIH	8	8.0	90	90.0	2	2.0	100	100.0
TREBINJE RS	8	7.8	89	89.3	3	2.9	100	100.0
SREBRENICA RS	13	13.1	81	81.3	6	5.6	100	100.0
ROGATICA RS	2	2.1	97	96.9	1	1.0	100	100.0
SOKOLAC RS	11	10.7	84	84.5	5	4.9	100	100.0
FOČA RS	9	8.5	88	88.3	3	3.2	100	100.0

In response to the question of how satisfied or dissatisfied they are with their water supply, about a half of respondents of the total sample (49.3%) stated that they are **generally** satisfied with water supply, while 38.1% of respondents stated that they are **very** satisfied. There were no significant differences found between municipalities in this respect, with the exception that respondents in the municipality of Srebrenica to a lesser percentage report that they are very satisfied with water supply (16.8%) compared to respondents in other municipalities. Table 4.3.2. presents detailed data on the level of satisfaction of respondents with water supply by municipality.

By level of education, the highest percentage of respondents that are **very** satisfied with water supply are those with elementary or less level of education (48.4%), with a somewhat lesser percentage of those with secondary and higher levels of education expressing strong satisfaction. Employed respondents (28.1%) and those from urban areas (33.2%) to a lesser percentage report being very satisfied with the water supply, compared to those that are unemployed (36.3%), and respondents that live in rural settlements (42.4%). In relation to category of population by total monthly household income, a somewhat higher percentage of respondents in the category of up to 300 KM (46.4%) and those in the category over 3000 KM (52%) report strong satisfaction with water supply compared to other income categories.

Table 4.3.2. *Data on satisfaction/dissatisfaction with water supply – by municipality*

	To what degree are you satisfied or dissatisfied with the water supply?											
	Very satisfied		Generally satisfied		Generally dissatisfied		Very dissatisfied		Don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Total sample	761	38.1	986	49.3	139	7.0	100	5.0	14	.7	2000	100.0
KAKANJ - FBIH	46	46.2	44	44.2	6	5.8	4	3.8	0	.0	100	100.0
TRAVNIK - FBIH	45	45.2	40	40.5	5	4.8	10	9.5	0	.0	100	100.0
VITEZ - FBIH	45	45.5	44	43.8	3	3.3	7	7.4	0	.0	100	100.0
BUSOVAČA - FBIH	41	40.8	42	41.8	11	11.2	3	3.1	3	3.1	100	100.0
NOVI TRAVNIK - FBIH	35	35.5	49	49.5	11	10.8	3	3.2	1	1.1	100	100.0
KOSTAJNICA RS	48	47.8	41	41.3	7	6.5	2	2.2	2	2.2	100	100.0
DERVENTA RS	28	28.4	59	58.8	4	3.9	9	8.8	0	.0	100	100.0
MODRIČA RS	41	41.2	53	52.9	2	2.0	4	3.9	0	.0	100	100.0
SRBAC RS	38	38.5	48	48.1	10	9.6	3	2.9	1	1.0	100	100.0
ORAŠJE FBIH	33	32.7	49	48.5	11	10.9	7	6.9	1	1.0	100	100.0
DOMALJEVAC FBIH	34	33.7	37	36.8	15	14.7	12	11.6	3	3.2	100	100.0
PRIJEDOR RS	37	37.3	45	44.8	6	6.0	10	10.4	1	1.5	100	100.0
VELIKA KLADUŠA FBIH	54	53.5	44	44.4	2	2.0	0	.0	0	.0	100	100.0
BIHAĆ FBIH	42	41.6	52	51.7	2	2.2	4	4.5	0	.0	100	100.0
BUGOJNO FBIH	48	48.0	47	47.0	2	2.0	2	2.0	1	1.0	100	100.0
TREBINJE RS	38	37.9	56	56.3	5	4.9	1	1.0	0	.0	100	100.0
SREBRENICA RS	17	16.8	57	57.0	14	14.0	12	12.1	0	.0	100	100.0
ROGATICA RS	24	23.7	59	58.8	12	12.4	5	5.2	0	.0	100	100.0
SOKOLAC RS	31	31.1	65	65.0	4	3.9	0	.0	0	.0	100	100.0
FOČA RS	36	36.2	54	54.3	9	8.5	1	1.1	0	.0	100	100.0

4.4. Payment for water

In order to research the practice and experiences related to payment for water supply, respondents were asked questions about the amount of water they use, whether and in what way do they pay for water, and their opinions about the price of water.

The average amount of water usage reported by respondents in the total sample is 3.4 cubic meters. Households in the municipality of Sokolac ($M^{17} = 8.4$) and Velika Kladuša ($M = 8.3$) report the highest number of cubic meters per month, while households in municipalities Novi Travnik ($M = 0.8$), Kostajnica ($M = 0.1$) and Prijedor ($M = 0$) report the lowest level of water usage. In terms of the amount of water used monthly, there was no evidence of significant differences based on demographic variables.

65.6% of respondents of the total sample state that they have to pay for water supply to their household. The highest percentage of respondents who reported not having to pay for water supply was from the municipalities of Domaljevac (96.8%) and Kostajnica (95.7%). A detailed presentation of findings related to obligation to pay for water supply is presented in Table 4.4.1.

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Table 4.4.1. *Data on obligation to pay for water supply – by municipality*

¹⁷ M – symbol for arithmetic mean, measure of average.



	Do you have to pay someone for the water supply to your household?							
	Yes		No		Don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%
Total sample	1311	65.6	685	34.2	4	.2	2000	100.0
KAKANJ - FBIH	46	46.2	54	53.8	0	.0	100	100.0
TRAVNIK - FBIH	63	63.1	37	36.9	0	.0	100	100.0
VITEZ - FBIH	79	78.5	21	20.7	1	.8	100	100.0
BUSOVAČA - FBIH	49	49.0	51	51.0	0	.0	100	100.0
NOVI TRAVNIK - FBIH	47	47.3	53	52.7	0	.0	100	100.0
KOSTAJNICA RS	4	4.3	96	95.7	0	.0	100	100.0
DERVENTA RS	63	62.7	37	37.3	0	.0	100	100.0
MODRIČA RS	63	62.7	37	37.3	0	.0	100	100.0
SRBAC RS	66	66.3	34	33.7	0	.0	100	100.0
ORAŠJE FBIH	42	41.6	57	57.4	1	1.0	100	100.0
DOMALJEVAC FBIH	2	2.1	97	96.8	1	1.1	100	100.0
PRIJEDOR RS	66	65.7	34	34.3	0	.0	100	100.0
VELIKA KLADUŠA FBIH	94	93.9	6	6.1	0	.0	100	100.0
BIHAĆ FBIH	99	98.9	1	1.1	0	.0	100	100.0
BUGOJNO FBIH	88	88.0	12	12.0	0	.0	100	100.0
TREBINJE RS	95	95.1	5	4.9	0	.0	100	100.0
SREBRENICA RS	93	92.5	7	7.5	0	.0	100	100.0
ROGATICA RS	79	79.4	21	20.6	0	.0	100	100.0
SOKOLAC RS	96	96.1	3	2.9	1	1.0	100	100.0
FOČA RS	78	77.7	22	22.3	0	.0	100	100.0

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There are a somewhat lower percentage of respondents with completed elementary or lower level of education (48.5%) among respondents that state that they have an obligation to pay for water supply compared to those with completed secondary education (70.4%) and respondents with higher education (83.4%). A somewhat lower percentage of unemployed respondents (57.5%) report that they are obliged to pay for water supply than do those respondents that are employed (76.5%). A significantly lower percentage of those that live in rural areas (39.5%) state that they are obliged to pay for water supply than do those in urban areas (95.2%). Detailed demographic data is presented in Table 4.4.2.

In regard to the average monthly amount of money that respondents pay for water supply, the average amount for the entire sample is 21 KM. A significantly higher average payment is reported by respondents from the municipality of Domaljevac (67 KM), while the



reported amounts in other municipalities are much closer to the average. There are no notable differences in regard to demographic variables on this question.

About a half of respondents in the total sample (51.4%) state that the price of water is as it should be, while 42.8% of respondents consider that the price charged for water is too high. The lowest percentage of respondents that consider that the price of water supply is too high is in Modriča (10.9%), while for all other municipalities there were higher percentages of those that consider that it is too high (all over 25%) Detailed data about the adequacy of the price charged for water by municipality is presented in Table 4.4.3. There is an evident tendency for respondents with lower total monthly household income to assess the price charged for water to be too high compared to those with higher monthly incomes. In regard to other demographic variables, there are no significant differences between categories of respondents. Table 4.4.4. presents detailed data by the variable 'total monthly household income'.

Table 4.4.2. *Demographic data on duty to pay for household water supply*



		Do you have to pay someone for the water supply to your household?							
		Yes		No		Don't know/wish to answer		Total	
		N	%	N	%	N	%	N	%
TOTAL		1311	65.6	685	34.2	4	.2	2000	100.0
Sex	Male	479	63.0	279	36.7	3	.4	760	100.0
	Female	833	67.2	406	32.8	1	.1	1240	100.0
Age in years	15-40	305	62.8	179	36.9	2	.4	486	100.0
	41-65	754	66.4	380	33.5	1	.1	1135	100.0
	66-90	248	66.4	125	33.3	1	.3	374	100.0
	Does not wish to answer	4	78.9	1	21.1	0	.0	5	100.0
Education level	Elementary or less	314	48.5	331	51.2	2	.3	647	100.0
	Secondary	706	70.4	295	29.4	2	.2	1004	100.0
	Tertiary / University	278	83.4	56	16.6	0	.0	334	100.0
	Does not wish to answer	12	80.4	3	19.6	0	.0	16	100.0
Employment status	Employed	436	76.5	134	23.5	0	.0	569	100.0
	Unemployed	180	57.5	133	42.5	0	.0	313	100.0
	Other	681	62.1	411	37.5	4	.4	1096	100.0
	Does not wish to answer	15	69.6	6	30.4	0	.0	21	100.0
Settlement type	Urban	892	95.2	43	4.6	2	.2	937	100.0
	Rural	420	39.5	642	60.3	2	.2	1063	100.0
Resident status	Domicile	906	61.2	571	38.6	3	.2	1480	100.0
	Displaced person	182	86.8	27	12.8	1	.4	210	100.0
	Returnee	104	68.3	48	31.7	0	.0	152	100.0
	Came from elsewhere	108	77.8	31	22.2	0	.0	139	100.0
	Does not wish to answer	12	59.0	8	41.0	0	.0	20	100.0
Total monthly household income	Up to 300 KM	283	57.5	209	42.5	0	.0	492	100.0
	From 300 to 500 KM	300	68.4	139	31.6	0	.0	438	100.0
	From 500 to 700 KM	180	67.4	86	32.2	1	.3	266	100.0
	From 700 to 1000 KM	169	72.1	64	27.5	1	.4	234	100.0
	From 1000 to 1500 KM	88	77.6	25	22.4	0	.0	113	100.0
	From 1500 to 2000 KM	56	76.6	16	21.9	1	1.4	73	100.0
	From 2000 to 3000 KM	30	80.3	7	19.7	0	.0	37	100.0
	Over 3000 KM	12	79.4	3	20.6	0	.0	15	100.0
	Don't know/wish to	195	58.9	135	40.8	1	.3	330	100.0
Ethnicity	Bosniac	429	72.5	163	27.5	0	.0	591	100.0
	Serb	609	68.7	276	31.2	1	.1	887	100.0
	Croat	196	47.0	219	52.5	2	.5	417	100.0
	Bosnian	21	74.9	7	25.1	0	.0	28	100.0
	Other	19	74.6	6	22.2	1	3.3	25	100.0
	Don't know/wish to	37	72.7	14	27.3	0	.0	51	100.0
Member of majority/minority ethnic group in municipality	Majority	922	62.8	543	37.0	3	.2	1468	100.0
	Minority	180	82.1	39	17.9	0	.0	219	100.0
	Don't know/wish to	207	67.5	100	32.5	0	.0	306	100.0

Table 4.4.3. *Perceived adequacy of the price of water – by municipality*

	Do you think that the price is too high, too low or as it should be?									
	Too high		Too low		As it should be		Don't know/wish to		Total	
	N	%	N	%	N	%	N	%	N	%
Total sample	562	42.8	22	1.6	675	51.4	55	4.2	1313	100.0
KAKANJ - FBIH	26	56.3	2	4.2	18	39.6	0	.0	46	100.0
TRAVNIK - FBIH	36	56.6	4	5.7	23	35.8	1	1.9	63	100.0
VITEZ - FBIH	23	29.2	2	2.1	49	61.5	6	7.3	79	100.0
BUSOVAČA - FBIH	29	57.1	1	2.0	16	32.7	4	8.2	50	100.0
NOVI TRAVNIK - FBIH	16	34.1	0	.0	29	61.4	2	4.5	47	100.0
KOSTAJNICA RS	2	50.0	0	.0	2	50.0	0	.0	4	100.0
DERVENTA RS	27	43.8	1	1.6	33	53.1	1	1.6	63	100.0
MODRIČA RS	7	10.9	1	1.6	49	78.1	6	9.4	63	100.0
SRBAC RS	38	58.0	0	.0	25	37.7	3	4.3	66	100.0
ORAŠJE FBIH	18	42.9	2	4.8	21	50.0	1	2.4	42	100.0
DOMALJEVAC FBIH	1	50.0	0	.0	1	50.0	0	.0	2	100.0
PRIJEDOR RS	21	31.8	0	.0	37	56.8	7	11.4	66	100.0
VELIKA KLADUŠA FBIH	25	26.9	1	1.1	66	69.9	2	2.2	94	100.0
BIHAĆ FBIH	47	47.7	3	3.4	47	47.7	1	1.1	99	100.0
BUGOJNO FBIH	44	50.0	1	1.1	40	45.5	3	3.4	88	100.0
TREBINJE RS	50	52.0	0	.0	44	45.9	2	2.0	95	100.0
SREBRENICA RS	56	60.6	0	.0	35	37.4	2	2.0	93	100.0
ROGATICA RS	33	41.6	1	1.3	42	53.2	3	3.9	79	100.0
SOKOLAC RS	43	44.4	1	1.0	48	49.5	5	5.1	96	100.0
FOČA RS	20	26.0	2	2.7	50	64.4	5	6.8	78	100.0

Table 4.4.4. *Perceived adequacy of the price of water – by total monthly household income*

		P12. Do you think that the price is too high, too low or as it should be?									
		Too high		Too low		As it should be		Don't know/wish		Total	
		N	%	N	%	N	%	N	%	N	%
Total monthly household income	Up to 300 KM	151	53.3	4	1.3	114	40.3	14	5.1	284	100.0
	From 300 to 500 KM	141	47.2	4	1.4	142	47.5	12	3.9	300	100.0
	From 500 to 700 KM	78	43.0	2	1.0	94	52.1	7	3.9	181	100.0
	From 700 to 1000 KM	61	35.9	0	.0	104	61.8	4	2.3	169	100.0
	From 1000 to 1500 KM	31	34.8	2	2.6	51	58.5	4	4.1	88	100.0
	From 1500 to 2000 KM	14	24.9	3	5.4	38	67.9	1	1.8	56	100.0
	From 2000 to 3000 KM	9	29.1	1	3.8	19	63.4	1	3.8	30	100.0
	Over 3000 KM	2	15.5	1	8.9	9	75.6	0	.0	12	100.0
	Don't know/wish to answer	76	39.2	4	2.1	102	52.5	12	6.2	195	100.0

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About a half of the total number of respondents (49.3%) is willing to pay more for water supply if this would mean a significant improvement in the quality of water supply. Respondents that reside in the municipality of Kostajnica (100.0%) are not prepared to pay more than they do now for a better quality water supply. 15.1% of respondents of the total sample do not know, or refuse to respond to this question. Table 4.4.5. presents detailed data by municipality about respondent willingness to pay more for water supply toward a better quality service.

Table 4.4.5. *Data on willingness to pay more for improved quality of water – by municipality*



	Would you be willing to pay more than you do now if it would mean a significant improvement in the quality of water?							
	Yes		No		don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%
Total sample	647	49.3	468	35.6	198	15.1	1312	100.0
KAKANJ - FBIH	20	43.8	18	39.6	8	16.7	46	100.0
TRAVNIK - FBIH	31	49.1	24	37.7	8	13.2	63	100.0
VITEZ - FBIH	40	50.0	25	31.2	15	18.8	79	100.0
BUSOVAČA - FBIH	28	56.3	16	33.3	5	10.4	49	100.0
NOVI TRAVNIK - FBIH	31	65.9	10	20.5	6	13.6	47	100.0
KOSTAJNICA RS	0	.0	4	100.0	0	.0	4	100.0
DERVENTA RS	27	43.8	23	35.9	13	20.3	63	100.0
MODRIČA RS	36	57.8	13	20.3	14	21.9	63	100.0
SRBAC RS	24	36.2	25	37.7	17	26.1	66	100.0
ORAŠJE FBIH	26	61.9	11	26.2	5	11.9	42	100.0
DOMALJEVAC FBIH	1	50.0	1	50.0	0	.0	2	100.0
PRIJEDOR RS	31	47.7	24	36.4	10	15.9	66	100.0
VELIKA KLADUŠA FBIH	48	51.6	35	37.6	10	10.8	94	100.0
BIHAĆ FBIH	47	47.7	39	39.8	12	12.5	99	100.0
BUGOJNO FBIH	42	47.7	34	38.6	12	13.6	88	100.0
TREBINJE RS	40	41.8	42	43.9	14	14.3	95	100.0
SREBRENICA RS	53	57.6	28	30.3	11	12.1	93	100.0
ROGATICA RS	33	41.6	37	46.8	9	11.7	79	100.0
SOKOLAC RS	50	52.5	31	32.3	15	15.2	96	100.0
FOČA RS	37	47.9	28	35.6	13	16.4	78	100.0

A lower percentage of respondents with elementary education or less (34.9%) are willing to pay more for water supply toward an improved service compared to respondents with completed secondary education (52.6%) or higher education (56.5%). A somewhat lower percentage of respondents with total monthly household income up to 500 KM are prepared to pay more than they do now for a better quality water supply than do those with total monthly household income over 500 KM.

Over a half of respondents in the total sample (60.3%) pay for their water supply based on an individual meter, while 23.7% pay a set charge, and 14.1% based on a shared water meter. The remaining respondents pay on some other basis or do not know or wish to answer this question. The lowest percentage of respondents that pay for water supply based on an individual meter are in the municipality of Novi Travnik (18.2%), with a relatively low percentage also in municipality Foča (24.7%). The highest percentage of respondents that pay based on a shared water meter is in the municipality of Trebinje (33.7%) and Sokolac

(30.3%). The highest percentage of respondents that pay a set charge for water supply was found in the municipality of Novi Travnik (63.6%), and a relatively high percentage (50% or more) was found in the areas of the municipalities of Rogatica, Foča, Domaljevac and Kostajnica. Additional data on the basis of charging for water supply is presented in Table 4.4.6.

A higher percentage of respondents in rural areas (74.3%) and respondents with total monthly household earnings higher than 3000 KM (81.9%) state that they pay for water supply based on an individual water meter compared to those in urban areas (53.6%) and those with lower total monthly household income (percentage less than 70%) a lower percentage of rural respondents (5.4%) pay for water supply based on a shared meter compared to those in urban areas (18.3%). The lowest percentage of those that pay a set charge for water supply are those with total monthly household income between 2000 and 3000 KM (13.1%), and those with total monthly household income over 3000 KM (10.0%).

Table 4.4.6. *Method of calculating water charges – by municipality*

	Do you pay based on an individual water meter, a shared water meter, a set charge or some other way?											
	Individual water meter		Shared water meter		Set charge		Some other way		Dn't know/wish to answer		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Total sample	791	60.3	185	14.1	311	23.7	15	1.2	10	.7	1313	100.0
KAKANJ - FBIH	37	79.2	3	6.3	7	14.6	0	.0	0	.0	46	100.0
TRAVNIK - FBIH	29	45.3	10	15.1	24	37.7	1	1.9	0	.0	63	100.0
VITEZ - FBIH	60	75.3	2	2.1	16	19.6	1	1.0	2	2.1	80	100.0
BUSOVAČA - FBIH	35	70.8	1	2.1	8	16.7	3	6.3	2	4.2	49	100.0
NOVI TRAVNIK - FBIH	9	18.2	6	13.6	30	63.6	2	4.5	0	.0	47	100.0
KOSTAJNICA RS	2	50.0	0	.0	2	50.0	0	.0	0	.0	4	100.0
DERVENTA RS	25	40.6	5	7.8	30	48.4	2	3.1	0	.0	63	100.0
MODRIČA RS	44	70.3	7	10.9	10	15.6	1	1.6	1	1.6	63	100.0
SRBAC RS	48	72.5	13	18.8	4	5.8	0	.0	2	2.9	66	100.0
ORAŠJE FBIH	35	83.3	1	2.4	5	11.9	1	2.4	0	.0	42	100.0
DOMALJEVAC FBIH	1	50.0	0	.0	1	50.0	0	.0	0	.0	2	100.0
PRIJEDOR RS	36	54.5	12	18.2	18	27.3	0	.0	0	.0	66	100.0
VELIKA KLADUŠA FBIH	84	89.2	6	6.5	3	3.2	0	.0	1	1.1	94	100.0
BIHAĆ FBIH	66	67.0	25	25.0	8	8.0	0	.0	0	.0	99	100.0
BUGOJNO FBIH	58	65.9	10	11.4	19	21.6	0	.0	1	1.1	88	100.0
TREBINJE RS	55	58.2	32	33.7	7	7.1	0	.0	1	1.0	95	100.0
SREBRENICA RS	64	69.7	4	4.0	23	25.3	1	1.0	0	.0	93	100.0
ROGATICA RS	27	33.8	6	7.8	45	57.1	1	1.3	0	.0	79	100.0
SOKOLAC RS	57	59.6	29	30.3	9	9.1	1	1.0	0	.0	96	100.0
FOČA RS	19	24.7	15	19.2	43	54.8	1	1.4	0	.0	78	100.0

4.5. Problems and improvement of the water supply system

Respondents in this survey were asked about problems they encounter with water supply, and what they consider necessary in the improvement of water supply in their community.

The highest percentage of respondents in the total sample (41.5%) considers that there are no problems with water supply in their community. 17.3% of respondents consider that the main problem with water supply is water quality. A higher percentage of respondents from municipality Rogatica (28.9%) state that regularity of water supply is the main problem with water supply in their community. The highest percentage of respondents from the municipality of Orašje (32.7%), Srebrenica (30.8%) and Sokolac (30.1%) consider that the quality of water is the most serious problem with water supply in their respective municipalities. The highest percentage of respondents that mention 'some other problem' with water supply in their community state as the main problem old water supply installations (31.7%), dependency of water supply on circumstances such as weather conditions, availability of electricity, etc. (18.3%), and lack of a water supply connection, or not being covered by the water supply network (16.9%). In regard to demographic variables, findings indicate that a somewhat lower percentage of respondents with elementary level education or less (9.9%) consider that water quality is the main problem with water supply than do respondents with completed secondary school or higher education (20.3% and 22.4%, respectively). Detailed presentation of data relating to problems with water supply is given in Table 4.5.1¹⁸.

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Table 4.5.1. *Main problems with water supply – by municipality*

¹⁸ For clearer presentation of findings, the responses „Do not know/wish to answer“ are excluded.



	In your opinion, what is the main problem with water supply in the case of your community?											
	Regularity of supply		Water pressure		Quality		Method of calculation and charges		Price		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Total sample	159	7.9	198	9.9	346	17.3	64	3.2	115	5.8	2000	100.0
KAKANJ - FBIH	5	4.8	9	8.7	10	9.6	6	5.8	5	4.8	100	100.0
TRAVNIK - FBIH	8	8.3	12	11.9	11	10.7	5	4.8	8	8.3	100	100.0
VITEZ - FBIH	16	15.7	9	9.1	16	15.7	2	1.7	2	2.5	100	100.0
BUSOVAČA - FBIH	7	7.1	13	13.3	22	22.4	1	1.0	2	2.0	100	100.0
NOVI TRAVNIK - FBIH	6	6.5	16	16.1	18	18.3	1	1.1	3	3.2	100	100.0
KOSTAJNICA RS	9	8.7	11	10.9	4	4.3	0	.0	2	2.2	100	100.0
DERVENTA RS	7	6.9	5	4.9	20	19.6	2	2.0	10	9.8	100	100.0
MODRIČA RS	6	5.9	7	6.9	24	23.5	1	1.0	0	.0	100	100.0
SRBAC RS	5	4.8	9	8.7	10	9.6	4	3.8	8	7.7	100	100.0
ORAŠJE FBIH	2	2.0	4	4.0	33	32.7	1	1.0	3	3.0	100	100.0
DOMALJEVAC FBIH	5	5.3	7	7.4	26	26.3	1	1.1	2	2.1	100	100.0
PRIJEDOR RS	13	13.4	28	28.4	12	11.9	0	.0	3	3.0	100	100.0
VELIKA KLADUŠA	4	4.0	6	6.1	8	8.1	2	2.0	6	6.1	100	100.0
BIHAĆ FBIH	0	.0	9	9.0	20	20.2	8	7.9	15	14.6	100	100.0
BUGOJNO FBIH	3	3.0	6	6.0	7	7.0	10	10.0	10	10.0	100	100.0
TREBINJE RS	4	3.9	17	17.5	9	8.7	6	5.8	12	11.7	100	100.0
SREBRENICA RS	14	14.0	3	2.8	31	30.8	4	3.7	10	10.3	100	100.0
ROGATICA RS	29	28.9	12	12.4	12	12.4	0	.0	5	5.2	100	100.0
SOKOLAC RS	2	1.9	6	5.8	30	30.1	6	5.8	7	6.8	100	100.0
FOČA RS	14	13.8	9	8.5	23	23.4	5	5.3	2	2.1	100	100.0

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Almost a half of respondents (49.6%) in the total sample state that all categories of the population in their community have equal access to water supply and connection, while 27.0% consider that not all categories of the population have equal access. There are no significant differences between municipalities in regard to whether respondents consider that all have equal access to water supply and connection. Detailed presentation of this data is given in Table 4.5.2.

Table 4.5.2. *Data on respondent opinion on whether all categories of the population have equal access to water supply – by municipality*

	In this municipality, do all categories of the population have equal access to water supply or to connection to water supply?							
	Yes		No		Don't know/wish to answer		Total	
	N	%	N	%	N	%	N	%
Total sample	993	49.6	540	27.0	467	23.4	2000	100.0
KAKANJ - FBIH	38	38.5	39	39.4	22	22.1	100	100.0
TRAVNIK - FBIH	50	50.0	26	26.2	24	23.8	100	100.0
VITEZ - FBIH	49	48.8	30	29.8	21	21.5	100	100.0
BUSOVAČA - FBIH	50	50.0	32	31.6	18	18.4	100	100.0
NOVI TRAVNIK - FBIH	51	50.5	26	25.8	24	23.7	100	100.0
KOSTAJNICA RS	43	43.5	35	34.8	22	21.7	100	100.0
DERVENTA RS	42	42.2	26	26.5	31	31.4	100	100.0
MODRIČA RS	50	50.0	25	25.5	25	24.5	100	100.0
SRBAC RS	46	46.2	28	27.9	26	26.0	100	100.0
ORAŠJE FBIH	48	47.5	29	28.7	24	23.8	100	100.0
DOMALJEVAC FBIH	41	41.1	45	45.3	14	13.7	100	100.0
PRIJEDOR RS	45	44.8	34	34.3	21	20.9	100	100.0
VELIKA KLADUŠA FBIH	62	61.6	24	24.2	14	14.1	100	100.0
BIHAĆ FBIH	60	59.6	20	20.2	20	20.2	100	100.0
BUGOJNO FBIH	54	54.0	19	19.0	27	27.0	100	100.0
TREBINJE RS	45	44.7	24	24.3	31	31.1	100	100.0
SREBRENICA RS	64	63.6	9	9.3	27	27.1	100	100.0
ROGATICA RS	36	36.1	35	35.1	29	28.9	100	100.0
SOKOLAC RS	67	67.0	16	15.5	17	17.5	100	100.0
FOČA RS	53	53.2	17	17.0	30	29.8	100	100.0

We did not find any significant differences by demographic variables in relation to respondent opinions about whether all categories of the population have equal access to water supply and connection in their municipality.

80.3% of those respondents that consider that not all categories of the population have equal access to water supply and connection consider that those disadvantaged reside in certain parts of the municipality. 8.3% of these respondents consider that poorer citizens do not enjoy equal status in relation to water supply and connection as that given to other categories of the population. Very low percentages of respondents consider that there are other population categories that are disadvantaged in regard to water supply and connection, and there are no significant differences between municipalities or demographic variables relating to this question.

More than a half of respondents in the total sample (66.2%) consider that it is necessary to improve the water supply system in their community, while 20.5% of respondents consider that the current system of water supply in their community is adequate and does not require improvement. There was no finding of significant differences between municipalities in this regard. Table 4.5.3. presents detailed data on respondent opinion on the need to improve the water supply system in their community – by municipality.

Table 4.5.3. *Need for improvement in the water supply system – by municipality*

	In your opinion, is it necessary to improve the current water supply system in your community?							
	Yes		No		Do not know/Not wish to answer		Total	
	N	%	N	%	N	%	N	%
Total sample	1325	66.2	411	20.5	264	13.2	2000	100.0
KAKANJ - FBIH	56	55.8	30	29.8	14	14.4	100	100.0
TRAVNIK - FBIH	64	64.3	19	19.0	17	16.7	100	100.0
VITEZ - FBIH	60	59.5	23	23.1	17	17.4	100	100.0
BUSOVAČA - FBIH	63	63.3	24	24.5	12	12.2	100	100.0
NOVI TRAVNIK - FBIH	65	64.5	24	23.7	12	11.8	100	100.0
KOSTAJNICA RS	70	69.6	22	21.7	9	8.7	100	100.0
DERVENTA RS	69	68.6	21	20.6	11	10.8	100	100.0
MODRIČA RS	64	63.7	18	17.6	19	18.6	100	100.0
SRBAC RS	66	66.3	19	19.2	14	14.4	100	100.0
ORAŠJE FBIH	67	67.3	19	18.8	14	13.9	100	100.0
DOMALJEVAC FBIH	80	80.0	11	10.5	9	9.5	100	100.0
PRIJEDOR RS	78	77.6	16	16.4	6	6.0	100	100.0
VELIKA KLADUŠA FBIH	39	39.4	41	41.4	19	19.2	100	100.0
BIHAĆ FBIH	71	70.8	22	22.5	7	6.7	100	100.0
BUGOJNO FBIH	46	46.0	33	33.0	21	21.0	100	100.0
TREBINJE RS	76	75.7	12	11.7	13	12.6	100	100.0
SREBRENICA RS	74	73.8	13	13.1	13	13.1	100	100.0
ROGATICA RS	78	78.4	12	12.4	9	9.3	100	100.0
SOKOLAC RS	70	69.9	13	12.6	17	17.5	100	100.0
FOČA RS	70	70.2	19	19.1	11	10.6	100	100.0

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Respondents that live in rural settlements consider to a somewhat lesser degree (62.1%) that it is necessary to improve the water supply system in their community compared



to urban respondents (71.0%). Similarly, a lesser percentage of respondents in the category of the population that has total monthly household earnings of less than 300 KM (53.6%) consider that improvement to the water supply system in their community is necessary than do respondents with a higher total monthly household income where over 70% of respondents consider the improvement of the water supply system as necessary and important.

In relation to what respondents consider necessary in water supply and quality, the highest percentage of respondents in the total sample consider that the following is most important: broadening of the water supply network/connection to the water supply network (26.1%); protection, control and improvement of water quality (25.8%); replacement of installations/reconstruction of water supply infrastructure (20.2%). Lower percentages of respondents consider that regularity of water supply (5.2%), regulation of the method of calculation and pricing of water (4.2%), and increased water supply pressure (3.2%) are the most important issues for them. By municipality, the highest percentage of respondents from municipality Busovača (44.4%), Srebrenica (40.5%) and Sokolac (38.9%) consider that protection, control and improvement of water quality as important and necessary; in other municipalities the percentages are in intervals from 12 to 30%. Respondents in municipality Foča (52.3%) consider to a greater degree that the replacement of installations and reconstruction of water supply infrastructure are necessary improvements in water supply and quality compared to those in other municipalities where the percentage of selection of this response range from 1.3% (Domaljevac) to 30.4% (Srebrenica). In regard to other responses, there were not significant differences between municipalities.

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On the basis of descriptive data we found that a higher percentage of male respondents (32.7%) than female respondents (21.4%) report the broadening of the water supply system and connection of new households as an important improvement to the water supply system. A somewhat lower percentage of respondents in rural areas (11.7%) consider the replacement of installations and reconstruction of water supply infrastructure to be important compared to urban respondents (28.7%). A lower percentage of urban respondents (16.6%) consider the broadening of the water supply network and connection of new households to be important compared to rural respondents (35.7%). No other significant differences found based on demographic variables relating to improvements to the water supply system.



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