

Water demand management in the Mediterranean, progress and policies

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*Experiences from Eastern Adriatic on Water Utilities
functioning*

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Title of the paper: Experiences from Eastern Adriatic on Water Utilities functioning

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Abstract of the paper:

Eastern Adriatic countries do not suffer from fresh water scarcity, but lack of rational usage and care for good water quality has led to discrepancy between water availability and water demands.

For the last 10 years, within the Water Sector Reform Programs implemented in B&H, with the support of international organizations (USAID, EU, etc.), special attention has been paid on strengthening of the Water Utilities in order to become sustainable, self supportive commercial companies, with high degree of autonomy.

Water Utilities in B&H are usually organized as public companies, owned by Municipalities or Cantons. Their operational and financial conditions were quite weak due to transition from a socialistic economy to a free market system and recovering from a devastating four year war.

The paper presents results achieved in strengthening Water Supply sector in Bosnia and Herzegovina and later on replicated in several Monte Negro's Water Utilities, through implementation of different projects by the Hydro Engineering Institute Sarajevo together with Water Utilities staff and International partners.

Key words: Water demand management, Water Utilities; unaccounted for water; water supply network; institutional, legal, technical and financial tools.

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1 Introduction

1.1 Political background

At the end of the four years war, Bosnia and Herzegovina was established with a new constitution by the Dayton Accords concluded in December 1995. According to Dayton Agreement, B&H comprised of two highly autonomous entities: Federation of B&H and Republic of Srpska. The Federation of B&H consists of ten cantons, where each one of these is governmental entity with high degree of discretion in establishing fundamental functions and carrying them out. Coordination and connection between Federation of Bosnia and Herzegovina and Republic of Srpska are developing gradually.

B&H is politically and administratively decentralized country. This situation creates complex environment for co-operation between entities, provincial (Canton or Regional) and local authorities responsible for water management. Also the war caused additional untypical and very specific problems in water supply sector that are not present in the other countries in the region.

1.2 Economic and social circumstances

The last three decades in Bosnia and Herzegovina were characterized by political and economic changes.

The period before 1989 was period of industrialization and urbanization of the country. Investments in big centers contributed to expansion of population in the towns in the short period of time, so the investment in infrastructure could not follow that rhythm.

The period between 1989 and 1992 was a period of political and economic changes in B&H. In that time, the market economy replaces planed economy. It was the first step of transition from socialism to capitalism.

Under such circumstances, started the war (1992-1995) that caused difficult consequences to all fields of life in Bosnia and Herzegovina. Economy was totally destroyed, residence fund was mostly damaged or destroyed, population displaced.

After 1995, the most important tasks were reconstruction of economic capacities and creating of conditions for employment opportunities in order to establish economic basis as a sustainable one. The inflow of international capital was relatively slow, because of insecure political conditions in the country and unfinished process of privatization.

The post-war economic growth in the B&H has been largely stimulated by international donations and loans. The sustainability of the economic growth depend on how effectively external assistance is used, as well as of progress in institutional building. A substantial reform is still underway in most sectors, including water sector.

1.3 Water Management –Legal and Institutional Framework

Both entities in B&H regulate water policy by its own “Water Laws” which are harmonized with European Legislative (EU Water Framework Directive) and adopted in 2006. By this law, both in FB&H and in RS, competence of water management is under entity's Ministries of Agriculture, Water-Management and Forestry.

The difference between entities is decentralization of competencies defined by the establishment of 10 Cantons in FB&H (which are also obliged to bring their own Water Laws), since in RS, competences are centralized.

1.4 Water Utilities in B&H

At present there are more than 100 water utilities in B&H that are usually organized as public companies, owned by Municipalities or even Cantons (in FB&H).

The utilities still operate at relatively low level of efficiency. Unaccounted for water (UFW) is usually on average more than 40% of total water production. Maintenance and repair was not carried out properly before the war, and during the war it was completely stopped. After the war, it was introduced again step by step, but still on unsatisfactory level.

Before the war water metering was carried out in all municipalities for almost all of the customers. During the war many meters were stolen or they became out of order because of intermittent flows and lack of maintenance. Consumer's metering is quickly improving in the last years in many utilities, although there are still some municipalities where old water meters are not replaced or not maintained and calibrated, and therefore, water bills are based on a lamp-sum.

Water tariffs rates and structure vary a lot from region to region in B&H and they are generally still inadequate to cover related expenses. Low payment collection rate is still problem for many water utilities, although it is improving in last years. The accumulation of unpaid customer bills over the last past few years represented bad debts, which often had to be written off.

All observed problems are basically due to improper institutional and management weaknesses in water utilities.

2 Activities on improvement of water supply sector in Bosnia and Herzegovina

This chapter will present results achieved in water supply sector in Bosnia and Herzegovina and Monte Negro in last years, through different projects implemented by Hydro Engineering Institute Sarajevo (HEIS) together with water utilities and International partners (USAID, EU, etc.).

Different types of tools for water demand management and for integrated water resources management were used within these projects; such are institutional, legislative, economic and technical tools.

2.1 Activities supported by USAID

The objective of USAID institutional strengthening activities directed to B&H water utilities was to restructure their management along commercial lines, to improve operational efficiency through minimizing losses, monitoring production and supply, establishing modern financial and audit procedures, and improving revenue collection.

2.1.1 Program "Assistance to Water Utilities in B&H"

This program is one of a series of USAID-funded programs for water utility strengthening that began in 1999, when USAID Sarajevo commissioned a study to assess the needs for the reform of the water sector. The objective of that particular assessment was to examine the water problems at the local level in order to strengthen the capability of these water utilities to provide satisfactory water and wastewater services to their customers in a business-like manner, i.e., to become efficient and financially self-sustaining.

The first phase of this program included a detailed field diagnosis of conditions in selected ten water utilities considered as representative, and the recommendations arising from that study in a form of designing of basic models, tools and procedures which address areas of weakness in the water and wastewater utilities of Bosnia and Herzegovina. Weaknesses were recognized in three aspects of their functioning:

- Legislative
- Technical
- Financial

Second phase of program started in March 2002, under the project “Assistance to Water Utilities in B&H - Pilot Water Utilities Doboj, Orašje, Konjic, Tuzla”.

Overall objective of this project was to strengthen the institutional and financial sustainability and operational efficiency of selected water utilities, to make them self-sustainable public companies and to qualify them for commercial credits from the World Bank and/or other lenders.

Main task within the first year of the project (2002-2003) was to adapt previously developed models, tools and procedures to the specific needs of each selected water utilities (Doboj, Orašje, Konjic, Tuzla).

The second year of the project (2003-2004), consisted primarily of hands-on training and day-to-day work with selected personnel from the four water utilities, in which HEIS and water utility staff worked together in the implementation of the models, tools and procedures developed in the first year.

Although some implementation occurred even during the first year, major achievements were results of second year's activities. During this phase additional three water utilities were selected (Cazin, Sokolac, Srebrenik) and limited scope of activities was implemented till the end of the project life-time.

Project covered legal, technical and financial components and in accordance to that, the following activities and tools were implemented in order to improve water utility's management and operation:

- Legal component

Water utilities are very dependent of municipal administration, and level of their autonomy is very low. They are not in position to bring their own decisions which could provide them self-sustainability. This project increased the autonomy and in the same time responsibility of the three pilot water utilities by:

- Developing an agreement between the water utility and the Municipality on Semi–Autonomy of Water Utility.
- Drafting a two-year strategy for implementation semi–autonomy given by the agreement.

- Technical component

- Drafting a policy on payment of bills for services.
- Developing a strategy for billing customers in multi-family buildings.
- Developing procedures to physically facilitate shut-offs.
- Developing a strategy to overcome non-payment by public customers.

- Setting up procedures for proper metering including meter reading and recording of the results.
- Setting up procedures for monitoring, periodic replacement, and calibration and repair of meters.
- Developing water demand management and unaccounted-for-water (UFW) reduction programs
- Improving estimates of production/ delivery and consumption.
- Financial component
 - Preparing a Chart of Accounts for each water utility. Showing separate accounts for the water function and wastewater function.
 - Determining and reporting on the budgeting needs of the water utility.
 - Developing procedures for a budgeting process for operating costs based on department responsibilities and for capital investments on department requirements.
 - Developing reporting requirements.
 - Preparing a tariff model for the selected water utilities.
 - Developing Tariff Manuals (guidelines for setting tariffs) for each water utility.
 - Developing a program to require governmental agencies to subsidize those unable (or unwilling, on the part of many institutional customers) to pay for water and wastewater services.

Some results coming from the implementation of the project were depending only on Consultant's efforts, while others were highly dependable on external factors, as example of increase the autonomy of the water utilities, where desired result was not met for the reason of constrained legal environment that could not be avoided during the project life-span.

Nevertheless, achieved results in the areas of increasing water utilities' revenues, development of effective metering programs, full understanding and further reducing unaccounted-for-water losses, development of networks mapping and GIS, development of effective accounting and budgeting systems, establishment of more realistic tariff rates completely confirmed that the overall project objective was met, so as increased capacities within the water utilities are full guarantee for long-term results sustainability. Even more, selection of additional water utilities during the second project year and implementation of limited number of activities proved replication potential to other water utilities in B&H.

2.1.2 Accounting/ budgeting/reporting program for water utilities

During period March – July 2001, B&H water utilities have been invited to participate in accounting/budgeting/reporting program. The whole program was done in several phases which were including workshops, visiting of utilities and follow on events.

All water utilities at first participated in the four-day Workshops. First two days were devoted to improvement of accounting procedures in the water utilities, third day to budgeting/operating procedures and water tariff structure, and fourth day to wastewater tariff structure and to Internet technologies and distance learning module. Water utility representatives were introduced with models and tools for improvements of their

accounting and bookkeeping, developing budget and operating procedures, establishment of proper tariff structure.

During the workshops, the accounting software specially designed for water utilities was delivered to all participants, and they were trained how to use it. Some water utilities that did not have previous Internet experiences got also external modems and many got access to pre-paid services on appropriate Internet Service Provider (ISP). During workshops participants were trained how to use Internet browser, how to access web page of Distance Learning module, how to reach desired content on it or how to initiate discussion etc.

After 3-6 weeks from participating in workshop, each water utility was visited by HEIS coaching team. This visit was aimed to resolve potential problems in accounting software installation, modem installation and connection to ISP or any other technical problem that could arise in trials to benefit from all parts of existing program.

From the beginning of the whole program (end of March 2001) Distance Learning module was active, too.

At the end of this phase, Follow On event was organized, with final goal of collecting all positive or negative experiences of participating water utilities, getting input on possible (desired) future activities in the field, exchange of experiences in privatization process and possibilities on water utilities Association establishment.

2.1.3 Unaccounted for water reduction and water demand management training

The objective of the training was to provide skills and knowledge to participants for development of Water Demand Management and Unaccounted for Water (UFW) Reduction Programs for their own utilities. This was accomplished by providing technical know-how transfer to participants, as well as explaining the role of government and/or local authorities in demand and reduction management.

Target for B&H water utilities was to reach a UFW level of 30%, which is believed to be reasonable and achievable for the incoming period. Water demand management program would reduce or eliminate the need for expensive investment in new water sources.

The training program included topics like water demand management concept, water audit procedure, organization in water utilities relevant to UFW reduction, efficient metering and methods for testing big water meters in place, leak detection methods, mapping or setting proper tariffs.

Examples from other cities in B&H were presented to the participants, as well. Each training was consisted of in-class work and field visit to the water utility from the training hosting municipality and its network.

2.2 Activities supported by EU

The objective of EU institutional strengthening activities directed to B&H water utilities was to introduce them with main principle of EU Water Framework Directive and other water related international acts, as well as to help them in solving technical and legal problems which occurs in their everyday operating.

2.2.1 Establishment and Institutional Strengthening of Water Works Association in B&H – BHWWA, EC LIFE Third Countries, 2002 – 2004

This institutional project was implemented in period 2002 – 2004, and main objective of project was to:

- Improve sustainability of the use of water resources through sector partnership by strengthening water works association (BHWWA),
- Determine priority actions of BHWWA, and
- Help to prepare BHWWA Strategic Action Plan with the aim of reaching long-term sustainability

The established Water Works Association in B&H - BHWWA has become a strong supporting organization to the whole water sector in B&H. Organization gathers more than 70 water utilities from B&H, and is recognized in B&H and wider as relevant partner in improvement of water management. It has directed its efforts primarily to the water works operations, providing them:

- Technical help in overcoming of major operating problems, like enormous UFW and shortage of technical and management knowledge in water works management, through organization of seminars, web site, operating manuals and continuous communication between Association members.
- Legal assistance, strengthening and representing this society in front of governments, helping the water sector to improve legal environment in B&H.
- Introduction of EU Water Framework Directive and other water related international acts, by which the awareness of the need to harmonize current B&H water legislation with international, especially EU water and environment legislation.
- Representing of B&H water sector in international organizations and in international cooperation.

2.3 Measurements and detected leak repair in the water supply systems of Neum (Bosnia and Herzegovina) and Herceg Novi, Budva and Bar (Montenegro)

Neum Municipality is the only area in B&H located on Adriatic coast and very well developed tourist centre. Water supply system of Neum Municipality has supplied water from the well field in Čapljina, via regional “Gabela“ water supply system, during entire year. Length of the system's main pipe is 38 km, while level of water pumping is 370 m, with three re-pumping. Having in mind mentioned, this system is very complicated and expensive for maintenance, and Neum Municipality decide to construct new well field “Blace”, which is located near Neum. The capacities of this well field are enough to satisfy the needs of Neum city during nine months of the year (except for the summer season), and should replace the existing “Gabela“ system. Water from the well field “Blace“ will be transported gravitationally which caused drastic reduction in the electric energy consumption.

Before starting with operation of the new source for supplying, it was decided to repair existing network, and decrease physical water losses which were in water supply

network. Neum Water Utility hires Hydro-Engineering Institute Sarajevo to carry out hydraulic measurements and leak detection.

In November 2004, the hydraulic measurements in the water supply network were performed. Water supply network was divided in two zones (upper and lower). Hydraulic analyze was done in accordance to the results from inflow and pressure measurements in both zones, as well as from the night measurement campaign. The main areas of physical losses were identified and leak detection champagne took place.

After the leak detection and leak repaired has been conducted, the physical water losses in the Neum water supply system were decreased from 60% to 30%, which can be considered as “satisfactory percentage”.

After successful project implementation and lessons learned in Neum city, the same activities were replicated in the several Monte Negro Water Utilities: Herceg Novi, Budva and Bar. The results from this leak detection and repair were in decreasing of water losses up to 60%.

3 Conclusion

Generally, Eastern Adriatic countries such B&H and Montenegro do not suffer from fresh water scarcity, but lack of rational usage and care for good water quality has led to discrepancy between water availability and water demands.

Therefore, it is very important to change traditional approach of developing a new water sources and abstracting of additional water quantities in order to increase production levels and satisfy increasing water demands, rather than eliminating the causes of high losses, i.e. introducing systematic approach and implementation of water demand management programs.

As Water utilities are one of the most important stakeholders in water sector, it is necessary to motivate them to apply water demand management principles and procedures in their companies.

Experience from B&H’s water utilities shows that only parallel implementation of institutional, financial and technical tools and step-by-step approach could result in efficient water usage and preservation of valuable water resource from degradation.

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