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Report No: ICR00004772

IMPLEMENTATION COMPLETION AND RESULTS REPORT

(TF017727 and TF017706)

ON A

GRANT

IN THE AMOUNT OF US$6.77 MILLION

TO

BOSNIA AND HERZEGOVINA

AND

THE REPUBLIC OF CROATIA

FOR A

GEF ADRIATIC SEA ENVIRONMENTAL POLLUTION CONTROL PROJECT (I)

August 15, 2019

Water Global Practice
Europe and Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective as of February 15, 2019)

Currency Unit =	Euro
EUR 1.127 =	US$1
US$1 =	EUR 0.886

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ASEP	Adriatic Sea Environment Program
BiH	Bosnia and Herzegovina
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EPEEF	Environmental Protection and Energy Efficiency Fund
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environmental Facility
ICR	Implementation Completion and Results Report
IFR	Interim Financial Report
IRR	Internal Rate of Return
ISM	Implementation Support Mission
IWLEARN	International Waters Learning Exchange and Resource Network
LD	Landfill Directive
LTP	Leachate Treatment Plant
M&E	Monitoring and Evaluation
MOFTER	Ministry of Foreign and Trade Relations
MZOIE	Ministry of Environment and Energy, Water Management
NGO	Nongovernmental Organization
NPV	Net Present Value
O&M	Operations and Maintenance
PAD	Project Appraisal Document
PDO	Project Development Objective
PIT	Project Implementation Team
PMT	Project Management Team
PSC	Project Steering Committee

SAP MED	Mediterranean Strategic Action Plan
SEA	Strategic Environmental Assessment
TA	Technical Assistance
TOR	Terms of Reference

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BASIC INFORMATION

Product Information

Project ID	Project Name
P143921	Croatia & Bosnia & Herzegovina GEF Adriatic Sea Environmental Pollution Control Project (I)
Country	**Financing Instrument**
Western Balkans	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Ministry of Finance	Environmental Protection and Energy Efficiency Fund, Ministry of Foreign Trade and Economic Relations

Project Development Objective (PDO)

Original PDO

The project's development and global environmental objectives are: (a) to reduce the discharge of pollutants with transboundary importance, particularly Nitrogen, in selected hot-spots of the eastern Adriatic Sea; and (b) to improve the capacity in Croatia and Bosnia and Herzegovina to prepare pollution control projects in selected localities of Dalmatia and Herzegovina and to strengthen the capacity to monitor environmentally sensitive areas of the sea.

PDO as stated in the legal agreement

The objectives of the Regional Project are to: (a) reduce the discharge of pollutants with transboundary importance, particularly nitrogen, in selected Hot-spots of the eastern Adriatic Sea; and (b) to improve the capacity in Croatia and Bosnia and Herzegovina to prepare pollution control projects in selected localities of Dalmatia and Herzegovina and to strengthen the capacity to monitor sea water quality.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
TF-17706	4,330,000	4,330,000	4,072,819
TF-17727	2,440,000	2,440,000	583,798
Total	**6,770,000**	**6,770,000**	**4,656,617**
Non-World Bank Financing			
Borrower/Recipient	23,200,000	23,200,000	24,360,000
Municipalities of Borrowing Country	0	0	0
Total	**23,200,000**	**23,200,000**	**24,360,000**
Total Project Cost	**29,970,000**	**29,970,000**	**29,016,617**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
11-Jun-2014	05-Dec-2014	12-Dec-2017	15-Mar-2017	15-Feb-2019

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
19-Sep-2016	1.21	Change in Results Framework Change in Components and Cost Change in Loan Closing Date(s) Change in Implementation Schedule

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Unsatisfactory	Moderately Unsatisfactory	Substantial

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	03-Nov-2014	Moderately Satisfactory	Moderately Satisfactory	0
02	08-May-2015	Moderately Satisfactory	Moderately Satisfactory	.55
03	09-Nov-2015	Moderately Satisfactory	Moderately Satisfactory	.86
04	30-May-2016	Moderately Satisfactory	Moderately Satisfactory	.88
05	02-Dec-2016	Moderately Satisfactory	Moderately Satisfactory	1.21
06	28-Jun-2017	Moderately Satisfactory	Moderately Satisfactory	1.24
07	04-Jan-2018	Moderately Unsatisfactory	Moderately Unsatisfactory	1.55
08	01-Nov-2018	Moderately Unsatisfactory	Moderately Unsatisfactory	2.85
09	15-Feb-2019	Moderately Unsatisfactory	Moderately Unsatisfactory	4.73

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Public Administration	**3**
Central Government (Central Agencies)	3
Water, Sanitation and Waste Management	**97**
Waste Management	61
Other Water Supply, Sanitation and Waste Management	36

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)

Environment and Natural Resource Management	**0**
Environmental Health and Pollution Management	99
Air quality management	33
Water Pollution	33
Soil Pollution	33

ADM STAFF

Role	At Approval	At ICR
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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Regional and Country Context

1. The Adriatic Sea is semi-enclosed and is part of the Mediterranean Sea extending from the Gulf of Venice south to the Strait of Otranto, linking it to the Ionian Sea. It has an approximate length of 500 miles, an average width of 100 miles, and an area of 50,590 square miles. The sea's western coast runs the length of Italy, while the eastern coast forms the borders of Croatia, Bosnia and Herzegovina (BiH), Montenegro, and Albania. A small part of Slovenia also reaches the Adriatic Sea. Eleven major rivers[1] flow into the Adriatic Sea: the Reno, Po, Adige, Brenta, Piave, Soča/Isonzo, Zrmanja, Krka, Cetina, Neretva, and the Drin (Drini). The Adriatic Sea is one of the most significant tourism and recreational area in Europe and a major maritime route for the goods transported to the central and southeastern European markets. Slow water exchange mechanisms have made the Adriatic Sea particularly vulnerable to anthropogenic activities from more than 50 million people living within its catchment area at the time of appraisal, with 20 percent of them on the coastline itself, and about 30 million tourists visiting this area every year, out of which 15 million on the eastern coast.

2. Under the Adriatic Sea Environment Program (ASEP), a regional Technical Assistance (TA) program funded by the Global Environmental Facility (GEF) and implemented by the World Bank to support preparation of environmental policies and demonstration investments, a study[2] on the 'Rapid Assessment of Pollution Hotspots[3] for the Adriatic Sea' was undertaken in 2011 by the World Bank. The study[4] looked at 41 potential pollution hotspot sites and 27 sites were confirmed in the Adriatic Sea, out of which 6 were identified at the eastern coast as priority sites that required immediate actions to address and reach the desirable environmental conditions. Tourism activities are an important source of revenue for the eastern Adriatic Sea countries and are the main export industry. Thus, the GEF Adriatic Sea Environmental Pollution Control Project (I) was born out of the ASEP and the Republic of Croatia and BiH were the two Adriatic Sea Riparian countries selected to be part of the regional project. The project was introduced to provide TA and investment funding to the riparian countries in the Adriatic to reduce the level of pollution of the Adriatic Sea.

3. The GEF Adriatic Sea Environmental Pollution Control Project was designed as the first project of a programmatic operation. The design, approach, and objectives followed those agreed to for the ASEP by the World Bank, GEF, and the countries in the region upon the completion of the assessment of hotspots. The project had to be viewed from the ASEP's perspective because its main broader programmatic objective was to launch the ASEP's implementation through TA to support preparation of investment proposals, policy development, and two demonstration investments.

[1] These 11 rivers sources are the following: Reno and Po is Cottian Alps; Adige is the Alpine mountains; Brenta is lake Caldonazzo; Piave is Carnic Alps; Soca/Isonzo is Julian Alps; Zrmanja is south of Lika; Krka is near Kinn; Cetina is Dinara slopes; Neretva is the Dinaric alps; and Drin is Lake Ohrid.
[2] Adriatic Sea Environment Program: Rapid Assessment of Pollution Hotspots for the Adriatic Sea Study, October 2, 2011, Final Report. Internal Use Only.
[3] Pollution 'hotspot' site, as defined in the study, is a coastal area that receives pollution regardless of its source. It thus includes sources that can be located far inland and still contribute to the marine pollution at the hotspot site.
[4] The different types of pollution that the hotspot study took into consideration were wastewater, solid waste, and nonpoint source pollution.

4. The project was aligned with the World Bank's Regional strategy of developing closer regional partnerships with the European Union (EU) institutions, particularly alignment with (a) Croatia's priorities for management of its marine and coastal environment, support of innovative technologies, and the preparation of project proposals for EU funding and (b) BiH's priorities of improved infrastructure and basic services; sustainable infrastructure development; reduced river pollution of Neretva, Bosna, and Miljacka river basins; and improved wastewater management.

5. **The Republic of Croatia.** At appraisal, Croatia had a population of 4.3 million people out of which about 1.5 million lived in the Adriatic Sea basin. The gross domestic product (GDP) per capita was US$13,530. Croatia's natural beauty attracted and continues to draw in millions of tourists each year,[5] with tourism revenues during project preparation representing around 15 percent of the country's GDP. Thus, preservation of the environment was high on the development agenda and a country priority after accession to the EU in July 2013 as the 28th member state. Within this context, addressing transboundary challenges of the water quality of the Adriatic was among the priorities for Croatia to maintain sustainable growth, particularly in industries such as tourism and fisheries.

6. The ASEP assessment on Croatia identified solid waste disposal as the main source of pollution and noted that there were almost no properly operated sanitary landfills on the coast, but numerous dumping sites. Due to the karstic nature of the terrain, leachates from waste dumping sites were thus released into the Adriatic Sea. The priority pollution hotspots identified through earlier studies and confirmed by the assessment were the following (from north to south): Pula, Rijeka, Zadar Channel, Krka Estuary, Split-Kastela, Ploce-Neretva Delta (which also receives pollution originating in BiH), and Dubrovnik-Ston. Croatia's National Environmental Action Plan (NEAP) had also prioritized coastal pollution in these areas for intervention.

7. **Bosnia and Herzegovina.** BiH is rich in natural resources and is regionally and internationally renowned for its natural beauty and cultural heritage. At appraisal, BiH had a population of 3.8 million out of which about 500,000 lived in the Adriatic Sea basin. The GDP per capita was US$4,446 with the total tourism contribution of about 8.4 percent. The country has 25 km of the Adriatic Sea coastline, all of it in the Municipality of Neum, which has a permanent population of about 4,000 people, that doubles during the summer months.

8. The importance of BiH for transboundary pollution management in the Adriatic stems from the fact that large parts of the catchment basins of Adriatic tributary rivers are located there. Consequently, pollution sources including leachates from local landfills without proper technical protection measures located in BiH significantly contributed to the pollution loads discharging into the Adriatic, either directly carried by the rivers (Neretva, Krka, and Cetina) or indirectly through the karsts.[6] BiH is a potential EU candidate country and is moving toward alignment with EU acquis requirements.

9. *Specific governance situation in BiH.* As indicated in the Country Partnership Strategy (CPS) of FY12–FY15[7] and in the more recent CPF FY16–FY20,[8] the political system in BiH is complex and reflects the

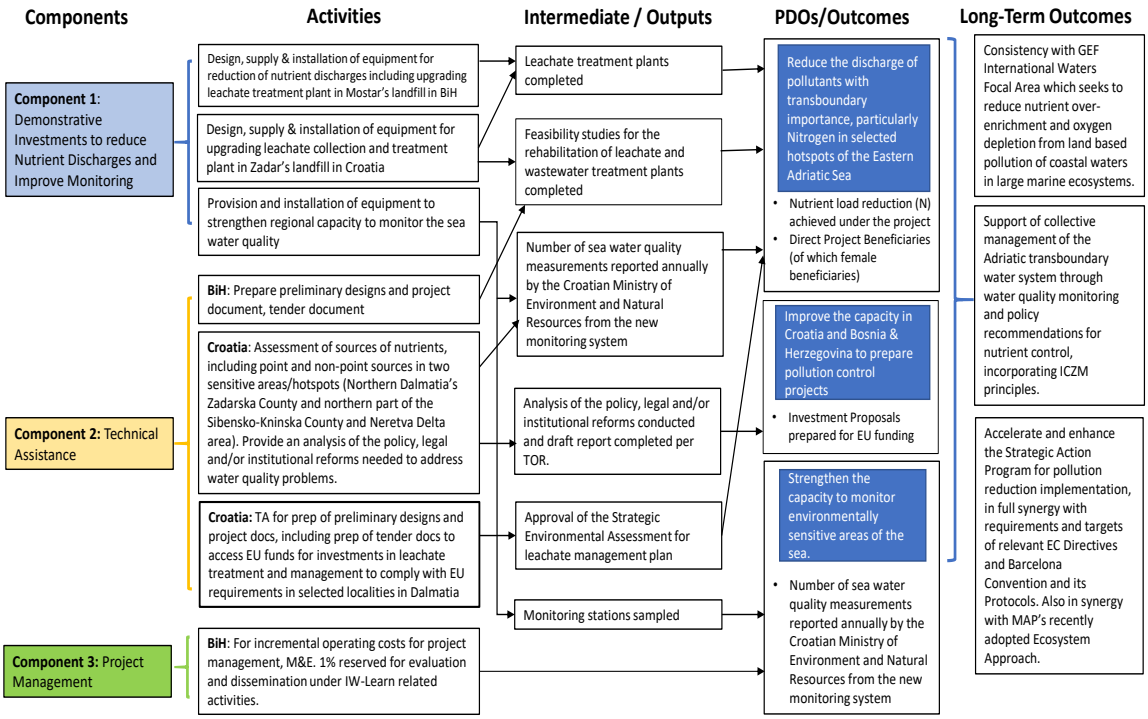
[5] By 2014, when the project was under preparation, about 9 million tourists visited the Croatian coast every year, significantly increasing the demands on environmental services and the pressures on the environment.
[6] Landscape underlain by limestone which has been eroded by dissolution, producing ridges, towers, fissures, sinkholes, and other characteristic landforms.
[7] The World Bank Group's CPS for Bosnia and Herzegovina for FY12–FY15. Report Number: 64428-BA.
[8] The World Bank Group's CPF for Bosnia and Herzegovina for FY16–FY20. Report Number: 99616-BA.

provisions of the country's constitution that was established to end ethnic conflict and subsequent changes to the system introduced under the guidance of the international community. The Dayton Accords[9] ended the war and brought peace. It also yielded a fragmented institutional structure, which allowed for a significant degree of self-determination of BiH's constituent population. The Government consists of four levels of units: (a) BiH Council of Ministers; (b) Government of Republika Srpska; (c) Government of the Federation of Bosnia and Herzegovina; and (d) Government of the Brcko District. The Federation of Bosnia and Herzegovina consists of 10 cantons, each with their own government, resulting in many public services being delivered at highly localized levels. In the case of Mostar there were four levels of government involved (national, federation, canton and municipality) and because of the specific situation of Mostar as a multi-ethnic city, power struggles during most of the project's life meant the municipality had no effective local government, which ended up playing a significant role in the project's outcome.

Theory of Change (Results Chain)

10. The Implementation Completion and Results Report (ICR) developed the Theory of Change under figure 1.

Figure 1. Results Chain for Croatia and BiH GEF Adriatic Sea Environmental Pollution Control Project (I)



[9] https://www.osce.org/bih/126173.

Project Development Objectives (PDOs)

11. The PDO as stated in the Legal Grant Agreements[10] for Croatia and BiH is to: (a) reduce the discharge of pollutants with transboundary importance, particularly nitrogen, in selected hot-spots of the eastern Adriatic Sea; and (b) to improve the capacity in Croatia and Bosnia and Herzegovina to prepare pollution control projects in selected localities of Dalmatia and Herzegovina and to strengthen the capacity to monitor the seawater quality. The PDO in the ICR is that reflected in the Legal Grant Agreements.

12. **Main beneficiaries**. The primary beneficiaries of this regional project were the people directly dependent on the Adriatic Seawaters for their livelihood and recreation, such as those involved in the fisheries and tourism industries. In addition, institutional development and knowledge sharing facilitated through the project would contribute to the strengthening of various institutions and agencies responsible for environmental management in Croatia and BiH to implement the required reforms. These institutions include local and central governments (including urban planning departments/institutes and water resources institutions), nongovernmental organizations (NGOs), water and sanitation companies, municipal departments, and solid waste management operators.

Key Expected Outcomes and Outcome Indicators

13. The PDO was measured against the following three outcome indicators:

- Nutrient load reduction (Nitrogen-N) achieved in the demonstration investments financed under the project (kg/year);
- Number of investments proposals prepared and presented to the EU for funding (Number); and
- Number of sea water quality measurements reported annually by the Croatian Ministry of Environment and Natural Resources from the new monitoring system (Number of measurements per year).

14. In addition, the Results Framework included the World Bank core indicator given as follows:

- Direct project beneficiaries, of which female beneficiaries (Number, Percentage).

Components

15. The project was composed of three components with clearly identified component objectives and scope, which are summarized as follows:

(a) **Component 1: Demonstration Investments to Reduce Nutrient Discharges and Improve Sea Water Quality Monitoring Capacity (E.[11] US$27.77 million, of which US$4.98 million is**

[10] PDO in the Project Appraisal Document (PAD) is different under part (b) "to improve the capacity in Croatia and Bosnia and Herzegovina to prepare pollution control projects in selected localities of Dalmatia and Herzegovina and to strengthen the capacity to monitor environmentally sensitive areas of the sea."
[11] E. Estimated at Appraisal.

GEF financing and A.[12] US$27.64 million, of which US$3.28 in GEF financing). This component aimed to undertake investments that would reduce nutrient discharges into the Adriatic Sea and strengthen regional capacity to monitor the seawater quality. This included the design, supply, and installation of equipment for the reduction of nutrient discharges and upgrading of the leachate treatment plant (LTP) in Mostar's landfill in BiH and the design, supply, and installation of equipment for upgrading the leachate collection and treatment plant in Zadar's landfill in Croatia. In addition, the component would finance the installation of quality monitoring equipment on a vessel that would be provided and adapted for this purpose by the Ministry of Environment and Natural Resources in Croatia. Also, as the project was Initially to be part of a larger nutrient reduction program aiming at nutrient reduction in the Adriatic Sea, the Croatian government contributed US$22.79 million to parallel investments in nutrient reduction on the Adriatic Coast and US$1.57 million of direct investments towards the project for equipment and technical assistance.

(b) **Component 2: Technical Assistance (E. US$1.98 million, of which US$1.60 million is GEF financing and A. US$1.20 million of which US$1.20 million in GEF financing).** The focus of this component was to finance consultant services for technical activities in Croatia and BiH.

- **Croatia.** First, the aim was to carry out an assessment of sources of nutrients, including point and non-point sources in Northern Dalmatia's Zadarska County and northern part of the Sibensko-Kninska County and the Neretva Delta area), as well as to provide analysis of the policy, legal, and institutional reforms needed to address related water quality problems. Second, this component would facilitate the preparation of preliminary designs and project documentation, including preparation of tender documents to access EU funds, for investments in leachate treatment and management to comply with EU requirements and reduce Adriatic Sea pollution in selected localities in Dalmatia.

- **BiH.** This component supported the preparation of preliminary designs and project documentation, including preparation of tender documents to access EU funds, for investments in leachate and wastewater treatment and management to comply with EU requirements and reduce Adriatic Sea pollution in selected locations in Herzegovina and Neum.

(c) **Component 3: Project Management and Dissemination (E. US$0.22 million, of which US$0.19 million is GEF financing and A. US$0.167 million, of which US$0.167 in GEF financing).** This component supported project management, as well as monitoring and evaluation (M&E) for the Project Management Team (PMT) in BiH. It included about 1 percent of grant funds specifically reserved for evaluation and dissemination under activities related to the International Waters Learning Exchange and Resource Network (IWLEARN).[13]

[12] A. Actual after the project restructuring of September 2016.
[13] IWLEARN is a content management system that supports knowledge sharing in the GEF International Waters portfolio. More information is available at https://iwlearn.net.

Dissemination under the project was undertaken through two GEF's IWLEARN events[14] held in Sri Lanka in 2016 and Morocco in 2018.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

16. The project had one restructuring in September 2016 that involved: (a) extension of the project closing date by 23 months; (b) adjustment to the Results Framework that included a change to the demonstration investment location, the end targets of PDO and intermediate indicators, and indicator name; (c) change in components; and (d) change in the implementation schedule to align with the revised closing date. These key changes made to the project are detailed in annex 4.

Revised PDOs and Outcome Targets

17. The PDO was not changed during project implementation.

Revised PDO Indicators

18. During the restructuring of September 2016, PDO indicators were revised. See details in annex 4. No new PDO indicators were introduced.

Revised Components

19. During the restructuring, the following change was made to 'Component 1: Demonstration Investments to Reduce Nutrient Discharges and Improve Sea Water Quality Monitoring Capacity'. Change to the location of the demonstration investment in Croatia from the Diklo landfill[15] to the Sitnica landfill on Korcula Island and the reduction of nutrient discharges with a change in unit measure from kg per year to tons per year. The component cost was not modified.

Other Changes

20. **Time extension.** The project closing date was extended from March 15, 2017, to February 15, 2019 (a total of 23 months) to allow for works to be completed.

21. The Croatia and Bosnia and Herzegovina GEF Adriatic Sea Environmental Pollution Control Project (I) financing volume and cancellation of funds is summarized in table 1. In BiH, the implementing agency did not manage to commit and spend most of the funds for the design, supply, and installation of the LTP contract before the extended project closing date and a joint decision was made by Deponija d.o.o. Mostar and the City of Mostar not to proceed with the implementation of the contract. Therefore, the corresponding funds[16] were canceled upon grant closing.

[14] IWLEARN was established to strengthen transboundary water management around the globe by collecting and sharing best practices, lessons learned, and innovative solutions to common problems across the GEF International Waters portfolio.
[15] The reasons for the change in demonstration investment from Diklo landfill are discussed in section III (B).
[16] The value of the contract was EUR 1,533,633.47 and the advance payment was 10 percent of the overall contract value. Documented Eligible Expenditures amounted to EUR 96,541, and the remaining balance of US$69,264.43 (equivalent of EUR 56,822.00) was unjustified and undocumented.

Table 1. Funding for Each Country in the GEF Adriatic Sea Environmental Pollution Control Project (US$, millions)

Country	Original	Undisbursed Amount	Total Disbursed	Percentage of Total Funds Approved (%)	Percentage of Total Funds Disbursed (%)
Croatia	4,330,000	257,180	4,072,819.05	64	60
BiH*	2,440,000	1,856,201	583,798	36	9
Total	**6,770,000**	**2,113,381**	**4,656,617**	**100**	**69**

*Note: *As of June 2019, the amounts of US$1,533,633 under BiH and US$257,180 under Croatia were officially cancelled.*

Rationale for Changes and Their Implication on the Original Theory of Change

22. The project closing date extension was for the completion of the two planned demonstration investments in Croatia and BiH. The changes under the restructuring did not affect the PDO and were considered necessary to fully use project funds and achieve the project development indicators.

II. OUTCOME

A. RELEVANCE OF PDOs

23. The PDO was relevant at Board approval in April 2014 and continued to be relevant at project closing in February 2019. The PDO was fully aligned with the CPSs and Country Partnership Frameworks (CPFs) of each country.

24. **Croatia.** The operation supported the Croatia CPS FY14–FY17[17] under Pillar III that sought to maximize the benefits of EU membership as follows: (a) the World Bank's regional strategy of developing closer regional partnerships with the EU institutions and (b) Croatia's goal of compliance with EU requirements and accelerating its income convergence with other member states in a fiscally, socially, and environmentally sustainable way. This in turn supported and was consistent with the higher level GEF International Waters Focal Area objectives which sought to reduce nutrient over-enrichment and oxygen depletion from land-based pollution of coastal waters in large marine ecosystems.

25. The PDO is also aligned with the recent Croatia CPF FY19–FY24.[18] Objective Five of the CPF focuses on improving water, wastewater, and solid waste delivery and management, with attention on managing increasing pressure on local resources and services in an environmentally sustainable manner, particularly with respect to wastewater pollution control and waste management.

26. **BiH.** The project goals were aligned with the FY12-–FY15[19] BiH CPS, as illustrated under Pillar III, Environmental Sustainability. The CPS placed emphasis on ensuring sustainable use of natural resources, such as water and forestry, which are key to economic growth in BiH and adaptation to climate change, and the promotion of sustainable development of basic municipal services.

[17] The World Bank Group's CPS for Croatia for FY14–FY17. Report Number: 77630-HR.
[18] The World Bank Group's CPF for Croatia for FY19–FY24. Report Number: 130706-HR.
[19] The World Bank Group's CPS for Bosnia and Herzegovina for FY12–FY15. Report Number: 64428-BA.

27. The project goals are also aligned with the recent BiH CPF FY16–FY20[20] Pillar III that focuses on ensuring the sustainable use of natural resources and promote the sustainable development of basic municipal services.

28. **Alignment with national policies.** The project supports both countries higher-level objective of accelerating implementation of the National Action Plan under the Mediterranean Strategic Action Plan (SAP MED) of 2000–2015[21] adopted under the Barcelona Convention in the Adriatic in accordance with EU accession policies and directives.

29. **Alignment with the EU water and wastewater policies.** According to the programmatic design of the project, even though there are no direct follow-up activities planned after closing of the project, the whole agenda of preventing water pollution by nutrients from point and non-point sources has been taken over by the EU. This has resulted in availability of large amounts of EU grant funds (Instrument for Pre-Accession Assistance funds in candidate countries and cohesion funds for EU member countries) that are available to countries of the region for the purpose of improving aquatic environment and satisfying requirements of EU water directives, namely Water Framework Directive, Urban Wastewater Treatment Directive, Bathing Water Directive, Nitrate Directive, and Landfill Directive (LD).

Assessment of Relevance of PDOs and Rating

30. Based on the alignment of the PDOs to the CPSs/CPFs and the national policies, as indicated in the preceding paragraphs, the relevance of the PDOs is rated **High**.

B. ACHIEVEMENT OF PDOs (EFFICACY)

31. The PDOs of the regional project consist of two parts, to: (a) reduce the discharge of pollutants with transboundary importance, particularly nitrogen, in selected hotspots of the eastern Adriatic Sea; and (b) to improve the capacity in Croatia and Bosnia and Herzegovina to prepare pollution control projects in selected localities of Dalmatia and Herzegovina and to strengthen the capacity to monitor the seawater quality.

[20] The World Bank Group's CPF for Bosnia and Herzegovina for FY16–FY20. Report Number: 99616-BA.
[21] The National Action Plan under the SAP MED 2000–2015 continues to be still relevant to date.

Assessment of Achievement of Each Objective/Outcome

Table 2. Achievement of PDO Outcome Indicators

Original Indicators	Original Target	After Restructuring Target	Accomplishment		
			End of Project	Percent (%) achieved of original target	Percent (%) achieved of revised target
Nutrient load reduction (Nitrogen-N) achieved in the demonstration investments financed under the	**130000 kg/yr**	**70 tons/yr**	**20 tons/yr**	**15%**	**29%**
Bosnia and Herzegovina	60,000	32	0		
Croatia	70,000	38	20		
Direct project beneficiaries (of which female)	**235000**	**140,500**	**15,500**	**7% (of which 3.5% female)**	**11% (of which 5.5% female)**
Percentage of which is female	117,500	70,250	7,750		
Bosnia and Herzegovina	125,000	125,000	0		
Percentage of which is female	62,500	62,500	0		
Croatia	235000	15,500	15,500		
Percentage of which is female	50%	7,750			
Investments proposals prepared and presented to the EU for funding	**6**	**No change**	**10**	**166%**	**No change**
Bosnia and Herzegovina	6	No change	3		
Croatia			7		
Number of sea water quality measurements reported annually by the Croatian Ministry of Environment and Natural Resources from the new monitoring system	**3000**	**No change**	**43,267**	**1442%**	**No change**

32. **PDO#1. To reduce the discharge of pollutants with transboundary importance, particularly Nitrogen, in selected hotspots of the eastern Adriatic Sea.** This PDO is assessed by the following indicator: Nutrient load reduction (Nitrogen-N) achieved in the demonstration investments financed under the project.

33. **Croatia.** At the start of the project, there were almost no sanitary landfills at the coast, and there were numerous dumping sites. Due to the karstic[22] nature of the terrain, leachates from waste dumping sites were quickly released into the sea, increasing environmental pollution and health risks of local population and tourists. This project was approved in June 2014. Effectiveness was delayed by six months to December 2014 due to the time needed to meet the conditions to declare the project effective. At the start of implementation, land transfer issues arose at the demonstration investment location on Diklo landfill in Zadar and the World Bank team was advised in mid-2015 that the project was no longer feasible in the time available. The Recipient subsequently looked for another investment site and proceeded with closure of the Diklo landfill[23] without leachate collection. Hence, the Sitnica landfill that is situated within

[22] Karst is an area of land formed of rock such as limestone that is worn away by water to make caves and underground drainage systems with formations such as sinkholes.
[23] The reasons for the change in demonstration investment from Diklo landfill are discussed in section III (B).

the borders of the municipalities of Blato and Vela Luka, on Korcula Isand, located in the Dubrovnik-Neretva county was identified as: (a) the new demonstration investment location and a hotspot site that was also spilling nutrients; (b) a site that did not have any land issues; and (c) a site that already had feasibility studies that were funded outside of the project. The project was then restructured in 2016 to facilitate change in location to Korcula Island, including an extension of the closing date and an adjustment in the related PDO target to the much lower population in Korcula compared to Zadar.[24]

34. Following the restructuring of the project, construction works commenced at the Sitnica landfill, however, further delays were experienced as illustrated in section III (B). The leachate management system is operational but still under construction with three out of the four cassettes completed in May 2019. The system for collection and recycling of leachate wastewater is not fully constructed as the pumping station and installation in cassette No. 4 is currently under construction. However, there is no more penetration of leachate waters into the environment as all sealing layers have been completed, thus preventing further pollution and meeting the objective outcome. Completion of all works is scheduled for the second half of August 2019 with technical inspection planned for early September 2019. It was agreed that the costs of works would be completed after the project closing date of February 15, 2019, would be fully covered by the Environmental Protection and Energy Efficiency Fund (EPEEF). This demonstrates the strong commitment and ownership of the project by the Recipient.

35. **Measurement of Nutrient load.** The amount of waste deposited at the landfill is estimated to be 8,337 tons of waste (in accordance with the Waste Disposal Data and Waste Disposal Schemes for 2018 that was published in May 2019, by the Ministry of Environment and Energy, Water management directorate (MZOIE)[25]). If the value thus obtained is summed up with the estimated nutrient levels of the waste that was deposited in 2018, the following are the nutrient levels: 19,927.41 tons or about 20 tons of nitrogen and 1,613.16 tons or about 1.6 tons of phosphorous. Overall, 20 tons nutrient reduction was achieved, which is 29 percent of the revised target of 70 tons per year but only 15 percent of the original target of 130,000 kg per year.

36. Additional anecdotal evidence suggests that the project also contributed to a reduction of sea pollution around the highland according to the two wells and puddles close to the Sitnica landfill were reported in the following sites:

(a) Zdenac Gugić - Compared with the analysis carried out before the landfill remediation and the analysis after the restoration, a reduction in nitrate concentration and total nitrogen was observed. Ammonium and nitrites were high before and afterwards below the limit of determination, while the concentration of total phosphorus remained unaltered.

(b) Zdenac Studenac - Compared with the analysis carried out before and after remediation, the reduction of nitrate concentration and total nitrogen was observed, and the concentration of ammonia and total phosphorus increased. The concentration of nitrite before and after remediation was below the limit of determination.

[24] See restructuring details in annex 4.
[25] The Waste Disposal Data and Waste Disposal Schemes for 2018 that was published in May 2019, MZOIE. This is published on a yearly basis.

37. Puddles of water tested around the Sitnica landfill:[26]

(a) The results of the post-remediation test indicate a reduction in ammonium concentration and the increase in nitrate concentration and total nitrogen while nitrites were before and after the limit of determination. The concentration of phosphorus remained unaltered.

38. It was further mentioned that there was an increase of phosphorus and ammonia. The sampling points are not landfill specific but are sources of potable water in an area that is karstic, implying that it is very difficult to trace water paths, and no further scrutiny is possible.

39. **The number of direct project beneficiaries** was affected as a result of the change in the demonstration investment from the Diklo landfill[27] to the Sitnica landfill area which was significantly smaller. The end target originally included the number of the direct project beneficiaries in Diklo, which per the 1991 census was 110,000. After restructuring, project beneficiaries in the Sitnica landfill per the 2011 census was 15,500. Thus, 15,500 direct project beneficiaries benefited, which is 11 percent of the revised target of 140,500 but only 7 percent of the original target of 235,000 beneficiaries.

40. The following TA contracts were implemented:

(a) Preparation of Strategic Environmental Assessment (SEA) of the Croatia Waste and Leachate Management Plan and guidelines for preparation of waste and leachate management plans, completed in October 2015.

(b) Update to the SEA of the Croatia Waste and Leachate Management Plan that was completed in August 2016.

(c) Preparation of the Main Design with Bill of Quantities for works contract for remediation of Sitnica landfill with closed leachate system, completed in June 2017.

(d) Preparation of the analysis of the environmental measures and the Environmental Management Plan (EMP) for remediation of the Sitnica landfill with assessment of nutrient contribution was completed in July 2019.

41. **BiH.** Nutrient load reduction was meant to be measured by the 'nutrient load reduction (in Nitrogen[N]) achieved (tons per year[28])' indicator. BiH was assessed as a contributor of pollution[29] into the Neretva River and subsequently the Adriatic Sea. Mostar was located as the site for demonstration investment. The declaration of project effectiveness was almost a year after approval on June 3, 2015, due to the elections that resulted in the change in government, and owing to complex institutional arrangements, the project had to be approved by all government bodies. This affected timely setting-up of the Project Steering Committee (PSC).

42. Further delay was experienced due to the legalization process of the Mostar Uborak landfill that needed a usage permit. The legalization process was completed in early 2016; up until then it was using a

[26] Reported in the Waste Disposal Data and Waste Disposal Schemes for 2018, that was published in May 2019, MZOIE.
[27] The reasons for the change in demonstration investment from Diklo landfill are discussed in section III (B).
[28] The measurement unit was modified from 'kg per year' to 'tons per year' under the 2016 restructuring.
[29] Adriatic Sea Environment Program Report of 2011: the Rapid Assessment of Pollution Hotspots for the Adriatic Sea.

temporary permit. Eventually, due to repeated cumulative delays, the LTP was not built as discussed in section III (B).

43. **Direct project beneficiaries**[30] did not change as the demonstration investment location remained the same as at approval. However, as the LTP was not built, the intended beneficiaries did not experience the intended benefits of the project. The target was not achieved.

44. Based on the above, **PDO#1** is rated as **Negligible** at pre-restructuring, as the project achieved 15 percent of the original target of 130,000 kg per year, and **Negligible** after restructuring, as 29 percent was achieved of the revised target of 70 tons per year.

45. **PDO#2: To improve the capacity in Croatia and Bosnia and Herzegovina to prepare pollution control projects in selected localities of Dalmatia and Herzegovina and to strengthen the capacity to monitor environmentally sensitive areas of the sea.** The success of this objective was measured by: (a) the number of investment proposals prepared for EU funding; and (b) the number of seawater quality measurements reported annually by the Croatian Ministry of Environment and Natural Resources from the new monitoring system.

46. **Croatia.** The project has played a critical role in terms of supporting the country to prepare project proposals and requests for EU funding. Without this support, the capacity of the country to absorb and properly use EU funds would be decreased. The three investment proposals identified in the project design were completed in November 2016. By June 2017, an additional three proposals were completed. At project closure, an additional investment proposal was reported bringing the total financed investment proposals under the project to seven.

47. A key success from this project was the knowledge transfer from the project to stakeholders and other government units. From 2014 to date, 42 activities that include six waste management centers in Marišćina, Kaštijun, Biljane Donje, Bikarac, Lećevica, and Babina Gora and 36 landfill remediation sites have been approved for EU co-financing and have signed the Grant Agreement, and 23 more are under preparation and should be financed in the programming period 2014–2020. For the coordination, preparation, and realization of these projects, it is almost the same Government team that has been engaged in the GEF Adriatic Sea Environment Pollution Project. This team has strongly cooperated with all stakeholders that are mainly government units as final beneficiaries to transfer the knowledge gained from this project.

48. The number of sea water quality measurements is reported annually by the Croatian Ministry of Environments and Natural Resources. Technical equipment for the purpose of monitoring the quality of the sea and strengthening the regional capacity for monitoring the quality of the sea was purchased in September 2018 and installed in the required locations in Rijeka, Split and Zagreb. The target was to reach 3,000 sea water quality measurements to be reported annually from 60 monitoring stations sampled. By 2019, 105 sampling stations were sampled for the physical, chemical and biological parameters of seawater, totaling 37,548 physical parameters of seawater, 3,170 chemical parameters of sea water and 2,549 biological parameters of sea water, totaling 43,267 seawater quality measurements. These stations are monitored every two weeks and reported on the Sea Bathing Water Quality in Croatia website. Given the significant difference compared to the baseline, it seems the baseline was underestimated. Thus, the

[30] Mostar census of 1991: 125,000.

indicators on the number of annual seawater quality measurements and the number of sampled metering stations were achieved and surpassed.

49. Analysis of the policy, legal, and institutional reforms was also conducted, and a draft report completed per terms of reference (TOR). The analysis that was prepared was input for the national waste and leachate management plan. The Plan itself was not adopted immediately but its third version was and it served as the basis for allocation of EU grant funds for the EU 2014-2020 programming period.

50. **BiH.** TA included: (a) three proposals for EU funding that covered the municipalities of Gacko, Neum, and Posusje; and (b) a feasibility study for Mostar. The feasibility studies with the conceptual design for the: (a) construction of a regional sanitary landfill for disposal of waste from the municipalities in eastern Herzegovina (Gacko); and (b) construction of a waste transfer station in Neum were completed by the project closing date. Overall support to the capacity to prepare projects was increased through the TA.

51. Capacity building and raising communication and institution awareness under the project was carried out in the form of a series of trainings. Targeted groups for these trainings included, but were not limited to, local and central governments (including urban planning departments/institutes and water resources institutions), NGOs, water and sanitation companies/municipal departments, and solid waste management operators, various groups within the tourism sector, and media. The activities included the following:

(a) Capacity-building activities for delivery of six workshops (held at three different locations in the western, eastern Herzegovina, and coastal area) covering two topics: (i) three workshops covering the topics on preparing documentation to apply for the EU funds; and (ii) three workshops covering the topic on sustainable planning and management of solid waste, landfill leachates, and wastewater.

(b) Organization of meetings/trainings with local and central government officials (including urban planning departments/institutes and water resources institutions officials), NGOs' officials, water and sanitation companies'/municipal departments' officials, such as solid waste management operator's officials. Seven such meetings/training were held in total that covered areas in Herzegovina with the potential impact to Adriatic.

52. Based on the above and because the targets were the same before and post restructuring of the project, PDO#2 has been achieved and is rated **Substantial**.

Justification of Overall Efficacy Rating

53. Based on the above, the overall efficacy is rated **Modest** pre and post restructuring.

C. EFFICIENCY

54. **Croatia.** The project was implemented for about four years and two months. The declaration of project effectiveness was delayed by six months, and in 2016, a major project restructuring was undertaken to address the change in investment location, substantial changes to targets, and extension of the project closing date (further details are in annex 4). Nonetheless, the demonstration investment,

Sitnica landfill, was completed after the revised project closing date with ancillary works being currently finalized, though removal of nutrients has been taking place since February 2019.

55. **BiH.** Due to the extended delay in project effectiveness by about one year, the implementation period totaled three years and eight months. The elections, complex institutional arrangements, and the legalization process of the Mostar Uborak landfill that needed a usage permit contributed to the delays. Challenges with procurement contract management, the decision-making process, and the misunderstanding on the question of ownership of the project between the Project Implementation Team in Mostar (PIT/Mostar), PMT/Ministry of Foreign and Trade Relations (MOFTER), and the City of Mostar, negatively impacted the project. Fragmented internal governance contributed to the noncompletion of the demonstration investment in Mostar, as discussed in section III (B).

56. The economic and financial analysis in this ICR examines whether the interventions positively affected the development of the project areas and takes into account the challenges in both countries. Annex 5 provides details on the methodology and results of the evaluation compared to those expected at appraisal.

57. **Economic analysis.** As part of project preparation, a project-level ex-ante cost-benefit analysis had been prepared for the two demonstration investments in Croatia and BiH on the basis of: (a) the standard value assigned to nitrogen; (b) the total reduction expected to be achieved by the demonstration investments; and (c) their cost. Using this approach, the ex-ante Net Present Value (NPV) of expected benefits had been estimated at US$6.21 million and the internal rate of return (IRR) of the demonstration investments at 24 percent, for a total cost of US$4.58 million, and an operations and maintenance (O&M) equivalent to 12 percent of the investment cost per year. The demonstration investments were also assessed to be the most cost-effective for this type of waste, and the cost of removal was estimated to be well below what was considered the cost-effective marginal cost of removing nitrogen (US$3.2 per kg of nutrients removed in these two demonstration investments versus US$53 per kg average for nine Baltic countries).

58. For this ICR, a project-level ex-post cost-benefit analysis is also prepared for the completed investments in Croatia, which extends beyond the project closing date, that is, the Sitnica demonstration investment in Korcula Island, Croatia, and only TA for BiH, on the basis of the assumptions[31] detailed in annex 5.

59. Using the assumptions described in annex 5, the ex-post Economic NPV is estimated at US$25.90 million (at 5 percent discount rate) and the IRR of the demonstration investment at 33.4 percent, for a total cost of US$4.75 million. The project delay has an insignificant impact on the economic results of the restructured project, that is, 6.5 percent decrease in NPV and only 0.03 percent decrease in ERR.

[31] The types of benefits and costs used in the ex-post cost-benefit analysis differ from the ones used in the ex-ante cost-benefit analysis because not only the project locations and types of projects significantly changed during project implementation but also the affected areas and their specifics. Having in mind that the benefits and costs need to reflect the project specifics, they (and the assumptions used) were adjusted in the ex-post cost-benefit analysis to the specifics of the Sitnica project, where the main environmental and social problem was linked to the pollution of drinking water sources and pollution of bathing water in the western part of the island, which affected not only the local population but also the tourists in the area. Benefits for and from tourists are not estimated separately, because this would cause a double counting of some of the benefits. On other hand, benefits related to fisheries, considered in the ex- ante analysis, are not addressed in the ex-post cost-benefit analysis because the affected area is much smaller than in the initial project and hence, the impact would be insignificant.

60. In comparison with the ex-ante cost-benefit analysis, the ex-post cost-benefit analysis displays 40 percent increase in the IRR and over 310 percent increase in the NPV results despite the changes in the project demonstrators, extended project implementation period, and reduced number of the population affected.

61. The higher economic benefits achieved are due to avoided pollution of the drinking water wells in the project area which were not anticipated in the original project location. The lower number of direct project beneficiaries is a result of the significantly smaller project area in comparison with the original sites. In sum, the ex-post economic analysis demonstrates significantly better results than the ex-ante analysis because of the specifics of the new location and its higher direct impact on human health.

62. **Financial analysis.** The project financed investment in one municipal site, namely Sitnica on Korcula Island in Croatia, located at the territory of two municipalities, Blato and Vela Luka, which received grant resources for physical investments. The remaining utility in BiH participating in the project received only TA for investment proposals preparation; hence, its financial capacity is not assessed.

63. The municipal budgets (2019–2021) of Blato and Vela Luka were analyzed to assess their capacity to ensure adequate funding for incremental O&M expenditures (investments costs are provided as a grant) of the monitoring of the closed Sitnica landfill. As these costs comprise about 0.2 percent of the total annual costs of the municipalities and the operators are public entities, the financial risk associated with the financing of the O&M costs is insignificant. Each of the municipalities is capable to cover the annual O&M costs alone.

64. The future costs associated with the closure of cell #4 after reaching the maximum capacity are expected to be grant funded, as is typical for such type of investments. Even if the grant is not ensured, the Blato Municipality would have the capacity to finance it.

Assessment of Efficiency and Rating

65. The overall efficiency is considered ‘Modest’ and is based on the overall assessment outlined earlier, including the protracted delays and eventual non-implementation of a significant portion of the project, as well as the positive economic impact of the portion that was implemented. Further details are in the financial and economic analysis in annex 5.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Table 3. Split Evaluation

	Before restructuring			After restructuring		
	Croatia	**BiH**	**Overall**	**Croatia**	**BIH**	**Overall**
Relevance	**High**			**High**		
Efficacy						
PDO #1	Negligible	Negligible	Negligible	Modest	Negligible	Negligible
PDO #2	Substantial	Substantial	Substantial	Substantial	Substantial	Substantial
Overall Efficacy			**Modest**			**Modest**
Efficiency	**Modest**			**Modest**		
Outcome ratings	**Moderately Unsatisfactory**			**Moderately Unsatisfactory**		
Numerical value of the outcome ratings			3			3
Disbursement			$ 1,205,556			$ 3,451,061
Share of disbursement			26%			74%
Weighted value of the			0.8			2.2
Final Outcome rating	***Moderately Unsatisfactory (2.2+0.8)=3***					

Note: Highly Unsatisfactory (1); Unsatisfactory (2); Moderately Unsatisfactory (3); Moderately Satisfactory (4); Satisfactory (5); Highly Satisfactory (6).

66. Relevance of the PDOs is rated 'High'; in addition, efficacy is rated 'Modest', and efficiency is rated 'Modest'. Given the partial achievement of the PDO indicators, utilization of resources, implementation delays, and contract cancellations, the overall outcome is rated 'Moderately Unsatisfactory'.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

67. Even though the project did not have specific gender-related activities, it did account for the number of female beneficiaries. At project closing, the indicator and sub-indicator targets were met for Croatia.

Institutional Strengthening

68. Members of the PSC were nominated from both countries and included staff from MOFTER in BiH and the EPEEF in Croatia. The PSC meetings were held regularly, as well as meetings that were organized by the World Bank to transfer new skills to the participants for different project roles such as finance, procurement, and project management, giving the opportunity to both sides to cooperate closely. This fostered knowledge exchange and cooperation.

69. Both Croatia and BiH participated in the IWLEARN conferences: (a) in Sri Lanka in 2016, a joint presentation was made on the project; and (b) in Morocco in 2018, that covered portfolio strategy and methodology, partnerships and synergies, and tools and practices for international water practitioners. Croatia had sent two Government representatives from the EPEEF: the Head of sector for EU funds and the Project Manager. BiH had sent three Government representatives: the Head of the PIU, an Assistant Minister, and a Procurement Officer.

70. The project supported capacity-building activities to strengthen the national governments' capacity regarding environmental and regional issues. As previously stated, the project aided in the preparation of investment proposals for EU funding. In addition, most of the studies planned as part of Component 2 were financed by Government funds (EFEEF): (a) TA); (b) preparation of investment proposals; and (c) feasibility studies. As indicated by the Recipient in Croatia, due to the project, the Client fully benefited from the World Bank's experience to manage complex projects. For further details, see section II (B).

Mobilizing Private Sector Financing

71. Not applicable.

Poverty Reduction and Shared Prosperity

72. Although the project did not specifically look at the impact of the World Bank twin goals of poverty reduction and shared prosperity, water pollution affects the riparian population of Croatia and BiH and is also a transboundary issue. This project would contribute to reducing the impact of pollution in the coastal areas where natural resources are important for the local economy, including fisheries and tourism.

Other Unintended Outcomes and Impacts

73. Not applicable.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

74. **Soundness of background analysis.** The regional project was based upon a comprehensive body of analytical work done by the ASEP that undertook a rapid assessment of pollution hotspots[32] in the Adriatic Sea in 2011. This Hotspot Assessment identified potential interventions, building upon the previous Transboundary Diagnostic Analyses (TDAs) conducted in 1997 and 2005. The study of 2011 confirmed the existence of 27 hotspot pollution sites in the Adriatic Sea, out of which 6 at the eastern coast were identified as priority sites that required immediate actions to be taken to reach the desirable environmental conditions. Hence, two of the Adriatic Sea's riparian countries—Croatia and BiH—were selected for this regional project. However, the subsequent technical appraisal did not identify the fact that the project site in Croatia was not conducive as a demonstration investment site given land ownership challenges.

75. **Results Framework.** Overall, the indicators were aligned with the objectives of the project.

76. **Adequacy of risk assessment and mitigation measures.** The overall risk rating was Moderate for both Croatia and BiH and in hindsight the risks seemed to be underestimated.

[32] 'Hotspots' were defined as a coastal area where the environment is subject to pollution due to intense human activities regardless of their location and source, which potentially affect public health, threaten biodiversity, degrade ecosystem services, and put at risk the prospects for sustainable development both on the spot but also in a wider area.

(a) **A Moderate rating was given to the implementing agency risk.** However, there was insufficient capacity to develop project proposals for EU financing. This was mitigated by the involvement of key stakeholders working with experienced consultants to develop investment proposals.

(b) **Social and environmental risk was given a Low rating.** At approval, it was confirmed that the demonstration investment locations would be in Zadar (Croatia) and Mostar (BiH) and did not require land acquisition or resettlement. However, due to a land transfer dispute, the demonstration investment location in Croatia was moved from Zadar to the Sitnica landfill. In spite of this initial setback, the Government of Croatia rallied and quickly identified the new demonstration investment site.

(c) **Program and donor risk was rated Low for the project.** This risk was to be mitigated by seeking EU buy-in during preparation and through implementation. In Croatia, donor and Government co-financing for the project was secured to a great extent. The Government, through the EPEEF, did co-finance the project; (a) HRK 9.9 million was paid during implementation to cover the financing gap due to the revised soil categorization at Sitnica landfill; and (b) when it was foreseen that the construction of the leachate management system at Sitnica would be completed after the project closing date, the Government committed to complete the works with their own funds and this is what has transpired. Also, see paragraph 16 (a) outlining the significant parallel financing activities of the Government.

77. **Governance.** The EPEEF in Croatia and MOFTER in BiH were the PMTs for the respective countries. In Croatia, the implementation structure was straightforward and proved to be effective, whereas in BiH, the team failed to properly understand and reflect the complexity of the inter-government relationships and the governance issues specific to Mostar in the design of project governance, eventually resulting in the project not being completed.

78. **Procurement.** The PMTs in Croatia, the EPEEF, and in BiH, the MOFTER, were made responsible for managing project implementation, procurement, financial management, M&E, and reporting. Civil servants already employed by both organizations would undertake the fiduciary functions. The PAD states that the two PMTs had experience in World Bank projects as follows: (a) in Croatia, the PMT/MOFTER had extensive experience in implementing IPA projects and was involved in World Bank projects; and (b) in BiH, staff had prior experience in the implementation of World Bank-financed projects.

79. The PAD gives two levels of procurement risks, that is, at the country level and the project level. The country-level risk is based on country public procurement legislation and overall procurement environment. The project-level risk is based on current risks in the country portfolio. Thus, the procurement risk was Moderate for Croatia and Substantial for BiH at both the country and project levels. In addition, a procurement capacity assessment was carried out during project preparation for both PMTs and was found to be satisfactory. However, during implementation, it became obvious that the procurement capacity had not been properly assessed, eventually contributing to the project's demonstration investment cancelation.

B. KEY FACTORS DURING IMPLEMENTATION

(a) Factors Subject to the Control of Government and Implementing Agencies

Croatia

80. The Zadar landfill was initially identified as the demonstration investment location in Croatia due to: (a) the demonstration potential on the efficiency and sustainability of such an LTP; (b) the impact on the Zadar Channel as one of the priority hotspots identified in the Hotspot Assessment through karstic groundwaters; and (c) the priority given by the Hotspot Assessment to the adequate treatment of solid waste leachate as a source of pollution for the Adriatic Sea. The project became effective in December 2014, six months after approval, delaying the start of implementation. In May 2015, the World Bank was first informed of the land ownership issues on the Diklo landfill in Zadar. Thus, in agreement with the City of Zadar and the World Bank, a geodetic[33] report was carried out on the Diklo landfill area that confirmed several land parcels were undergoing a denationalization process, in addition to a few privately-owned parcels of land. The city representatives did negotiate with the owners but were unsuccessful, and this led to the decision of the Recipient to proceed with closure of the Diklo landfill without a leachate collection system and search for another demonstration investment location. This added to further delays in implementation.

81. Nonetheless, the Recipient expeditiously identified and changed the demonstration investment location to the Sitnica landfill on Korcula Island, and this was facilitated through the 2016 restructuring of the project. At the time of the decision, it was determined that there was an already existing feasibility study for the Sitnica landfill that was paid for outside of the project, and the land was owned by the municipality without any issues. All parties concerned thought that this would also help accelerate project implementation.

82. Commencing the works on the Sitnica landfill proved to be a challenge due to the discovery that the soil categorization specified in the feasibility study was substantially different, thus resulting in the need to change the scope of originally contracted works to incorporate a change in volume and technology needed. The World Bank contracted an independent auditor who confirmed these findings. This resulted in a significant price increase, which was covered by the EPEEF securing additional HRK 9.9 million. The construction timeline had to be extended due to the delays and it was evident that the works would be completed after the project closing date.

83. Construction resumed with the new design and scope, but the occurrence of fires within the body of the landfill was then discovered, halting the works once again though for a short time. This risk was not identified in the initial EMP but was effectively resolved by the contractor. Works on the Sitnica landfill are scheduled to be completed second half of August 2019, with the main works already completed and removal of nutrients ongoing since February 2019. Only ancillary works remain and are being finalized.

84. It is very clear that the Government of Croatia had ownership and was committed to achieving the PDOs. The EPEEF, municipalities of Blato and Vela Luka, the contractor, and all stakeholders worked in a collaborative and unified manner to address and overcome emerging challenges.

[33] The definition geodetic survey is a survey of a large land area.

Bosnia and Herzegovina

Coordination and Engagement

85. The project became effective on June 3, 2015, in BiH, almost a year after Board approval due to the complexity of the BiH institutional processes and elections as specified earlier. This significantly contributed to the delay in project implementation. The project was designed to be implemented by the PMT established within MOFTER. To assist and provide technical support to the PMT/MOFTER, another PIT referred to as PIT/Mostar was established at the sanitary landfill Uborak-Buđevci in Mostar City. Deficiencies in coordination and lack of clarity on responsibilities and accountability among various parties at state and city level undermined the ability to proceed with the implementation of necessary project tasks and this also attributed to the delay in project implementation. The municipal authorities had only limited control over PIT/ Mostar given the unclear governance mandates within the city administration itself. Eventually, these challenges caused a deterioration in communications between PIT/ Mostar, PMT/MOFTER, the City of Mostar, and the World Bank team that became worse over the course of project implementation.

Governance

86. As described in section I (A) of the ICR and in the most recent BiH CPF of FY16–FY20,[34] it is important to understand the governance landscape of BiH in order to get clarity on the challenges of the lack of commitment and ownership experienced with the project in BiH. Fragmented internal governance in Mostar and a misalignment of incentives and project implementation arrangements, eventually led to the cancelation of the demonstration investment project in the city.

Fiduciary

87. The project was designed to be implemented by the PMTs of both countries. Even though there were no late audit reports, the project had seven interim financial reports (IFRs) overdue during implementation. See further details in Section IV (B).

(b) Factors Subject to the Control of the World Bank Control

Adequacy of Supervision of the Project

88. **Croatia.** The World Bank supervised the project on a regular basis, and this created an environment of close collaboration and teamwork between the World Bank, the EPEEF, the municipalities of Blato and Vela Luka, and Eko Ltd. The World Bank team effectively managed the project complexities and the different stakeholders involved. The World Bank team played a proactive role in addressing implementation challenges as they arose and ensured that communication with counterparts and stakeholders throughout project implementation was smooth and constructive.

89. **BiH.** The World Bank team supervised the project on a regular basis, providing support to the Recipient and all teams involved in implementation in a cooperative manner. Focus was on the risks that would jeopardize the successful completion of the project, and these included: (a) capacity strengthening in relation to management and operation of the landfill; (b) addressing of the increased operational costs

[34] The World Bank Group's CPF for Bosnia and Herzegovina for FY16–FY20. Report Number: 99616-BA.

of the leachate plant; (c) guarantees through introduction of the commitment clause in the Implementation Agreement to ensure completion of works after project closing date; and (d) accusation on tailoring of the bidding process. However, challenges with procurement contract management, the decision-making process, and misunderstanding on the question of ownership of the project between PIT/ Mostar, the PMT/MOFTER, and the City of Mostar negatively affected the project. The World Bank team did its best to resolve the situation on a continuous basis, but the relationship further deteriorated when complaints arose during the rebidding process in August 2017 related to the design, supply, and installation of the treatment of leachate at the utility sanitary landfill in Mostar. The team failed to identify that a restructuring clarifying and simplifying implementation arrangements could have been a way to address this challenge.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

90. The project followed a structured theory of change, with specified objectives and indicators that captured outcomes and outputs of the project. It was agreed during preparation that the PMTs of both countries would be responsible for the M&E of the project.

91. The chosen outcome indicators were related to the reduction of nutrient load, preparation of investment proposals, the number of seawater quality measurements reported on an annual basis, and direct project beneficiaries. The changes made to the outcome indicators during the 2016 restructuring are detailed in annex 4.

M&E Implementation

92. Responsibility for monitoring project performance and achievement of project outcomes and results were the EPEEF in Croatia and MOFTER in BiH. These two entities were already implementing ongoing projects in the respective countries and it was concluded that there was adequate capacity to carry out the M&E function under the project. Biannual reports were submitted to the World Bank to monitor project progress and identify and respond to problems that emerged.

93. The project targets were properly adjusted through a restructuring in 2016 when the project activities in Croatia were modified. The midterm review of December 2017, though conducted with some delay, confirmed and kept the revised Results Framework according to the 2016 restructuring and monitoring in relation to Croatia. For BiH, there was no discussion to restructure the project to address the challenges faced in BiH at the time.

M&E Utilization

94. The PDO and outcome indicators were used by the EPEEF and MOFTER to facilitate project management monitoring, decision making, and implementation. The implementation delays due to the need for more efforts made and opaque responsibility roles by the Recipient, the lack of mechanisms to enforce agreements on the ground, and procurement challenges suggested the need for strengthening

staff to manage the procurement processes in BiH. Any issues regarding scope and alignment of targets of the Results Framework indicators were addressed during the substantial project restructuring of 2016.

Justification of Overall Rating of Quality of M&E

95. Based on the above, the overall rating of quality of M&E is Substantial.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

96. **Environmental Assessment (OP/BP 4.01).** The project was classified as a Category B—partial assessment project triggering OP/BP 4.01 on Environmental Assessment. As the project activities spanned two countries, an Environmental Management Framework (EMF) was prepared for activities in Croatia and a separate EMF was prepared for activities within BiH. The EMFs for both countries were disclosed following public consultations in June 2013. An EMP for the activities in Mostar was prepared as part of the BiH EMF in June 2013. The EMP for the Sitnica landfill in Korcula Island was prepared and finalized in April–May 2017 after public consultations held on April 11, 2017, due to the later introduction of Sitnica as a project site.

97. A number of supervision missions were carried out to both sites—Uborak in Mostar and Sitnica on Korcula Island. No issues were noted on site nor were there any non-compliances with the EMP. For Mostar, the actual works never started, so there was not much to supervise in terms of activities on the ground. However, for Korcula, the contractor already had experience working on World Bank-financed projects, so the site and all activities were carried out in line with the EMP and sound environmental practices. The one risk that was identified at a later stage was the occurrence of fires within the body of the landfill and how to mitigate them. This was not identified in the initial EMP. The EMP also identified the impacts and proposed mitigation measures beyond the remediation works because the landfill will remain predominantly closed but also partly operational until the County Waste Management Center is established.

98. **Physical Cultural resources (OP/BP 4.11).** This World Bank policy was triggered as the project recognized that the historical richness of Croatia and BiH creates a higher-than-usual likelihood of cultural ‘chance finds’ in any construction activity. The Environmental Management and Social Frameworks include provisions on chance finds. The demonstration investment in Mostar did not materialize, and at the Sitnica landfill, there were no chance finds during construction works.

99. **Involuntary Resettlement (OP/BP 4.12).** The World Bank’s policy on Involuntary Resettlement (OP/BP 4.12) was not triggered for the two demonstration landfills—Mostar in BiH and Zadar County in Croatia (original proposal) as no land acquisition was anticipated and the ownership of the land areas was not contested. However, during the second year of project implementation, the investment for the Zadar County landfill was dropped due to long delays of land ownership transfer from the state (Republic of Croatia) to Zadar County. Instead, the investment for the Sitnica landfill on Korcula Island was selected which had no issues with land ownership as this was municipal land. The World Bank’s environmental and social safeguards specialists were located in the country offices (in BiH and Croatia respectively) during the entire implementation period. There was strong collaboration with the staff of the EPEEF (Croatia), MOFTER (BiH), and the World Bank.

100. **International Waters (OP/BP 7.50).** The project triggered the World Bank's Operational Policy on International Waterways as the project activities spanned two countries and because the Adriatic Sea and its tributaries, including the Neretva, Krka, and Cetina Rivers, are international waterways. Through the United Nations Environment Programme, the Coordinating Unit for the Mediterranean Action Plan, the Governments of Croatia and BiH notified the Government authorities of all the riparian countries around the Adriatic Sea regarding the project. The notification period concluded on July 25, 2013, without any responses received from any of the riparian countries.

101. **Grievance mechanisms.** In Croatia, the Sitnica landfill site has information boards placed with contact details of both the contractor and investor in case of any complaints by the population. During construction, there were no complaints.

102. **Fiduciary.** There were no overdue audits for the project. In July 2016, a request was made to combine the FY15 and FY16 audit periods and the waiver was granted. At project closing, it was noted that the audit report for the BiH part of the project was submitted with a slight delay. The project received an unmodified audit opinion for the year ended December 31, 2017. Over the course of project implementation, there were overdue IFRs as follows: (a) one IFR reflected in the Implementation Status and Results Report (ISR) overdue by 61 days in ISR No. 3, dated November 5, 2015; (b) two IFRs overdue by 30 days in ISR No. 4, dated May 23, 2016; (c) two IFRs overdue by 30 days in ISR No. 5 of November 28, 2016; and (d) two IFRs overdue by 30 days in ISR No. 9 of February 15, 2019.

Procurement

103. **Croatia.** The project was implemented by the EPEEF. Overall, during implementation, procurement was conducted in compliance with the provisions of the Legal Grant Agreement and the World Bank's procurement policies and procedures.

104. **BiH.** The project was designed to be implemented by the PMT established within MOFTER and to assist and provide technical support to the PMT/MOFTER. Another PIT was established within the utility sanitary landfill Uborak-Buđevci in Mostar in accordance with Grant Agreement, Schedule 2, section 1 (A), paragraph 4. During implementation, challenges arose on project ownership between the two teams that created obstacles to the successful implementation of the project. This in turn caused a deterioration in communications between the PIT/ Mostar, PMT/MOFTER, and the City of Mostar, which became worse over the course of project implementation.

105. The main activities that were planned under the project in BiH under Component 1 were the design, supply, and installation for the treatment of leachate at the sanitary landfill Uborak-Buđevci in Mostar.

(a) A first bidding process related to contracting the firm to execute design, supply, and installation for treatment of leachate at the utility sanitary landfill Uborak-Buđevci in Mostar was cancelled on the grounds of partial noncompliance with one of the qualification requirements. The PIT/ Mostar was insistent on the matter and the rebidding documents were redesigned by the PIT/ Mostar, which deleted the qualification requirement previously insisted upon and thus, caused rejection of the bid from a qualified bidder on grounds that such requirement was not mandatory anymore.

(b) During the preparation of rebidding documents in June 2017 and the rebidding process in August 2017, the World Bank received two complaints, alleging tailoring of the bidding documents in favor of JV Izgradnja Tojaga, a local contractor from Mostar with the highest price bid provided, and its partner Klarwing of Romania. These complaints were reviewed by the World Bank, which concluded that there were no grounds to object to the process. The PIT/ Mostar then prepared and issued responses to the two complainants, and the contract was eventually awarded to the lowest evaluated bidder.

(c) During the procedure for selection of the supervising engineer, the situation was further exacerbated. The whole process of selection was performed by the PIT/Mostar and the PMT/MOFTER initially refused to sign the evaluation report. Given the deadlock, the World Bank commissioned an external expert and provided significant comments to the evaluation report, which were never addressed, thus preventing the World Bank from issuing a no-objection. Despite these efforts in the fall of 2018, it became clear that because the supervising engineer was not hired, the works for the construction of the LTP could not start and therefore would not be completed before the grant closing date of February 15, 2019. As a result, the contract was terminated and a significant portion of the BIH grant was canceled.

C. BANK PERFORMANCE

Quality at Entry

106. The World Bank team incorporated relevant lessons from the broader GEF International Waters portfolio and projects involving similar activities from the region and elsewhere. Recommendations from underpinning studies on the European Nitrogen Assessment (2011) and global report 'Our Nutrient World: The Challenge to Produce More Food and Energy with Less Pollution' (2013) were taken into account. The World Bank ensured that a team of specialists was mobilized to address all the relevant project aspects, including technical, social, and environmental safeguards, procurement, financial management, and M&E. Even though the World Bank spent sufficient resources and time on project preparation to ensure that the proposed project design was closely aligned to both Government objectives as outlined in the respective CPS[35] and the ASEP, it was evident that the project design was wanting, as illustrated through the restructuring changes in annex 4.

107. **Croatia.** While the initial demonstration site selection was based on a solid technical analysis, project preparation lacked due diligence in the selection of the demonstration investment location in Croatia. During project implementation, it became clear that land issues made the original site in Zadar unsuitable and the best alternative site was sought. This resulted in the selection of the Sitnica landfill, which then further revealed that there was inaccurate information with the feasibility study provided by the authorities leading to design challenges and further delays as outlined in section II (B) under PDO#1 of the ICR.

108. **BiH.** Even though the PAD indicated that there was capacity to implement the project in BiH, it became clear during implementation that PIT/Mostar lacked the experience, incentives and oversight to conduct the procurement processes and contract management according to the World Bank guidelines,

[35] The Croatia CPS FY14–FY17 and Bosnia and Herzegovina CPS FY12–FY15.

which negatively affected the relationship between MOFTER and the PIT/Mostar and the World Bank and the PIT/Mostar. In addition, and more importantly, the complex governance situation in Mostar and BiH did not allow for the proper alignment of views between the different levels of government nor for the appropriate oversight and intervention from local authorities once the situation in the PIT/Mostar became critical. This risk was not properly identified and addressed during preparation.

Quality of Supervision

109. A total of nine implementation support missions (ISMs) were conducted by the World Bank during project implementation, as well as frequent technical and field visits in between ISMs, given the nature of the regional project, the changes, and challenges that took place during implementation. The task team leader during preparation was based at the World Bank's headquarters in Washington, D.C. This changed once in 2015 during project implementation and the task team leaders were based in the Croatia Country Office for the duration of the project until completion. The World Bank team specialists such as environmental and social safeguards, procurement, and financial management were located across both countries. This enabled a stronger field presence and facilitated closer engagement with Clients in both countries.

110. Critical problems were identified as early as possible and solutions sought in close collaboration with the Project Management Teams, concerned government Ministries and World Bank management. The strengths of the supervision performance included a proactive supervision team that was multidisciplinary with skills in water supply and sanitation, civil engineering, environmental management, social development, financial management and procurement. The missions acted proactively to identify issues and problems that could have jeopardized the achievement of the PDOs as indicated in section III (A) and (B). The Aide Memoires prepared at the end of each mission were informative, clear, and timely, and identified the issues that needed to be addressed before the next mission.

111. It should be noted that the project faced significant challenges during project implementation in BiH. The World Bank team did their utmost to manage and navigate the complex governance situation whilst ensuring that the project would adhere to Bank policies and guidelines, and still attempt to achieve the project objectives. However, the Bank failed to identify that the governance issues in BiH were such that a more stringent action, such as a restructuring of implementation arrangements, would be needed. On the other hand, the Government of Croatia was committed and had ownership of the project, as seen by the almost completed Sitnica landfill on Korcula Island despite the change of demonstration investment location. In addition, when it was foreseen that the landfill would not be completed by the project closing date, the EPEEF committed funds to ensure completion after project closure.

Justification of Overall Rating of Bank Performance

112. Despite the team's significant efforts, the project did not achieve its PDO. Therefore, the World Bank's overall performance is rated Moderately Unsatisfactory, based on the insufficient due diligence of investment sites and governance structures at entry and the failure to identify a solution to address the protracted delays and governance challenges in BiH during implementation.

D. RISK TO DEVELOPMENT OUTCOME

113. The major risks to development outcome seen at completion of the project are the following:

(a) **Croatia.** Bulky waste is currently being deposited on the Sitnica landfill and will significantly shorten the expected operational life of the landfill. Both construction and bulky waste should be separated from municipal waste prior to the landfilling as these are taking up space and significantly shortening the operational life of the landfill unnecessarily. Given that the works on the local waste management center has not started, it is of utmost importance to reduce the landfilling of reusable fractions to Sitnica. Municipalities should make it a priority to address the issue and improve the current landfilling separation collection practice.

(b) **BiH.** The LTP in Mostar was not constructed or financed from the GEF funds, resulting in the cancellation of part of the grant proceeds totaling US$1.5 million.

V. LESSONS AND RECOMMENDATIONS

114. **Effective collaboration between institutions is essential for positive outcomes of complex environmental projects.** In Croatia, the Sitnica landfill is jointly used by Blato and Vela Luka Municipalities. The completion of this landfill during the ICR preparation period speaks volumes on what can be achieved when there is collaborative and effective team work by all stakeholders – in this case the Municipalities of Blato and Vela Luka, the EPEEF, Eko Ltd., the World Bank, and all others. It must be noted that despite having different political parties, the mentioned municipalities collaborated for the benefit of the public. Even with the challenges encountered, as illustrated in Section III of the ICR, all sides managed to put joint interests ahead of particular interests and cooperated to ensure that all emerging issues were quickly addressed, as testified by the results achieved. Whereas in BiH, there was no effective collaboration between the key stakeholders, MOFTER, PIT Mostar, and the City of Mostar, and this resulted in failure to achieve the development outcomes of the project. Other factors such as no clarity in roles and responsibilities, as illustrated in paragraph 10 of the ICR, were all contributing factors. Government institutions in Croatia were not fragmented as in BiH and thus the aforementioned should be taken into account when future projects are being designed.

115. **Teams should ensure project readiness during preparation and undertake due diligence throughout the project life in order to successfully implement a project.** The delays experienced in both countries were largely due to insufficient readiness and shortfalls in due diligences, including: (a) the challenges faced on land property issues at the Zadar landfill in Croatia that was initially identified as the demonstration investment location at approval; this led to a change in demonstration investment location to the Sitnica landfill on Korcula Island during project implementation; (b) once the Sitnica landfill was identified, it would have been prudent to undertake additional soil investigations during the preparation phase in order to confirm assumptions for the design of the project; (c) due to the major procurement challenges experienced in BiH, it was apparent that there was insufficient capacity and inadequate oversight in the Mostar Project Implementation Team (PIT); and (d) in BiH, the prolonged legalization process of the Mostar Uborak landfill could have been avoided if this was identified and addressed during project preparation. By ensuring project readiness, unforeseen delays during implementation and high costs related to the change in scope, volume of works, and the substantial deviation of the soil categorization would be avoided.

116. **It is important for the Client and Task Team to closely monitor progress on the ground during project implementation and not shy away from significant adjustments if needed.** Despite challenges of project readiness, the Recipient in Croatia, together with the World Bank team, made a turnaround by comprehensively restructuring the project in an expeditious manner and identifying an alternative demonstration investment location as discussed in section III (B). This speaks of the willingness and ownership of the project by the Government of Croatia that was pertinent to the project achievement in Croatia. On the other hand, in BiH, challenges such as clarity on roles and responsibilities of the stakeholders, lack of mechanisms to enforce agreed actions, and deterioration in communications as illustrated in section III (B) worked against the project achievement, but no fundamental change/restructuring was discussed. It is important that World Bank teams should be able to step back and candidly evaluate a non-performing project and make the decision to: (a) continue with implementation and put in place additional mechanisms to turn it around; (b) restructure the operation, or (c) cancel the project.

117. **When designing grant-financed projects, the long-term sustainability of the investments needs to be discussed up front as these entail significant operation and maintenance costs and technical capacity requirements that need to be provided by beneficiaries.** Thus, it is imperative that under project design, sustainability of outcomes has to be addressed beyond implementation of a project. In terms of the project design in Croatia, it did not look at the long-term outcome sustainability of the Sitnica landfill. As an example, bulky waste is being currently sent to the Sitnica landfill instead of regional landfills such as Lucino Razdolje that are yet to start works; hence, this will impact the operational life of the Sitnica landfill and the real achievement in Croatia could be threatened. It is also unclear whether the Mostar Uborak landfill would have had the technical and financial capacity to properly operate the new LTP.

118. **The project teams should take into account the governance landscape, ownership, accountability, incentives, and political economy of a country when designing projects as this can positively or negatively impact the outcomes of a project**. In BiH, the governance structure is complex and reflects the provisions of the country's constitution developed to end the war, as well as subsequent changes to the system introduced under the guidance of the international community through the Office of the High Representative.[36] It brought about a fragmented institutional structure that should have been addressed by the project with clear roles, responsibilities, and corresponding authorities specified. The lack of ownership, clearly defined responsibilities, and mechanisms to enforce agreed actions was a great impediment to the project. Thus, all key stakeholders and structures should have been identified during project preparation and made part of the project design, to effectively foster project commitment and ownership. As part of improving governance, all future projects should also ensure to have a Project Procurement Strategy.

119. **The regional nature of a project, complexity of the topic, and size of the project should be taken into account by project teams to ensure commensurate efforts.** This project had a relatively small amount of US$6.77 million in grant funds with a regional dimension and a complex topic. In order to tap into the Global Environment Facility (GEF) grant, it had to be structured as a regional project and its inception was largely supply driven; thus, risk in over programming the project and facing limited ownership in countries was high. In addition, there was a difficult implementation structure in BiH. Thus,

[36] The World Bank Group's CPS for Bosnia and Herzegovina for FY16–FY20. Report Number: 99616-BA.

Task Teams should note that regional programs and supply-driven projects are not the best basis for success especially when funding is relatively small.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: To reduce the discharge of pollutants with transboundary importance

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Nutrient load reduction (Nitrogen(N)) achieved under the project	Tones/year	0.00 19-Sep-2013	130000.00 23-Apr-2014	70.00 19-Sep-2016	20.00 15-Jul-2019

Comments (achievements against targets):
Monitoring of the Nutrient load reduction in Croatia at Sitnical landfill on Korcula Island results were published in the July 2, 2019 Report on the Contribution of Nutrients. This report is issued on a yearly basis. 29% achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Number	0.00 19-Sep-2013	235000.00 23-Apr-2014	140500.00 19-Sep-2016	15500.00 15-Jul-2019

Female beneficiaries	Percentage	0.00	50.00	50.00	50.00

Comments (achievements against targets):
Only the project beneficiaries identified in Croatia will benefit as the Leachate Management System was completed after project closure. 11% Achieved.

Objective/Outcome: To improve the capacity to prepare pollution control projects

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Investment Proposals prepared for EU funding	Number	0.00 19-Sep-2013	6.00 23-Apr-2014	6.00 19-Sep-2016	10.00 15-Jul-2019

Comments (achievements against targets):
10 investment proposals were prepared for EU funding: (i) three in Bosnia and Herzegovina; and (ii) seven in Croatia. 166% achieved.

Objective/Outcome: To strengthen the capacity to monitor environmentally sensitive area of the sea

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Number of sea water quality measurements reported annually by the Croatian Ministry of Environment and Natural Resources from the new monitoring system	Text	Manual reporting 19-Sep-2013	3,000 23-Apr-2014	3,000 19-Sep-2016	43,267 15-Jul-2019

Comments (achievements against targets):
The monitoring included physical, chemical and biological parameters that were met in 2018 and monitoring is still ongoing. 1442% achieved.

A.2 Intermediate Results Indicators

Component: Component 2. Technical Assistance

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Analysis of the policy, legal and/or institutional reforms conducted and draft report completed per TOR	Text	No 09-Sep-2013	Yes 23-Apr-2014	Yes 19-Sep-2016	Yes 15-Jul-2019

Comments (achievements against targets):

This indicator was completed in 2015 and refers to the national waste and leachate management plan. The Plan itself was not adopted immediately but its third version was and it served as the basis for allocation of EU grant funds for the EU 2014-2020 programming period. Achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Approval of the Strategic Environmental Assessment for leachate management plan	Text	No 09-Sep-2013	Yes 23-Apr-2014	Yes 19-Sep-2016	Yes 15-Jul-2019

Comments (achievements against targets):

The Strategic Environmental Assessment was approved. Achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Feasibility studies for the rehabilitation of leachate and wastewater treatment plants completed	Number	0.00 19-Sep-2013	4.00 23-Apr-2014	4.00 19-Sep-2016	4.00 26-Oct-2018

Comments (achievements against targets):

100% achieved.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Monitoring stations sampled	Number	0.00 19-Sep-2013	60.00 23-Apr-2014	60.00 19-Sep-2016	105.00 15-Jul-2019

Comments (achievements against targets):
The monitoring stations were sampled every two weeks. 175% achieved.

Component: Component 1. Demonstration investments to reduce nutrient discharges and improve water quality monitoring capacity

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Leachate management systems completed	Number	0.00 19-Sep-2013	2.00 23-Apr-2014	2.00 19-Sep-2016	1.00 15-Jul-2019

Comments (achievements against targets):

The leachate management system in Croatia was completed after the project closing date with funds from Government (EPEEF). At the time of the ICR preparation, only ancillary works were being done. The leachate management system in Bosnia and Herzegovina was not built. This was 50% achieved.

B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Reduce the discharge of pollutants, particularly Nitrogen, in selected hot-spots of the eastern Adriatic Sea	
Outcome Indicators	1. Nutrient load reduction achieved under the project 2. Direct project beneficiaries of which 50% is female 3. Number of seawater quality measurements reported annually by the Croatian Ministry of Environment and Natural Resources from the new monitoring system at completion.
Intermediate Results Indicators	4. Monitoring stations sampled 5. Leachate treatment plants completed
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	**Component 1** 1. 20 tons of nutrient load reduction achieved under the project at completion 2. 15,500 direct project beneficiaries of which 50% were female 3. 43,267 seawater quality measurements reported at completion 4. One leachate management system completed in Croatia 5. Provision and installation of equipment to strengthen regional capacity to monitor the seawater quality 6. 105 monitoring stations sampled
Objective/Outcome 2: Improve the capacity in Croatia and Bosnia and Herzegovina to prepare pollution control projects in selected localities	
Outcome Indicators	1. Investment Proposals prepared for EU funding
Intermediate Results Indicators	1. Analysis of the policy, legal, and/or institutional reforms conducted and draft report completed per TOR 2. Approval of the Strategic Environmental Assessment for leachate management plan 3. Feasibility studies for the rehabilitation of leachate and wastewater treatment plants completed
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	**Component 2** 1. There were 4 feasibility studies for the rehabilitation of leachate and wastewater treatment plants completed

	2. There were a total of 10 investment proposals prepared for EU funding: Croatia prepared 7 and BiH prepared 3. 3. Approval of the Strategic Environment Assessment for leachate management plan was completed 4. Analysis of the policy, legal and/or institutional reforms were conducted and draft report completed per the TOR.
Objective/Outcome 3: Strengthen the capacity to monitor environmentally sensitive areas of the sea	
Outcome Indicators	1. Number of seawater quality measurements reported annually by the Croatian Ministry of Environment and Natural Resources from the new monitoring system
Intermediate Results Indicators	1. Monitoring stations sampled
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	**Component 1** 1. 105 monitoring stations sampled 2. Provision and installation of equipment to strengthen regional capacity to monitor the seawater quality 3. 43,267 seawater quality measurements reported at completion

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Manuel G. Marino	Task Team Leader and Lead Water and Sanitation Specialist
Natasa Vetma	Senior Operations Officer, Environment
Stjepan Gabric	Senior Operations Officer, Engineering
Karina Mostipan	Senior Procurement Specialist
Goran Tinjic	Senior Operations Officer, Project Management
Lamija Marijanovic	Financial Management Specialist
Joseph Formoso	Senior Finance Officer, Disbursement
Adam Shayne	Lead Counsel
Julie Rieger	Senior Counsel
Diego Juan Rodriguez	Senior Economist
Vera Dugandzic	Senior Operations Officer, Social
Sanyu Lutalo	Senior Water Supply and Sanitation Specialist, Engineering
Sergio Dell'Anna	DRM Specialist
Ronnie Hammad	Senior Operations Officer
Milane de Jesus Reyes	Project Assistant
Guy Tchabo	Project Assistant
Supervision/ICR	
Natasa Vetma, Stjepan Gabric	Task Team Leader(s)
Karina Mostipan	Senior Procurement Specialist
Sidy Diop	Senior Procurement Specialist
Lamija Marijanovic	Financial Management Specialist
Senad Sacic	Team Member
Vera Dugandzic	Social Specialist
Marko Balenovic	Team Member

Damir Leljak	Team Member
Esma Kreso Beslagic	Environmental Specialist
Carolina Abigail Delgadillo Medin	Team Member
Ali R. Abedini	Senior Environmental Consultant, ISWM
Nikola Kerleta	Procurement Consultant
Ivana Ivicic	Environment Consultant

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY13	3.650	33,075.15
FY14	7.725	108,114.22
Total	**11.38**	**141,189.37**
Supervision/ICR		
FY15	9.531	61,954.60
FY16	7.423	31,604.47
FY17	7.194	32,868.34
FY18	13.680	58,446.51
FY19	30.835	140,002.29
FY20	0	325.00
Total	**68.66**	**325,201.21**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$, millions)	Actual at Project Closing (US$, millions)	Percentage of Approval (US$, millions)
Croatia Component 1: Demonstration Investments to Reduce Nutrient Discharges and Improve Water Quality Monitoring Capacity	2.98	3.111	104
Croatia Component 2: Technical Assistance	1.35	0.954	71
Croatia Component 3: Project Management and Dissemination	0.00	0.007	−7.00
Bosnia and Herzegovina Component 1: Demonstration Investments to Reduce Nutrient Discharges and Improve Water Quality Monitoring Capacity	2.05	0.17	8
Bosnia and Herzegovina Component 2: Technical Assistance	0.20	0.25	125
Bosnia and Herzegovina Component 3: Project Management and Dissemination	0.19	0.16	84
Recipients Contributions	23.20	24.36[37]	105
Total	**29.97**	**29.02**	**96.8**

[37] The Republic of Croatia made the contribution of US$24.36.

ANNEX 4. RESTRUCTURING

Table 4.1. Restructuring Changes 2016

Pre-restructuring Information from PAD			Post-restructuring Changes 23 Months Extension of the Project Closing Date		
No.	**PDO Indicators**	**Targets**	**PDO Indicators**	**Targets**	**Comments**
1.	Nutrient load reduction (Nitrogen-N) achieved in the demonstration investments financed under the project	130,000 (kg/year)	No change	70[38] (tons/year)	End target revised to reflect change in the demonstration investment locations Croatia from Zadar to Sitnica landfill with a much lower population. The change from kg to tons was that it was a more suitable unit to measure nutrients.
2.	Investments proposals prepared and presented to the EU for funding	6 (Number)	Investment proposals prepared for EU funding	6	Indicator excluded the word 'presentation' and the description was expanded to include preparation of investment proposals for future EU funding for nutrient reduction and management in selected location of the Croatian Adriatic Sea Coastline[39].
3.	Number of seawater quality measurements reported annually by the Croatian Ministry of Environment and Natural Resources from the new monitoring system	3,000 (Number of measurements per year)	No change	3,000	No change
4.	Direct project beneficiaries	235,000 (Number)	—	140,500 (Number)	End target was revised to reflect change in the demonstration investment locations, representing the sum of Mostar landfill (BiH) and Sitnica landfill (Croatia, Korcula Island). Mostar census 1991: 125,000; Korcula census 2011: 15,500.
	Female beneficiaries (Subtype supplemental)	50 (Percentage)		50 (Percentage)	

[38] There are 1,000 kg in 1 ton; thus, at the new demonstration location, Sitnica landfill, 70,000 kg/year will be expected after restructuring. The drastic change in the target is in correlation to the change in location where the population decreased from 110,000 in Zadar to 15,500 in Sitnica.
[39] The Croatian Adriatic Sea Coastline is a broader geographic area than just Dalmatia.

Pre-restructuring Information from PAD			Post-restructuring Changes 23 Months Extension of the Project Closing Date		
No.	**Intermediate Results Indicators**	**Targets**	**Intermediate Results Indicators**	**Targets**	**Comments**
5.	Analysis of the policy, legal, and/or institutional reforms conducted, and draft report completed per TOR.	Yes (Text)	No change	Yes (Text)	No change
6.	Approval of the Strategic Environmental Assessment for leachate management plan	Yes (Text)	Yes	Yes	No change
7.	Leachate treatment plants completed	2 (Number)	Leachate management systems completed	2	To accommodate leachate collection that might be treated in existing wastewater treatment plants and where leachate is collected but not treated, a treatment plant was expected to be built.
8.	Feasibility studies for the rehabilitation of leachate and wastewater treatment plants completed	4 (Number)		4	Slight modification to the distribution of feasibility studies expected throughout project implementation years.
9.	Monitoring stations sampled	60 (Number)	No change	60	No change

ANNEX 5. ECONOMIC AND FINANCIAL ANALYSIS

I. General Project Background

1. **The Croatia and Bosnia and Herzegovina Global Environmental Facility (GEF) Adriatic Sea Environmental Pollution Control Project (I).** Croatia and BiH (the Project thereafter) is a regional project that was conceived as part of a broader Adriatic Sea Environment Program (ASEP) to include activities in two of the Adriatic Sea's riparian countries: Croatia and BiH. It was intended to address some of the most critical environmental issues identified[40] in the region, namely the pollution of seawaters from unsanitary solid waste dumping sites. Within the broad programmatic objective of supporting the launching of ASEP described above, the project's specific objectives are to: (a) reduce the discharge of pollutants with transboundary importance, particularly Nitrogen, in selected hotspots of the eastern Adriatic Sea; and (b) to improve the capacity in the Republic of Croatia and BiH to prepare pollution control projects in selected localities of Dalmatia and Herzegovina and to strengthen the capacity to monitor the seawater quality.

2. The main identified pollution source at the Croatian and Bosnian coast is solid waste. There are almost no sanitary landfills at the coast and there are numerous dumping sites. Due to the karstic nature of the terrain, leachates from waste dumping sites are quickly released into the sea increasing health risks of local population and endangering tourism activities.

3. The priority pollution hotspot sites are Ploče and Neretva Delta and Rijeka due to their location and risk of groundwater and sea contamination that could possibly affect the local population and over 1 million tourists per year. Diklo landfill was the selected demonstration project site, however, because of the problems related to the project technical readiness and land transfer issues, during project implementation stage, this was replaced by Sitnica landfill at Korcula Island, which (regardless of its significantly smaller impact area) is not only a priority landfill-related pollution hotspot site but also pollutes drinking water wells that affect even more significantly the local population and ever-increasing number of tourists. Further, the project demonstrated sufficient technical readiness.

4. These changes in the project implementation provoked not only reallocation of the budget and delay in the deadlines but also changes in the project objectives and target results, as presented in table 5.1.

Table 5.1. Changes during Project Implementation

Item	Initial Targets	Updated Targets
Budget	6.77	6.77
Deadline	March 15, 2017	February 15, 2019
Nutrient load reduction (tons/year)	Baseline: 135, end target 130	Baseline: 0, end target: 70
Direct project beneficiaries (number)	Baseline: 0, end target: 235,000	Baseline: 0, end target: 140,500
Female beneficiaries(percentage)	50%	50%
Investment proposals prepared for EU funding (number)	Baseline: 0, end target: 6	Baseline: 0, end target: 6
Number of seawater quality	3,000	3,000

[40] The other major causes of transboundary pollution in the Adriatic are: (a) municipal sewage point sources and agriculture non-point source discharges along the coast and the main rivers in the Adriatic basin, which pollute coastal waters and have created a highly eutrophic system in its northern sections; and; (b) chemical and oil discharges from point sources such as industry and port wastes.

Item	Initial Targets	Updated Targets
measurements reported annually (text)		

II. General Site Information

5. Korcula (see figure 5.1) is the second most populous Croatian island in the Adriatic Sea (after Krk) and the most populous Croatian island not connected to the mainland by a bridge. It has an area of 276 km^2 and 187.1 km coastal line (just off the Dalmatian coast). It has 15,522 inhabitants (2011), of which 40 percent live in the Western part of the island (that is, in the project area).

Figure 5.1. Korcula Island, Croatia

Source: www.korculainfo.com

6. Main settlements on the island are the towns of Korcula, Vela Luka, and Blato, where only Vela Luka and Blato are within the project area. The climate is Mediterranean; an average air temperature in January is 9.8 °C and in July 26.9 °C; the average annual rainfall is 1,100 mm, making the island a very popular summer resort. Tourists arrivals and overnights in Korcula for the period 2013–2017[41] are presented in table 5.2.

Table 5.2. Tourist Arrivals and Overnight Stays on Korcula Island

	2013	2014	2015	2016	2017
Tourists, arrivals in Korcula island (number)	104,000	111,000	114,300	124,100	153,300
Tourists overnights in Korcula (number)	617,000	635,000	643,600	698,800	883,800
Average overnight stay per tourist (number)	5.9	5.7	5.6	5.6	5.8

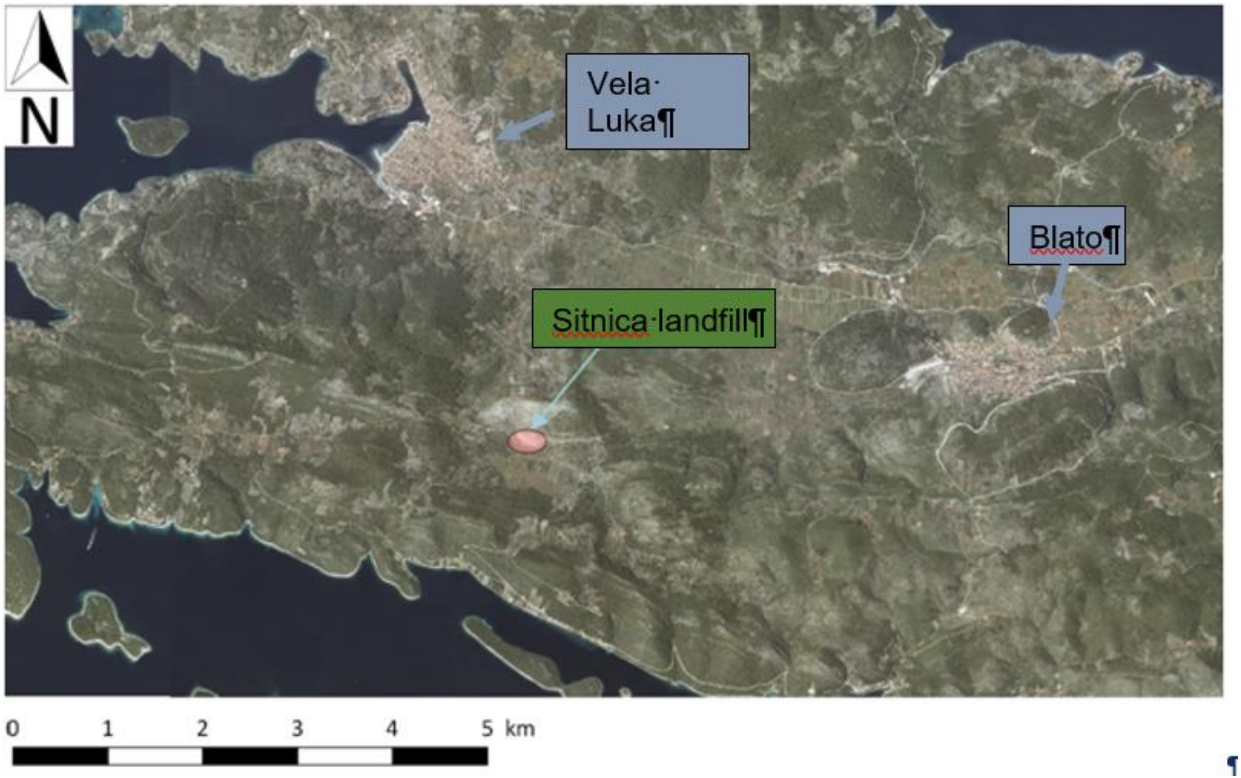
7. The well-established road connections within the main settlements on the island, as well the water lines connecting them with the main Croatian coastline cities, for example, Split, Dubrovnik, Zadar, Rijeka, and so on; other islands, that is, Hvar and Lastovo; and during the summer with Italian Adriatic ports, make the island easily accessible and even more attractive for the tourists.

[41] As per Tourists in Figures, 2014, 2015, 2016, and 2017, Ministry of Tourism, Republic of Croatia.

General Technical Description of the Landfill

8. Solid waste from the western part of Korcula Island is being disposed at the Sitnica landfill since 1980. The landfill is located west of the town of Blato and east of Potirna along the asphalt road Vela-Luka Blato, on the border of the Blatsko polje. It is located next to the tourist part of the Karbuni bay and is about 4 km from Blato and Vela Luka, within the borders of the municipalities of Blato and Vela Luka at a distance of approximately 1.5 km north of the Adriatic Sea (Karbuni Bay).

Figure 5.2. Sitnica Landfill Location[42]



Source: ESRI basemap, 2016.

9. Northeast of the landfill at a distance of about 2 km in the area of Blatsko polje are installed water intakes “Studenac”, “Prbako”, “Gugić” and “Prcalo”. The mentioned water intakes serve to supply drinking water to the western part of the island of Korcula, that is, to 40 percent of the population and circa 40 percent of the tourists in the island.

10. About 95,000 tons of waste have been deposited at the location so far. Since the existing landfill did not meet even the most basic requirements for a solid waste landfill and was operated contrary to the set technical and technological criteria and EU Landfill Directive, it had an adverse impact on the environment. This includes pollution of groundwaters in the surrounding areas, including the water intakes mentioned above, and the Adriatic Sea. Therefore, rehabilitation of the landfill and construction of closed leachate wastewaters has been included in the project. Remediation of the existing landfill

[42] On Korcula Island.

consisted of removal of the existing waste where it was deposited and its installation on the newly constructed landfill cells (1, 2, 3, 4A).

11. The Sitnica landfill consists of the following parts: the landfill and the entry-exit zone. The newly built landfill layout is approximately 2.95 ha and has a capacity of approximately 203,000 m^3 of waste and consists of the following parts: peripheral embankment, foundation seal, the drainage system of the leachate, the passive degassing system, the final sealing layer, and rainwater drainage systems from the body of a closed landfill. The works involved in the construction of the landfill include the construction of a gravel pit roads, landfill cells, displacement and disposal of waste on the envisaged cells and formation landfill body, including peripheral embankment, bottom sealing layer, drainage system, upper sealing layer, degassing, and rainwater drainage system from the body of the closed landfill.

12. The construction of the entry-exit zone includes the performance of traffic manipulative surfaces, entry door and fences around the entire building, staff building, compactor garage, wheel washing facility, and the construction of ancillary infrastructure.

Economic and Financial Analysis

13. The results of the ex-post project-level economic analysis carried out are summarized in this section. Also, a comparison with the results of the ex-ante project-level financial and economic analysis of the two initial solid waste utilities (Zadar and Mostar) planned to be implemented is presented.

14. The traditional economic evaluation method, based on the incremental benefit and cost flows between the situation 'with' and 'without' the project is applied, to catch only the 'pure project' impacts, where the specifics provoked due to the introduced changes in the project implementation are well considered in the ex-post analysis. Therefore, only the main economic results from the ex-post economic analysis (that is, the economic NPV and economic IRR) are compared with the corresponding values from the ex-ante cost-benefit analysis as most of the other elements of the analysis are not comparable.

15. Likewise, the capacity of the operator of the new site is also assessed to guarantee the financial sustainability of the investments, but it is not compared with the capacity of the two companies responsible for the two initial sites, because of the significant differences in the sites and operators. For instance, before the project restructuring, the significance of the pollution was related to fisheries and large river discharges, which are not of significance to the location of the restructured project. Instead, the significance of the pollution is related to drinking water in the nearby wells.

16. The analysis confirms the positive benefits of the project and the financial viability of the entities that will operate the demonstration investment.

17. The project-level analysis clearly indicates that despite the fact that not all indicators are fully achieved (due to smaller impact area of the Sitnica landfill), the investment was worth carrying out as it generates significant benefits in the region and contributes to the implementation of the ASEP, and the institutions responsible for its long-term O&M, being public bodies, are capable of ensuring its sustainability.

(a) Economic Analysis

18. A project-level ex-ante cost-benefit analysis had been prepared for the two demonstration investments on the basis of: (a) the standard value assigned to Nitrogen; [43] (b) the total reduction expected to be achieved by the demonstration investments; and (c) their cost. Using this approach, the ex-ante NPV of expected benefits had been estimated at US$6.21 million and the IRR of the demonstration investments at 24 percent, for a total cost of US$4.58 million, and an O&M equivalent to 12 percent of the investment cost per year. The demonstration investments were also assessed to be the most cost-effective for this type of waste, and the cost of removal was estimated to be well below what was considered the cost-effective marginal cost of removing Nitrogen (US$3.2 per kg of Nutrients removed in these two demonstration investments versus US$53 per kg average for nine Baltic countries[44]).

19. A project-level ex post cost-benefit analysis is also prepared for the completed investments, that is, the Sitnica demonstration investment in Korcula Island, Croatia, and TA for BiH on the basis of the following assumptions:

- Total US$4.07 million (of originally signed US$4.33 million) was spent for Croatia, and US$0.68 million (of originally signed US$2.44 million) was spent for BiH.
- The project implementation took place in the period September 2014–February 2019 instead of the originally set period (September 2014–March 2017), and the project period is 30 years (as typical for this kind of projects).
- The O&M is HRK 80,000 or US$12,120 per year (constant terms), equivalent to only 0.3 percent of the investment cost per year. Further, HRK 925.662 or US$140,252 is envisaged for the closure of cell No. 4, after reaching the maximum capacity.
- Benefits from improved access to drinking water, that is, the benefits to human health from availability of improved drinking water as a result of the project (the closure of the landfill will cease polluting the drinking water wells), are generally difficult to estimate. Their monetization is normally done on the basis of willingness-to-pay surveys conducted with a representative sample of the potential customers. Since such surveys are currently not available for Croatia, a benefit transfer approach from Romania and Bulgaria is used based on the household income.[45] The unit value of this benefit per household in the project area for Croatia is estimated at US$343.98 in 2010 terms. The annual values of this benefit are projected by increasing them following the real GDP growth over the project reference period.

[43] See Hernandez et al. (2010) for the "Economic valuation of environmental benefits of wastewater treatment processes," where shadow prices for Nitrogen and other pollutants discharges (reflecting the environmental damage avoided) are presented for discharges into different receiving waters, EUR 4.6 and EUR 16.3 per kg, respectively, for discharges into river or sea environments. These are similar to those included in the recent European Nitrogen Assessment, EUR 5 and EUR 20 per kg (Sutton and van Grinsven 2012).
[44] See Gren (2008) "Cost Effectiveness and Fairness of the Helcom Baltic Sea Action Plan Against Eutrophication," where these figures are presented.
[45] See page 34 of JASPERS' cost-benefit analysis methodology for water and wastewater, Romania, 2008.

- Benefit for improved quality of bathing water refers to the use value of an improvement in the quality of water bodies in the region under consideration and is linked to the benefits accruing to people undertaking water-related recreational activities. The unit value of this benefit per person in the project area is estimated at US$47.64 in 2010 terms (a benefit transfer approach from Romania and Bulgaria is used based on the household income[46] as no relevant surveys are available in Croatia). The annual values of this benefit are projected by increasing them following the real GDP growth over the project reference period.

- Benefits (nonuse value) of improved water bodies as a result of pollution prevention is also taken into account despite its insignificance compared to the remaining benefits from the project. This benefit refers to ecosystems in the region under consideration and is linked to the benefits accruing to households per km or river in the project area. The unit value of this benefit per household per km of river is estimated at US$0.11 in 2010 terms (a benefit transfer approach from Romania and Bulgaria is used based on the household income[47] as no relevant surveys are available in Croatia). The annual values of this benefit are projected by increasing them following the real GDP growth over the project reference period.

- Considering that the project area is a popular summer resort, not only the local population in the concerned area but also the population equivalent of the tourists in that area is considered in the analysis, where it is assumed that 40 percent of the population of the island and 40 percent of the tourist arrivals in the island are within the project area.

20. Using these above described assumptions, the ex-post economic NPV is estimated at US$25.89 million (at 5 percent discount rate[48]) and the IRR of the demonstration investment at 33.4 percent, for a total cost of US$4.75 million.

21. In comparison with the ex-ante cost-benefit analysis, the ex-post cost-benefit analysis displays 40 percent increase in the IRR and over 310 percent increase in the NPV results despite the changes in the project demonstrators, extended project implementation period, and reduced number of the population affected.

22. It should be noted that the impact of the project delay on the NPV and IRR is as follows, which is insignificant in the overall project context:

- 1.58 million (6.5 percent) decrease in the NPV, and

- 0.03 percent decrease in the IRR which is insignificant in the overall project context.

23. Comparison between ex-post and ex-ante results are presented in tables 5.3, 5.4, and 5.5.

[46] See page 34 of JASPERS' cost-benefit analysis methodology for water and wastewater, Romania, 2008.
[47] See page 34 of JASPERS' cost-benefit analysis methodology for water and wastewater, Romania, 2008.
[48] As per Regulation (EU) 2015/207 for Croatia for 2014–2020.

Table 5.3. Ex Ante and Ex Post NPV and IRR

	NPV (US$, millions)	IRR (%)
Ex-ante	6.21	24.0
Ex-post	25.90	33.4

Table 5.4. Disbursement in US$, millions

Disbursements (in Millions)									
Project	**Loan/Credit/TF**	**Status**	**Currency**	**Original**	**Revised**	**Cancelled**	**Disbursed**	**Undisbursed**	**% Disbursed**
P-143921	TF-17706	completed	USD$	4.33	4.33	0	4.07	0.26	94%
	TF -17727	completed	USD$	2.44	2.44	0	0.68	1.76	28%
	TOTAL		USD$	6.77	6.77	0	4.75	2.02	70%

Table 5.5. Targets and Results

Item	Updated Targets	Achieved Results	Deviation
Budget	US$6.77 million	US$4.75 million	US$ minus 2.02 million or 70% fulfilment of the budget
Deadline	February 15, 2019	June 3, 2019	3 months delay
Direct project beneficiaries (number)	Baseline: 0, end target: 140,500	83,696 in the project area	minus 56,604 direct beneficiaries in 2019 or 60% fulfilment of the target
Female beneficiaries(percentage)	50%	Over 50% (as per Croatia's Census 2011, the share of female in Croatia is over 51%)	Over 101% fulfilment of the target
Investment proposals prepared for EU funding (number)	Baseline: 0, end target: 6	9	150% fulfilment of the target

24. The higher economic benefits achieved are due to avoided pollution of the drinking water wells in the project area. The lower number of direct project beneficiaries is a result of the significantly smaller project area in comparison with the original sites. In sum, the ex-post economic analysis demonstrates significantly better results than the ex-ante analysis, because of the specifics of the new location and its higher direct impact on human health.

(b) Financial Analysis

25. The project finances investment in one municipal site, Sitnica on Korcula Island in Croatia, located at the territory of two municipalities, Blato and Vela Luka, which received grant resources for physical investments. The remaining utility participating in the project received only TA for investment proposals preparation; hence, its financial capacity is not assessed.

26. The municipal budgets (2019–2021) of Blato and Vela Luka were analyzed to assess their capacity to ensure adequate funding for incremental O&M expenditures (investments costs are provided as a grant) of the monitoring of the closed Sitnica landfill. As these costs comprise about 0.2 percent of the total annual costs of the municipalities and the operators are public entities, the financial risk associated

with the financing of the O&M costs is insignificant. Each of the municipalities is capable alone to cover the annual O&M costs.

27. The future costs associated with the closure of cell #4 after reaching the maximum capacity are expected to be grant funded, as is typical for such type of investments. Even if the grant is not ensured, the Blato Municipality would have the capacity to finance it.

Appendix I: Assumptions for the Economic Analysis

Table 5.6. Assumptions

Item	2018
Total population, Croatia, #*	4,105,500
Households in Croatia, #*	1,536,000
Population, Korcula island, #*	14,640
Population, project area (Western Korcula island), #*	5,856
Tourists, arrivals in Korcula island, #*	172,773
Tourists, arrivals in project area (western Korcula island), #*	69,109
Tourists, overnights, Korcula island, #*	999,298
Tourists, overnights, project area (western Korcula island), #*	399,691
Tourists overnights equivalent per day, Korcula island, #	2,738
Tourists overnights equivalent per day, project area (western Korcula island), #	1,095
Real GDP growth**	*2.8*
Post-closure care and maintenance, US$***	12,120
Estimated cost of closure of landfill cell No. 4 (after reaching maximum capacity), US$***	140,252
Access to drinking water, unit value, US$****	343.98
Improvement of water bodies (use value), unit value, US$****	47.64
Improvement of water bodies (use value), unit value, US$****	0.11
Currency exchange EUR in USD, 2010*****	1.34

Note:
*Data projected based on historical statistics data.
** Data from Croatia Convergence Programme.
*** Project data.
****As per cost-benefit analysis methodologies for Water and Wastewater for Bulgaria and Romania, 2008, JASPERS.
***** as per European Central Bank.

ANNEX 6. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

1. Croatia provided feedback to the World Bank's Implementation Completion Results Report (ICR). Bosnia and Herzegovina and Croatia each prepared an ICR documenting the final outcomes of project implementation. The following sections summarize the main points from the client's ICRs regarding: (a) assessment of outcomes; (b) assessment of risk to development outcomes; and (c) the World Bank's performance. Lessons learned are quoted as such from the client's reports.

REPUBLIC OF CROATIA

2. Recipient feedback to the World Bank's ICR was received on August 7, 2019, see figure 6.1.

Figure 6.1. Croatia feedback to the ICR

Subject: RE: Croatia: GEF Adriatic Sea Environmental Pollution Control Project (TF017706) - Implementation Completion and Results Report (ICR)

[External]
Stupanj klasifikacije: **NEKLASIFICIRANO**

Dear Ms. Novosel,

Thank you for sharing the draft Implementation Completion and Results Report for the GEF Adriatic Sea Environmental Pollution Control Project I. with us. The Report clearly and thoroughly indicates the successful implementation of the Croatian part of the Project. We regret lower ratings on the whole Project due to the weaker performance of BiH part.

Once again, thank you for the excellent and professional cooperation. A proactive role of the World Bank, especially Ms. Vetma and Mr. Gabrić, was critical for the successful implementation of the Project.

Kind regards,

REPUBLIKA HRVATSKA / REPUBLIC OF CROATIA
Fond za zaštitu okoliša i energetsku učinkovitost
Environmental Protection and Energy Efficiency Fund

mr. sc. Ivana Jonke, MBA
Voditeljica projekata / Project Manager
Služba za podršku krajnjem korisniku za provedbu projekata /
Department for Support to End Beneficiaries in Project Implementation
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Republic of Croatia's ICR

Summary of Client's Assessment of Outcomes

- Due to a change in demonstration investment location from the Diklo landfill to the Sitnica landfill, core indicator nutrient load reduction (Nitrogen-N) was achieved.

- The supply and delivery of information and communication technology (ICT) equipment for the purpose of monitoring the quality of the sea and strengthening the regional capacity for monitoring the quality of the sea was purchased and installed in the required locations in Rijeka, Split, and Zagreb.

- With regard to the TA component, the target was overachieved with seven investment proposals prepared for EU funding which include leachate collection and measures to prevent nutrient pollution of the Adriatic Sea (the total target number of proposals for both countries and grants was six at the end of the project).

- In addition to the Government-financed TAs, the GEF funds were used in the preparation of the following technical documentation:

    - Contracts for the preparation of documentation for the Diklo landfill in Zadar (fully implemented).

    - The contract for updating the Environmental Impact Assessment Study with public consultations and dissemination process including control investigation works and monitoring for the Diklo landfill (completed on November 3, 2016).

    - The contract for the preparation of the Feasibility Study with cost-benefit analysis, employer's requirements, conceptual design with the location permit, and the application for EU co-financing of remediation of the Diklo landfill with leachate capture and leachate treatment plant (completed on October 3, 2016).

- Furthermore, the following TA contracts have also been implemented:

    - Preparation of Strategic Environmental Assessment (SEA) of the Croatia Waste and Leachate Management Plan and guidelines for preparation of waste and leachate management plans (completed on October 31, 2015).

    - Update to SEA of the Croatia Waste and Leachate Management Plan (completed on August 3, 2016).

    - Contract for the preparation of the analysis of the environmental measures and EMP for remediation of the Sitnica landfill with assessment of nutrient contribution (expected to be completed by July 15, 2019).

- Contract for the preparation of the main design with bill of quantities for works contract for remediation of the Sitnica landfill with closed leachate system (completed on June 19, 2017).

- Supervision of Works for the remediation of the Sitnica landfill with closed leachate system

Efficiency Factors

3. The project was extended during restructuring and the Grant funds were used by the extended closing date, February 15, 2019, in the amount of US$4,072,819.05, representing 94 percent of the funds. The following factors led to the efficiency of project implementation:

- Effective procurement process.

- Effective management by the PMT (for example, during restructuring when great efforts were put into founding a new demonstration investment in a very short period).

- Strict adherence to World Bank procurement guidelines and without any complaints or negative feedback, which was a significant time-saver. This allowed the project to deliver its services in a timely and effective manner.

- Effective project management by the EPEEF was also central to achieving efficiencies. The EPEEF has gathered a multidisciplinary team of experts, who, under experienced guidance from the World Bank experts, had no problems tackling the project challenges.

Summary of Client's Assessment of Risk to Development Outcomes

- The Sitnica landfill has been in use since 1980 and is located west of the municipalities of Blato and Vela Luka along the Vela Luka-Blato road on the edge of Blato field and is situated about 4 km from both municipalities. About 158,300 m^3 (95,000 tons) of municipal and industrial waste has been disposed there from both municipalities that represent more than 7,730 residents. The landfill area is about 4.86 ha; however, before the project, the existing technological solution of waste disposal at the time, as well as the plan of the landfill, did not meet the requirements of sanitary landfills regulation. Due to the specific terrain configuration, the thickness of landfilled municipal waste in some places was up to 40 m, with the formation of a very steep slope, creating a risk of collapse of the landfill deposit. Because the landfill was working without satisfying the required technological criteria, thus potentially creating a serious potential risk to the environment, and in particular, groundwater and seawater, landfill remediation was necessary while ensuring the continuation of the operation of the Sitnica landfill until the opening of the waste management center.

Summary of the Client's Evaluation of World Bank Performance

4. The client acknowledged the following under its evaluation of the World Bank's performance and significant value to the project at inception, preparation, and implementation:

- **Project implementation and management.** From inception, the World Bank team provided valuable support and worked closely with all stakeholders that included the Project Management Team (PMT), Eko Ltd, Municipality of Blato, and Municipality of Vela Luka, and this contributed to the successful implementation and management of the project. The World Bank team communicated effectively with counterparts and sought and found solutions to resolve bottlenecks during the project, especially during pivotal moments such as selection of the new project demonstration investment location, in-depth project restructuring, and hiring of an independent auditor to address the soil categorization matter at the Sitnica landfill.

- **Promoting and strengthening collaboration among project stakeholders.** The World Bank's intensive supervision was one of the major contributing factors in achieving the targets; more importantly, it created an environment of close collaboration and teamwork between the World Bank, the EPEEF, and all stakeholders.

- **Future projects.** It is the hope of the EPEEF that future projects may be realized with the same or similar World Bank team as this cooperation was considered a valuable learning experience.

Lessons Learned (quoted from the Client's Completion Report)

- Proper site investigation during the preparation phase is of utmost importance for the preparation of good quality project design and for the reduction of unexpected issues in scope and volume of works during construction. During the course of the project, it was established that there was no proper site investigation before the commencement of the works on site. During additional site investigation and through audit by the independent expert hired by the World Bank, it was established that prior categorization of the soil did not reflect site conditions. Due to this, pre-categorization of soil was done to precisely reflect soil conditions.
- Reaching good understanding of common objectives and distribution of responsibilities and authorities among different project stakeholders before start of the works is a key precondition for successful project implementation.

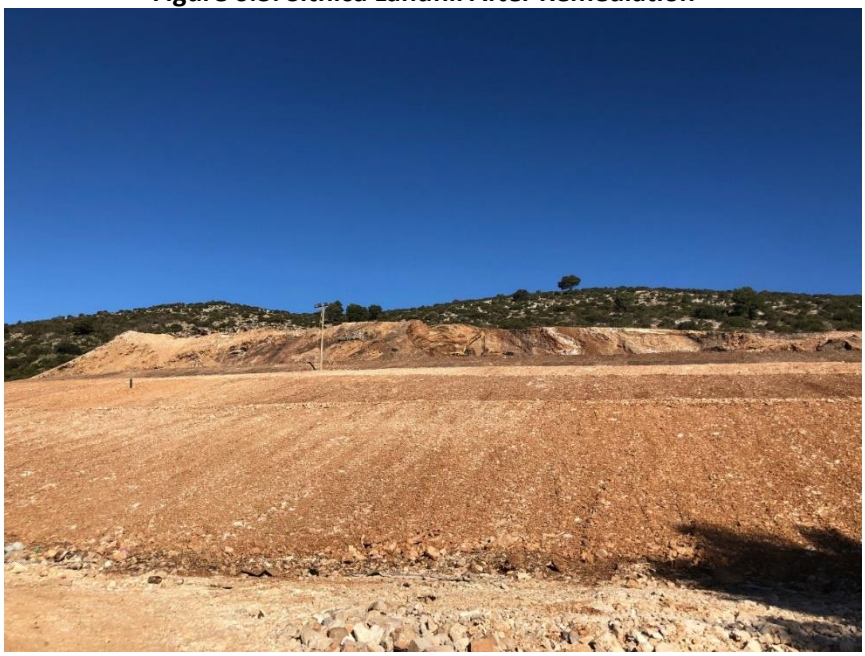
- Timely and complete resolution of all land property issues is important but is an often-underestimated precondition for implementation of construction works. Land property issues should be resolved before the commencement of works because solving these issues during the implementation of the project could have a negative effect on the project's closing date as these issues tend to be time- and money-consuming activities if they are not dealt with before the implementation of the project.

- Adequate public relationship approach is important to mitigate possible negative feedback from the local community that is usually very sensitive when it comes to issues of solid waste and groundwater quality. Public perception of the project is of utmost importance for the project itself because negative perception of the project could result in the obstruction of the works and/or delays in the implementation.

- When facing a project crisis, it is crucial to have experienced experts at hand (that is, World Bank experts) who are capable of providing timely and beneficial advice.

Figure 6.2. Sitnica Landfill during Remediation[49]

Figure 6.3. Sitnica Landfill After Remediation[50]



[49] Photo taken by the World Bank project team during supervision mission.
[50] Photo taken by the World Bank project team

BOSNIA AND HERZEGOVINA

5. Bosnia and Herzegovina did not have comments to the World Bank's ICR.

Bosnia and Herzegovina ICR

Summary of Client's Assessment of Outcomes

- The Leachate Treatment Plant (LTP) in Mostar was not financed from the GEF funds and thus was not achieved.

- The contractor prepared the main design in accordance with the contract for the design, supply, and installation for treatment of leachate at Mostar, and the construction permit was obtained for the LTP.

- As the consultant firm for supervising was not contracted due to a discontinued procurement process, the works for the construction of the LTP could not start. The termination of the contract between JP Deponija d.o.o and contractor JV Izgradnja Tojaga and Process Engineering SRL was requested by the contractor and was processed.

Summary of Client's Assessment of Risk to Development Outcomes

- Lack of project ownership and deteriorating communication between the PIT/ Mostar, MOFTER, and the World Bank resulted in unsuccessful project completion. This largely related to the implementation of Component 1.

- There was lack of experience in conducting the procurement processes according to the World Bank guidelines in PIT/Mostar, more specifically lack of awareness that such knowledge was missing. This further impacted the relationship between MOFTER and PIT/Mostar and the World Bank and PIT/Mostar. Despite management support, the Mostar City communication did not improve.

Summary of the Client's Evaluation of World Bank Performance

6. The Recipient recognized the valuable support the World Bank team gave to the PMT in project implementation and management, particularly:

- The World Bank project team were cooperative and communicated effectively with counterparts from the PMT, and decisions were made in a reasonable time. All parties made every effort to make contribution toward the successful completion of the project;

- The World Bank worked closely with the client to support its efforts to successfully implement the project. Both parties sought and found solutions to implementation bottlenecks (procurement, financial aspects, and restructuring). The World Bank supervised the project regularly; and

- There was room for improvement and some aspects of project planning, implementation, and management which can still be enhanced in the future.

Table 6.1. Lessons Learned (Quoted from the Client's ICR)

Key factors that affected performance	Procurement for Supervision for the works contract (…) selection of supervision has not been completed and the contract was not awarded despite that Project closing date will stay on February 15, 2019 (…) (…) works contract for Leachate treatment plant was terminated (…)
Lessons learned	The project requires stronger human resources in the local PITs; better coordination between institutions and PITs, as well as between the PMT, PIT, and local authorities; timely issued permits; … etc. The project should be prepared in a participatory manner with all relevant agencies involved in the decision making and the approval of the design.
Recommendations	Main design and revised documentation should be finished on time, in the early stage of project preparation, as well as urban and building permits and other municipal paper work, to avoid any possible delays. Borrower and implementing agency should consider an appropriate control mechanism that could help keep the project on track, in the early stage of project implementation, and introduce that through a commitment clause in the Implementation Agreement signed between all involved parties. Increased local community participation and positive perceptions and views about the project contributed to achieving the project outcomes, thus resulting in improved living conditions of the population in the basin.
Other factors that affected performance	Transboundary water basin and environmental projects are high-risk projects.
Lessons learned	The ASEP demonstrated that cooperation and coordination built throughout the project life between different countries even in a complex environment is possible and as such, is a significant achievement by itself.
Recommendations	The rigorous preparation and full agreement of the partner countries before the project start on the project objectives and outcomes can result in a successful project. More frequent PSC meetings or some additional training for PMT staff representatives from partner countries would have a benefit for the project cycle.

ANNEX 7. SUPPORTING DOCUMENTS

1. Adriatic Sea Environment Program (ASEP), Rapid Assessment of Pollution Hotspots for the Adriatic Sea, October 2011 (Internal Use Only).
2. Project Appraisal Document (PAD), dated April 23, 2014, Report Number PAD00000479.
3. **Croatia:** Global Environment Facility Grant Agreement, GEF Grant Number TF017706, dated September 8, 2014.
4. **Croatia:** Global Environment Facility Project Agreement, GEF Grant Number TF017706, dated September 8, 2014.
5. **Croatia:** Amendment to Grant Agreement, GEF Grant Number TF017706, dated September 2017.
6. **Croatia:** Amendment to Project Agreement, GEF Grant Number TF017706, dated March 2017.
7. **Bosnia and Herzegovina:** Global Environment Facility Grant Agreement, GEF Grant Number TF017727, dated September 10, 2014.
8. **Bosnia and Herzegovina:** Amendment to Grant Agreement, GEF Grant Number TF017727, dated March 2017.
9. Implementation Supervision Reports (numbers 1–9).
10. World Bank Supervision Aide Memoires for Croatia and Bosnia and Herzegovina.
11. Management Letters for Croatia and Bosnia and Herzegovina.
12. Restructuring Paper dated September 2016.
13. **Croatia:** Country Partnership Strategy for FY14–FY17. Report Number: 77630-HR.
14. **Croatia:** Country Partnership Framework for FY19–FY24. Report Number: 130706-HR.
15. **Bosnia and Herzegovina:** Country Partnership Strategy for FY12–FY15. Report Number: 64428-BA.
16. **Bosnia and Herzegovina:** Country Partnership Framework for FY16–FY20. Report Number: 99616-BA.
17. **Croatia:** Water Management Strategy (2009).
18. **BiH:** Water Management Strategy for Federation of BH (2012).
19. Financial Statements with Independent Auditors' Report (2012–2016).
20. Croatia Project Completion Report, 2019.

21. Bosnia and Herzegovina Project Completion Report, 2019.

22. Implementation Completion and Results Report (ICR) for Investment Project Financing (IPF) Operations, July 5, 2017.

23. Strategic Action Programme to Address Pollution from Land Based Activities (SAP MED) and related National Action Plans (NAP) from 2000 to 2015.

24. Reference websites: (a) http://www.unepmap.org; and (b) https://iwlearn.net.

ANNEX 8. MAPS

Figure 8.1. Adriatic Sea Basin

Figure 8.2. Bosnia and Herzegovina

Figure 8.3. Croatia