

Ex post evaluation – Turkey

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Sector: 43030 Urban development and administration
Programme/Project: (A) Communal infrastructure I (BMZ no. 2001 66 074)*
 (B) Complementary measure (BMZ no. 2001 70 365)*
Implementing agency: Municipal administrations of the cities of Sivas and Siirt



Ex post evaluation report: 2015

		Project A (Planned)	Project A (Actual)	Project B (Planned)	Project B (Actual)
Investment costs (total)	EUR million	66.00	55.85	3.84	3.84
Counterpart contribution	EUR million	11.10	8.60	0.00	0.00
EIB co-financing	EUR million	22.69	16.21	0.00	0.00
of which BMZ budget funds	EUR million	32.21	31.04	3.84	3.84

*) Random sample 2015

Summary: The project consisted of measures aimed at improving the supply of water and disposal of waste water in the cities of Sivas and Siirt. Its main components were the construction of two sewage treatment facilities, the renovation and expansion of the sewer system, measures aimed at reducing pipe network losses of drinking water and separating the waste and rain water drainage systems, targeted measures aimed at improving the supply of drinking water and consulting services. The purpose of the complementary measure was to improve the administrative and financial effectiveness of the executing agency. The project was implemented as part of a co-financing arrangement with the EIB.

Objectives: Ultimate objectives: Helping conserve resources and improve both sanitation and socio-economic conditions in the cities of Sivas and Siirt. Programme objective: The disposal of urban waste water in a way that is not harmful to health or the environment, the improved supply of drinking water to the population and the sustainable use of the existing or improved infrastructure.

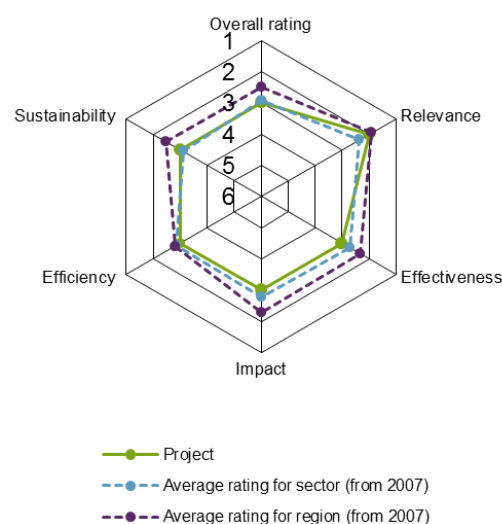
Target group: The inhabitants of the cities of Sivas and Siirt, as well as neighbouring communities.

Overall rating: 3

Rationale: Satisfactory implementation of the programme overall. All facilities are operational and meeting expectations for the most part. In comparison to the situation had the project not been implemented, the waste water of two medium-sized cities with approximately 0.5 million inhabitants is being treated in accordance with EU standards before being fed into the Botan (Siirt) and Kizil Irmak (Sivas) rivers. No structural effects are apparent at the sector level as a result of the project. This is despite the fact that numerous reforms were carried out, although these can primarily be attributed to harmonisation with EU standards.

Highlights: (i) Although the volume of the overall German commitment focusing on water and sanitation was significant (about EUR 900 million), there was no overarching dialogue at the sector level.

(ii) Although stricter environmental standards were introduced within a relatively short space of time and extensive investment was carried out, there was no equivalent increase in the population's awareness of environmental issues. This is an obstacle to compliance with and the implementation of the new benchmarks and standards.



Rating according to DAC criteria

Overall rating: 3

The programme helped conserve resources and improve both sanitation and socio-economic conditions for the inhabitants of the cities of Sivas and Siirt. The facilities that were built are operational and meeting expectations with the exception of certain sub-areas. This concerns the separation of the rain and waste water systems and the systematic reduction of network losses, as well as the lack of cost coverage in Siirt and the treatment/disposal of sludge in Sivas. The executing agencies receiving promotion in connection with the complementary measures (SISKI and SIBESKI) are essentially capable of carrying out the tasks assigned to them professionally and promptly, but operating on very different levels.

No indicators were defined for the ultimate objectives (“Helping conserve resources and improve both sanitation and socio-economic conditions”). It can be assumed, however, that the programme contributed to the changes in the water quality of the Botan (Siirt) and Kizil Irmak (Sivas) river systems, central health indicators and per capita income, although the complexity of the interdependencies and the poor availability of data in general makes it impossible to identify any direct causality. No structural effects were achieved at the sector level. This is despite the fact that numerous reforms were carried out, although these can be attributed to harmonisation with EU standards. In comparison to the situation had the project not been implemented, the waste water of two medium-sized cities with approximately 0.5 million inhabitants is being treated in accordance with EU standards before being fed into the Botan (Siirt) and Kizil Irmak (Sivas) rivers.

General conditions and classification of the project

Conventional development cooperation with Turkey, which focused among other things on water and sanitation with a large number of projects (such as Batman, Van, Samsun, Diyarbakir and Bursa), including the project in Sivas and Siirt, was terminated in 2008 after more than 50 years. The German federal government provided more than EUR 0.9 billion in total for projects in the field of communal infrastructure that benefited about 7.5 million people.

Relevance

Since the severe economic crisis in 2001 and subsequent reform measures, Turkey has experienced impressive development that is reflected not only in high average economic growth rates of 6 % p.a. (2002 - 2011) and rising income levels (per capita income in 2002: USD 3,500, 2013: USD 10,950), but also in tangible progress in the fight against poverty (proportion of the population living in poverty 2004: 20.9 %, 2012: 2.3 %).

The high growth rate was accompanied by a high level of urbanisation that is still ongoing and causing cities to grow by 1.9 % on average each year. Studies indicate this trend to will continue until about 85 % of the population lives in cities (currently: 72 %).

At the same time, water is becoming more scarce and the renewable water resources available each year have fallen from 4,000 m³ to 2,850 m³ (per capita/year). In light of the country's intensive irrigation farming and growing population, and in the absence of drastic measures, this figure is expected to fall to 1,000 m³ by the year 2030, plunging Turkey into a severe water shortage.

Negotiations concerning Turkey's accession to the EU were entered into in 2005. The subsequent process resulted in the successive adoption of European standards into Turkey's legislation and institutional landscape. In the context of increasing urbanisation, this led to massive investment in the treatment of waste water. In order to meet the applicable standards, a total of around EUR 49 billion will need to be invested in the treatment of industrial and domestic waste water between 2007 and 2023.

The project was implemented in close partnership with other donor agencies involved at the municipal level (the EIB and the World Bank), and co-financed by the EIB. The promotion complied with the objec-

tives of the cooperation between Germany and Turkey, and fell within the priority area of water and sanitation that aimed to support the poorer regions of Turkey following the turn of the millennium.

Relevance rating: 2

Effectiveness

The programme objective of the “Communal Infrastructure I” project was to “contribute to the disposal of urban waste water in a way that is not harmful to health or the environment, the improved supply of drinking water to the population and the sustainable use of the existing or improved infrastructure.” Since a contribution to conserving resources has also been defined as part of the overall objectives, and measures aimed at reducing network losses have been carried out, an additional indicator for measuring network losses was incorporated for Siirt (no significant investment in the renovation of the network was planned for Sivas). An indicator regarding the quality of drinking water was not incorporated. The quality standards applying in Turkey were adapted to the EU Drinking Water Directive in 2005, and are met in both cities (with the exception of a few weeks each year in Siirt).

The achievement of the programme objectives defined during the programme appraisal can be summarised as follows:

Investment

Indicator	Status PA	Ex post evaluation
(1) The approximate achievement of the effluent concentration standards ¹ for waste water defined by Iller Bank, six months after the treatment facility started operating.	N/A	The indicator was adapted to the existing national environmental legislation with the following thresholds: COD < 125, BOD < 25, pH between 5 and 11. Sivas: Average figures in 2013: COD: 22, BOD: 7.4, pH: 7.9. Siirt: Average figures in 2013: COD: 48.5, BOD: 16, pH: 7.13.
(2) Increasing the duration of the drinking water supply throughout the entire city in the critical summer months.	Sivas: Brief supply shortages in the dry months. Siirt: Supply shortages in the summer months as well as significant fluctuations in water quality.	Sivas: All households (100 %) are connected to the water supply and are supplied throughout the year (24/7). Siirt: Around 98 % of households are connected to the water supply, and are supplied throughout the year (24/7) with isolated interruptions amounting to about 10 to 15 days.
(3) Coverage of operating costs plus actual debt service obligations by income every year starting in 2003.	Sivas: Met (even before the programme was implemented) Siirt: About 50 % of operating costs covered.	Sivas: The dynamic initial cost statement indicates a coverage (full costs) of 88 %. The coverage of running costs is 144 %. This indicator is almost met. Siirt: The dynamic initial cost statement indicates a coverage (full costs) of just 25 %. The coverage of running costs is 55 %. This indicator is not met.

¹ The environmental standards applied by Iller Bank are largely based on the standards of the EIB, World Bank and EU. The Iller Bank standards have become established in the field of municipal environmental investment in Turkey (as an analogy to the “World Bank standards”) because, as the largest Turkish institution financing municipal investment, Iller Bank is usually involved in such measures.

(4) Reduction of network losses in Siirt by a third to < 46 %	Siirt: About 69 %	Siirt: About 45 % including administrative losses, but taking into account the supplying of neighbouring communities free of charge. Target (46 % excluding administrative losses) therefore achieved.
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Complementary measure

The objective of the complementary measure was to enable the municipal utilities to independently operate the water supply and waste water disposal facilities in the long term from both a commercial and a technical perspective. Only outcomes were defined in this case, although they can also function as indicators:

Indicator	Status
The municipal utility companies ('SKI) in the programme cities operate on the basis of an appropriate organisational structure, and an MIS has been introduced.	Sivas: SIBESKI has an appropriate and effective organisational structure as well as a computer-based MIS system. Siirt: SISKI has an appropriate organisational structure and a rudimentary MIS system that does not meet the requirements of modern management.
The executing agencies are qualified to manage the programme.	Sivas: According to the information provided, there are no significant shortages and staff turnover is low. Siirt: According to the information provided, there are no significant shortages but staff turnover is excessively high at the upper levels of the hierarchy.
The executing agencies' financial management and accounting meet the standard of a modern public service provider.	Sivas/Siirt: The financial management and accounting of the executing agencies are audited each year by the Turkish National Audit Office and meet the national standards.
Business units are capable of carrying out operating and maintenance tasks independently, and systematically training themselves internally on standard functions.	Sivas/Siirt: Maintenance and repair tasks are carried out independently and promptly. Internal training measures are held regularly.
The operation of the waste water facilities and third-party feed-in activities are regularly monitored and regulated as part of the 'SKIs' legal mandate.	Sivas/Siirt: Third-party feed-in activities are regularly and properly monitored. However, breaches are merely registered. There are no mechanisms for ensuring compliance with standards, especially in connection with industrial waste water.
The services offered by the executing agencies are customer-oriented.	Sivas: The services offered are customer-oriented on the whole. SIBESKI also has a customer centre and a hotline that is always available (24/7). Siirt: The services offered are more traditional. There is a lack of modern services such as online transfers or pre-paid metering, nor is there a customer centre or hotline.

Both facilities are operational and essentially meeting expectations. The utilisation of capacity is satisfactory (Sivas: 75 % - 82 %, Siirt 85 % - 90 %). Full capacity utilisation is expected to be achieved in both cities within the next few years (planning horizon: 2018). At the same time, not all of the components were implemented as planned, with negative consequences in some cases. The separation of the waste and rain water drainage systems has still not been completed in either city, as a result of which rain water is getting into the waste water drainage systems and vice versa. This means that in Siirt the capacity of the waste water drains is exceeded even after light rainfall, and the waste water comes to the surface in several places, putting health at risk. The only waste water pumping station in Siirt is also non-operational and has now been destroyed, as a result of which between 800 and 1000 m³/d (about 4 % - 5 % of the total volume of waste water) is not being sent for treatment but instead leaking uncontrollably into the ground and putting the health of the population at risk. Furthermore, it has not been possible to get the sludge drainage facility in Siirt up and running, and the pumps in the sand trap are unable to get rid of all of the sand. In the case of the sludge drainage, this can be compensated for by making more use of the sludge drying bed, while another auxiliary pump could be used in the sand trap if necessary. The high network losses in Siirt's water supply network were successfully reduced. The planned installation of flow meters in the supply system was not carried out, as a result of which it is not currently possible to measure volumes by region (which would make it easier to locate the source of losses).

While the sludge in Siirt is not polluted with heavy metals or other substances that are harmful to health, and is used in agriculture, the sludge in Sivas is badly polluted with heavy metals from industrial waste water, and has to be stored at a repository outside the facility. The original plan was for the industrial waste water that is fed in to be continuously monitored, and for companies that do not meet the relevant standards to be relocated to the industrial zone. Although the water fed in was monitored, compliance with the standards and the relocation of companies proved to be unenforceable. The location of the sludge repository outside the city of Sivas was selected in partnership with the city's environmental authorities, and is sealed off from the layers of soil below using clay. There are however still residual risks relating to the hillside location and the absorption of rain water. The repository is also operating close to its maximum capacity. The executing agency is aware of the situation, and is in talks on the subject with local authorities and Iller Bank.

As part of the complementary measure, the municipal utility companies in Siirt and Sivas received training on central functions (Human Resources and Organisational Development – HROD) and a Management Unit (MMO) was set up at the Turkish Treasury Office to handle the overall management of the support measures, prepare needs analyses and advise the executing agencies on matters of strategy.

The MMO closed down in 12/2009, and PWC certified the appropriate use of funds as part of an appropriation audit conducted in March 2010. Although the use of the MMO was considered necessary and made implementation more effective, we consider the volume of funds spent to be excessively high (accounting for about 40 % of the complementary measure, or EUR 2.5 million).

The HROD measures were comprehensive but their effectiveness varied. Relatively good results were achieved in all non-sensitive areas. In sensitive areas such as pricing, performance indicators and operating transparency, the outcome depended to a large extent on political factors and the willingness of managers to reflect critically on their own actions. Strikingly, a number of important indicators (including the collection rate, arrears, network losses and user complaints) were integrated into the MIS in Sivas, and that the same was only true to a limited extent for Siirt. It is unclear whether or not a better result could have been achieved with the much higher volume of funds originally planned, especially since a number of central decisions were influenced more by political considerations than operating requirements.

The planned full coverage of costs will not be achieved in Siirt in the foreseeable future (25 % of costs covered). This stems on the one hand from the fact that the tariffs have not been adjusted for seven years as well as from excessively high "losses" since only a third of the total volume of water produced is even billed for. This is due in part to genuine network losses (approximately 45 %), while around 25 % goes to the suburbs surrounding Siirt, which do not make any kind of payment for this service. While there are plans for a united water supply arrangement which will also involve payments, it is not clear whether this can be achieved from a political perspective. Although the collection rate has improved from where it was when the project appraisal was carried out (72 %) to its current level of 86 %, there is still room for improvement in this regard.

Since the programme objectives were essentially achieved at both locations despite the deficits described, the effectiveness of the programme can still be judged to be satisfactory on the whole. This only applies to Siirt with reservations because the collection of waste water there is incomplete and the cost recovery ratio in particular is unsatisfactory.

Effectiveness rating: 3

Efficiency

The implementation of the programme in Sivas was delayed by 26 months (started in 2/2005) and was completed in 2/2009, about three years later than originally planned. The implementation of the programme in Siirt started in 7/2005 after a 31-month delay and was also completed in 2/2009, also about three years later than originally planned. The delays can mainly be attributed to political obstructions to the conclusion of the onlending agreements by the central government and also (to a lesser extent) to differences in opinion between KfW and the executing agencies in Siirt regarding the bid appraisal of the implementation consultants. The implementation of the programme went according to plan on the whole, and complied with the agreements.

The original plan was for a mechanical biological waste water treatment facility with capacity for 300,000 residents to be built in Sivas and a pond sewage treatment plant for 160,000 residents to be built in Siirt. Both plans were adapted and the capacity of the facility in Sivas was increased to 345,000 residents. In Siirt the planned pond treatment plant was replaced with a mechanical biological treatment facility, the capacity of which was reduced to 130,000 residents. These adjustments were appropriate in light of the actual changes in the populations of the two cities (planning horizon: 2018, current population of Sivas 335,000 and Siirt 136,000). The change in the treatment process for Siirt resulted in a higher-quality facility, albeit with higher operating costs. The final review report states “that a higher-quality facility was built in accordance with the EU standard for almost the same volume of investment.” The adjustments improved the overall efficiency of the project. The volume of industrial waste water fed in in Sivas was underestimated, or rather the potential for preventing it from being fed in was overestimated. The problem of separating rain and waste water, which leads to problems when it rains in Siirt in particular, was also underestimated.

Taking the adjustments into account, the programme was implemented according to plan, the facilities are operational and they are meeting expectations with certain deficits (please refer to the previous section). The project is playing an important role in reducing pollution levels in the Botan and Kizil Irmak rivers, and improved both the communal sanitation and living conditions in Sivas and Siirt.

Despite certain deficits, the efficiency of the programme as a whole can still be classified as satisfactory.

Efficiency rating: 3

Impact

The ultimate objective for the “Communal Infrastructure I” project was defined as “help conserve resources and improve both sanitation and socio-economic conditions for the inhabitants”, albeit without specifying any details or defining indicators. Thus, for the purpose of analysis, measurements were taken of the change in the quality of water in the two receiving rivers (the Botan and the Kizil Irmak), the change in the health situation in both cities based on the frequency of certain diseases and child mortality, and the region’s economic development based on per capita income and unemployment (although the poor overall availability of data only allowed limited conclusions to be drawn).

When the project appraisal was carried out, the quality of the water in the Kizil Irmak, the receiving river in Sivas, was category 1 above where the waste water is fed in (low level of pollution) with respect to BOD5, COD, ammonium and phosphorous, and category 3 (high level of pollution) with respect to the chloride load. No data was available for the Botan, the receiving river in Siirt, at the time of the project appraisal. It was assumed that quality category 2 would be achievable following the installation of the waste water treatment facility. Unfortunately, no current data could be obtained from those responsible at the municipal level in Sivas and Siirt or from the ministry responsible for monitoring water quality (the Ministry of Forest-

ry and Water). The reason given was that the system for monitoring water quality was comprehensively reformed in 2012 and no data was available yet.

However, scientific investigations indicate that the overall quality of water in both receiving rivers has continued to deteriorate despite the increased share of treated domestic waste water. The negative trend is linked to the rapid pace of economic development in Turkey, which has led to the more intense use of water due to abstraction and the increased feeding in of untreated industrial waste water as well as the washing in of insecticides and fertilisers used in agriculture. There are not many industrial companies that have their own waste water treatment facilities. Despite this development, we assume that both waste water treatment facilities and the treatment of the waste water produced by around 0.5 million people are having a positive impact on the quality of the water in the Kizil Irmak and Botan rivers, even if they have been unable to compensate for the additional rise in pollutants.

The population of Siirt was exposed to a large number of health risks in the 1990s, the causes of which included poor-quality drinking water and problems relating to the sewer system. Cases of typhus and diarrhoea tripled during that decade, and the child mortality rate of 90 per 1000 births was more than 100 % higher than the national average. The measures significantly improved the quality of the drinking water supply and the drainage of waste water, even though the latter remains prone to disruption and problems when it rains. The measures have dramatically improved the health situation, as a result of which typhus is no longer a significant factor and the figures for diarrhoea and child mortality are in line with the national average (child mortality 2013: 19/1000). On the other hand, these improvements cannot be attributed entirely to the impact of the project since significant improvements were also made to healthcare, pensions and education at the same time.

The project had no demonstrable impact on the health situation in Sivas, which was in line with the national averages both before and after the project.

The two locations experienced highly divergent economic trends. While per capita income in both cities fell significantly short of the national average at the end of the 1990s (EUR 1,900 in Sivas and EUR 1,150 in Siirt), it rose to EUR 7,400 in Sivas and EUR 3,400 in Siirt (average for Turkey: EUR 8,650). This development also reflects the strong disparities between the regions, which have become more pronounced during the country's period of strong economic growth. A similar picture emerges when looking at unemployment, which was high in both cities at the time of the project appraisal (with no more specific details provided) and even led to significant migration in Sivas (minus 0.7 % p.a.). In 2013 unemployment stood at 10 % in Sivas and 20.5 % in Siirt, compared to the national figure of 9.5 %. The population of both cities grew: in Sivas from 252,000 (2001) to 335,000 (2013), and in Siirt from 102,000 (2001) to 136,000 (2012). Today Sivas is a centre for trade on the North-South and East-West routes, and has rail links with Ankara, Kayseri, Samsun and Erzurum. Its industry is mainly based on agriculture, alongside several industrial settlements in the fields of textile and carpet processing as well as construction materials (cement and tiles). Siirt is still one of Turkey's poorer regions with no industrial settlements of note and highly reliant on agricultural production. This is exacerbated by its immediate proximity to the conflict zones in Syria and Iraq, as a result of which trade has collapsed and about 10,000 refugees have fled to the city.

Although developments in the fields of the environment, health and the economy are complex and influenced by a large number of other factors, it can be assumed that the project made a positive contribution in all respects even if additional, structural impacts largely failed to materialise.

Impact rating: 3

Sustainability

It is reasonable to assume that the waste water treatment facility in Sivas will be operated for the long term, although the same can only be said with reservations for the facility and executing agency in Siirt, which is dependent on regular substantial transfers from the municipal budget for the medium term. However, maintenance and repair are carried out regularly at both locations, and the personnel responsible for operations are sufficiently qualified and motivated. The city parliaments provide the necessary finances from the two cities' municipal budgets following a process of assessment and ratification. However, the coverage of at least the operating costs by income from water and waste water tariffs could only be substantiated in Sivas, where the income from water and waste water charges even covers a large percent-

age of the full calculated costs. In Siirt, only about 55 % of the operating costs are currently covered by income from water and waste water charges. This is not only putting an unusually severe strain on the municipal budget, but also resulting in the inefficient use of water which is an increasingly scarce resource.

In summary, a strong foundation has been laid for long-term operation without external financial support for the facilities in Sivas, even though there are risks relating to ecological sustainability as a result of the unsatisfactory treatment of sludge. In Siirt there are elevated levels of risk not only as a result of the unsatisfactory coverage of costs but also due to persistently high network losses and an inadequate collection rate, which are likely to increase the need for subsidies to the facility in the medium term if no decisive action is taken to counteract these factors.

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).