Ex post evaluation – Bosnia Herzegovina

Sector: Basic drinking water supply and basic sanitation (14030)
Programme/project: Water supply and wastewater disposal in Banja Luka, BMZ no. 2008 66 038* (water supply, EUR 10 million) and BMZ 2008 66 046* (wastewater disposal, EUR 4 million)
Implementing agency: City of Banja Luka

Ex post evaluation report: 2019

All figures in EUR million	(Planned)	(Actual)
Investment costs (total)	14.60	19.04
Counterpart contribution	0.60	0.60
Funding	14.00	18.44
of which BMZ budget funds	14.00	14.00

*) Both projects in 2019 random sample

Summary: During the project, measures were implemented to expand the water supply in the Tunjice district, to renovate water supply systems in the Caire district and to expand wastewater collection in the Novoselja district. In addition to FC funds, the project was also financed with EU mandate resources.

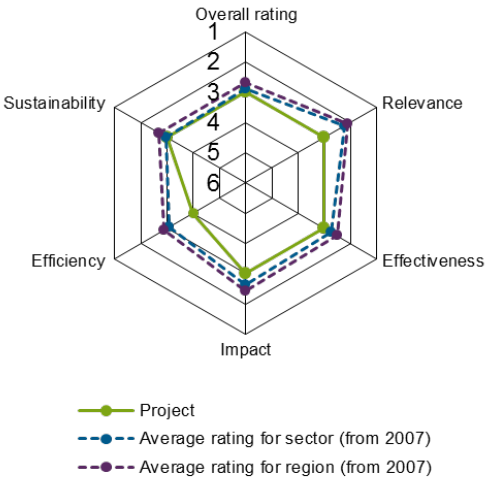
Development objectives: The project pursued the goal of ensuring the use of sustainable, ecological and sanitary water supply and wastewater disposal services in Banja Luka at socially compatible prices (outcome). With this goal, the project was to contribute to improving the population's living conditions and protecting natural resources (impact).

Target group: Around 200,000 residents in the city of Banja Luka in northern Bosnia Herzegovina, including a large number of Serbian refugee families who settled in the city after the end of the armed conflict.

Overall rating: 3

Rationale: Around 30% of the city's current population consists of refugees who fled to Banja Luka from other parts of the country as a result of the Bosnian War (1992–1995). The project was able to ensure a drinking water supply for these internal immigrants, who have since settled in the city. At the same time, it also facilitated the arrival of new businesses in an industrial area. Furthermore, additional renovation measures were able to reduce unaccounted for water throughout the network as a whole.

Highlights: These positive effects are counteracted by the fact that the wastewater for all of Banja Luka's 200,000 residents is still discharged untreated into the River Vrbas. The construction of a sewage plant, which was not due to be implemented during the project but at a later date, has yet to be specified in further detail.



Rating according to DAC criteria

Overall rating: 3

Ratings:

Relevance	3
Effectiveness	3
Efficiency	4
Impact	3
Sustainability	3

Relevance

Even though Banja Luka was not directly affected by fighting during the Bosnian War (1992–1995), the conflict caused extensive social upheaval, particularly caused by migration and displacement. A large number of Serbian refugees from other parts of the country settled in Banja Luka. According to estimates, around a third of the city's current 200,000 residents can be traced back to this internal migration. Bosniaks and Croats, on the other hand, only make up small minorities of the population after displacements. As a result, this posed significant challenges for the city, including for its drinking water supply. For instance, a large number of refugees settled in the outlying district of Tunjice, which was very sparsely populated at that time and had not been connected to the central water supply. Furthermore, an ever-increasing settlement along the banks of the River Vrbas (Karanovac district) generated fears over a risk to drinking water resources as the population's untreated wastewater was released upstream of the extraction point in the Vrbas used for the water supply. Further problems in the sector were caused by the connection rate to the drinking water supply – which still required improvement at that time – and the high levels of unaccounted for water in certain sections of the network (Caire district) caused by the outdated network. Furthermore, the connection rate to the central wastewater network was relatively low (50%).

From today's perspective, the problems were identified correctly and addressed by suitable measures. However, the population density in Karanovac has remained at a manageable level, meaning that the extensive measures for protecting the upper reaches were perhaps sensible from today's perspective but would not necessarily have been required.

However, another problem could not be addressed within the project: all of the city's wastewater is still released untreated into the River Vrbas to this day. While it was hoped during the project appraisal (PA, 2009) that a sewage plant would be built for Banja Luka during a later phase of the project, these plans have yet to progress past this point. Nevertheless, it is positive that the implementation of compatible measures in the wastewater sector generated the relevant impetus.

The chains of effects appear to stand to reason and are plausible from today's perspective. The Tunjice district's connection to the central drinking water network was intended to provide the area's population with access to a reliable and hygienic water supply via home connections; this access was due to be accompanied by a corresponding improvement to living conditions (saved time, improved hygiene, reduced costs). Connecting the settlements in Karanovac to the wastewater network protected the drinking water extracted from the river against contamination from untreated sewage, helping to protect water resources. However, this contribution only occurs on a very local level as the collected wastewater is released downstream without being treated.

The project was carried out in coordination with the other donors in the sector, which is also reflected in the cofinancing by the European Union. Since it financed municipal facilities for basic public services, the project was in accordance with the Bosnian government's development objectives and the priorities of German DC, which was involved in multiple urban water management projects in Bosnia-Herzegovina, including the construction of a treatment plant in the city of Bihac.

From today's perspective, the relevance is rated as satisfactory.

Relevance rating: 3

Effectiveness

The project's objective was defined as ensuring a sustainable, ecological and sanitary water supply and its usage at socially compatible prices. Wastewater-specific measures also contributed to this objective as they primarily aimed to protect the resources used for water supply. Furthermore, an indicator was also defined for the quality of the water in the River Vrbas at the level of the drinking water extraction point in Novoselja. As the target level was not clearly defined in the appraisal report, it was adjusted for the purposes of the ex post evaluation. Furthermore, an additional indicator was added at outcome level, covering the use of the new water infrastructure.

The target achievement at outcome level can be summarised as follows:

Indicator	Status PA, target PA	Ex post evaluation
(1) Percentage of connections to the water supply in Tunjice	n.a., target value 70%	>99% -> Target achieved
(2) Unaccounted for water: Unaccounted for water in the Caire district	>50%, target value <25%	Roughly 25%* -> Target achieved
(3) Security of supply: 24h supply in all districts of the city	n.a., target value 24 h	24 h -> Target achieved
(4) Percentage of connections to the sewage network in the newly populated areas (target: 70%)	Target value 70%	63%
(5) Quality of untreated water: Improvement to bank filtrate/surface water (concentration of e.coli)	100–2,000 MPN** per 100 ml depending on the measurement, target should be a clearly positive trend for measured values (roughly -50%)	Only slight improvements detected -> Target not achieved
(6) (New) Daily specific consumption on average (l/c/d)	n.a., target: adequate minimum consumption	170–180 l/c/d adequate consumption*** -> Target achieved

*) According to estimates from the supply company based on night flow analyses
**) Most probable number/cell number
***) Including the irrigation of vegetable gardens, which are found in a large number of homes

Based on the data provided by the regional water protection authority Vode Srpske, only a slightly positive trend in the quality of untreated water can be ascertained in Novoselja. It is likely that this can be traced back to two factors: on the one hand, a large number of households (who have to pay for the connection themselves) remain unconnected in the catchment area (around 300 of a total of 817 households) despite prompting by the operating company, though this is down to topographical conditions in some cases. For instance, lots of houses would have to be equipped with a pumping station and the households would be responsible for both their operation and maintenance. On the other hand, it can be assumed that the influence the applied measures has on water quality is very limited anyway, particularly because the district's population developed less dynamically than expected during the PA. Other influential factors, such

as agricultural run-offs or other diffuse wastewater discharges upstream, may outweigh the influence of the untreated wastewater in Karanovac.

Taking the average household income in Banja Luka as a basis (KM 918, around EUR 470), the percentage of costs for water and wastewater is around 3%. Tariffs for water supply and wastewater disposal are therefore considered socially compatible enough.

Most of the objectives at outcome level were achieved, so the effectiveness is considered satisfactory.

Effectiveness rating: 3

Efficiency

Despite some significant differences between the building companies, the implementing consultant and the city of Banja Luka, a prolonged suspension of the building work was avoided thanks to intense mediation by KfW, meaning that the project's implementation period was only delayed to an acceptable extent compared to the plans (85 instead of 62 planned months).

Since the renovation to the supply network ultimately improved supply in the entire urban area, the specific costs of the drinking water components at around EUR 55 per resident are comparatively low due to the high number of beneficiaries. If, on the other hand, the specific measures for the district of Tunjice are considered separately, this results in very high specific costs of EUR 372 per capita, which can partly be traced back to unanticipated problems that arose during the construction of a reservoir (risk of mud slides) and required a much more intricate construction process.

The opposite effect applies for the specific costs of the wastewater components because here a relatively costly approach to network expansion only benefits a limited number of households. This effect is exacerbated further by the relatively low percentage of connections in the newly populated districts (only 512 of 817 houses are connected so far, see Impact). This theoretically results in costs of around EUR 4,000 per resident benefiting directly. However, it should be considered that the original purpose of wastewater measures was primarily to protect water resources to supply the entire urban population (200,000 residents), which corresponds to specific costs of around EUR 40 per capita.

The improvement – which is marginal at best – to the water quality at the water extraction point is not commensurate with the high construction costs for the wastewater components, which used up 40% of the project's funds. This has a negative impact on the project's allocation efficiency.

Overall, the efficiency is deemed unsatisfactory.

Efficiency rating: 4

Impact

One of the developmental objectives defined for the project was to contribute to improved living conditions for the population, though no indicators were set out for this goal.

An increased supply rate of hygienic drinking water in the district of Tunjice along with a reduction in unaccounted for water in the district of Caire and the resulting improvement to the supply situation contributed to an improvement in the target group's living conditions.

In Tunjice, 4,000 residents received access to the urban drinking water supply for the first time; furthermore, almost 13,500 residents benefit from the improved infrastructure in the form of a permanent water supply with adequate pressure. In the Caire district, unaccounted for water was almost cut in half (-50%), which led to a more stable supply without interruptions and also had a positive effect on water distribution in the entire urban area. Another positive aspect is the arrival of small and medium-sized businesses in Tunjice's industrial zone, which would not have been possible without a reliable water supply.

A wastewater network was laid in the Karanovac district to protect the urban water extraction point in Novoselja, downstream on the Vrbas. However, living conditions only improved for the portion of the target group that actually connected to the sewage network (currently 50%). These residents do not have to deal with the outlay or costs required to run domestic septic tanks. However, the other portion of the population

are not benefiting from this because some of them would require extra household pumping equipment (which in turn would increase energy costs) or because there is a lack of awareness.

While the protection of natural water resources in the River Vrbas established by the construction of sewers may exist in theory, this is not evident in existing data or measurements. Data from the analysis of raw water quality reveals a slight downturn in the concentration of nitrogen and coliform bacteria since project completion; but the biological and chemical oxygen demand remain unchanged. Natural factors, such as solar radiation, flow rate and diffuse upstream discharges, have a more decisive impact on water quality than the removal of wastewater from around 400 households. Fluctuations in raw water quality are intercepted by the water treatment facilities in Novoselja. However, there are potentially positive effects from the removal of problems caused by poorly maintained or leaking septic tanks that previously were not connected to the network. However, there is no data on this aspect.

The intended impact of raising awareness of wastewater treatment and resource protection at both a private and political level was not achieved. So far, the construction of a central sewage treatment plant has not been implemented by the city of Banja Luka, not least due to a lack of funds or unwillingness to take on further loans. All of the city's wastewater is still discharged untreated into the Vrbas at several points downstream of the extraction point.

Nevertheless, it cannot be ruled out that a corresponding change to priorities could see the implemented, compatible wastewater measures becoming part of integral wastewater disposal, including treatment over the long term.

Impact rating: 3

Sustainability

The drinking water supply facilities and the wastewater network are operated properly by the municipal company Vodovod Banja Luka, while the city of Banja Luka was the investment measure's implementing agency. The infrastructure visited, such as the treatment plant, reservoirs and pump stations, were generally well maintained. Measuring and control equipment was functional and was managed correctly by staff. All of the plant's main technical components were accessible and properly maintained. Employees were able to operate the SCADA system financed in this project and the geo-information system. A sufficient quantity of spare parts appeared to be in place, although the storage conditions leave room for improvement. Vodovod owns a relatively modern TV inspection system consisting of a vehicle and two cameras for running the wastewater network. According to staff, this equipment is used to navigate around 12 km of pipes per year (total length of the network roughly 400 km).

The shaft structures visited were in a good condition, though two of the three drinking water shafts were flooded with water. It could not be ascertained whether this was rainwater or leakage.

Quality checks are regularly performed on the treatment plant and the network as a whole. The central lab is adequately equipped for this purpose and employs trained staff. The chlorine content is measured on a permanent basis at the reservoir outlets and monitored centrally using the SCADA system.

Vodovod currently has 360 employees, which seems high in view of the number of house connections (8.5 employees per 1,000 connections). This is put into perspective by the fact that Vodovod runs its own construction business and also by the inherent over-employment of public enterprises in former socialist countries.

Thanks to the tariff increases introduced after project implementation and a consistently high collection efficiency of 100%, Vodovod can cover all of its running costs and service the debt to be paid by the city of Banja Luka. However, the owner, Banja Luka city council, makes decisions regarding investments.

Even though only a small sustainability risk can be identified in relation to Vodovod's technical and economic performance, sustained resource protection still has to be called into question. Sufficient ecological sustainability can only be achieved here by constructing a sewage plant and by increasing the connection rate to the sewage network.

Sustainability rating: 3

Notes on the methods used to evaluate project success (project rating)

Projects (and programmes) are evaluated on a six-point scale, the criteria being **relevance, effectiveness, efficiency** and **overarching developmental impact**. The ratings are also used to arrive at a **final assessment** of a project's overall developmental efficacy. The scale is as follows:

Level 1	Very good result that clearly exceeds expectations
Level 2	Good result, fully in line with expectations and without any significant shortcomings
Level 3	Satisfactory result – project falls short of expectations but the positive results dominate
Level 4	Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
Level 5	Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
Level 6	The project has no impact or the situation has actually deteriorated

Rating levels 1-3 denote a positive assessment or successful project while rating levels 4-6 denote a negative assessment.

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability): The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected).

Sustainability level 3 (satisfactory sustainability): The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability): The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and is very unlikely to improve. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The **overall rating** on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. Rating levels 1-3 of the overall rating denote a "successful" project while rating levels 4-6 denote an "unsuccessful" project. It should be noted that a project can generally be considered developmentally "successful" only if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are rated at least "satisfactory" (level 3).