

# **Ex-Post Project Evaluation 2010: Package III-6 (Bosnia and Herzegovina)**

**November 2011**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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**Octavia Japan Co., Ltd.**

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## Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2008, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2007. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

November, 2011

Masato Watanabe

Vice President

Japan International Cooperation Agency (JICA)

## Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

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Bosnia and Herzegovina

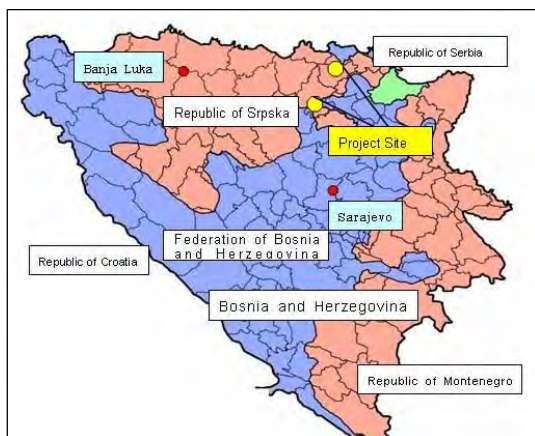
Ex-Post Evaluation of Japanese Grant Aid Project  
**Project for Reconstruction of the Main Bridges on Road Network  
(Doboj and Modrica Bridges)**

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

0. Summary

At the time of the ex-post evaluation, it is evident that the project is consistent with policies such as development of transport infrastructure and developmental needs such as development of road network and its expansion. Although the project period was as planned, the project cost slightly exceeded the planned. The detour situation for heavy vehicles (20t or more) and traveling speed (design speed) have progressed as planned at the time of the ex-ante evaluation. Additionally, the beneficiary survey results show the positive impacts on the living conditions of residents in the adjacent areas of both bridges as well as on the working condition of carriers. Furthermore, no major problems have been observed in the operation and maintenance (O&M). In light of the above, this project is evaluated to be highly satisfactory.

1. Project Profile



Project Locations



New Doboj Bridge

1.1 Background

Due to the interethnic conflicts that occurred between 1992 and 1995, the road network in

Bosnia and Herzegovina<sup>1</sup> (hereinafter referred to as “BiH”) was destroyed and fragmented, and its restoration and recovery became a major challenge since then. The Doboj Bridge is located along Highway Route M4-3 in the Republic of Srpska (hereinafter referred to as “RS”), which shares a border with the Federation of Bosnia and Herzegovina (hereinafter referred to as “FBiH”) at a point approximately five kilometers south of its bridge location. Meanwhile, the Modrica Bridge is located along Highway Route M5 (E73)<sup>2</sup> in RS, which runs southward from Budapest, the capital of Hungary, passes through Croatia, and finally connects to Sarajevo, the capital of BiH. These two bridges had taken on important functions as key junctions of passenger transportation and goods distribution between RS and FBiH. The Doboj Bridge was getting older and also suffered significant dilapidation such as cracks in the superstructure due to heavy military vehicle transit during the interethnic conflicts, free lime, corroded reinforcing bars, and concrete deterioration in the foundation. Thus, heavy vehicles were restricted to pass through the bridge. As for the Modrica Bridge, vibrations associated with the vehicle passage was so large due to significant damage of the superstructure that may have been caused by heavy military vehicle transit and impact from bombings, and thus, there was a risk of structural disorder and collapse of the bridge. Therefore, it was considered as an urgent issue to reconstruct both bridges to ensure safe and smooth transportation.

## 1.2 Project Outline

The purpose of the project is to improve the detour situation of heavy vehicle and transport velocity, by reconstructing Doboj and Modrica bridges where deterioration by the interethnic conflicts was remarkable; thereby contributing to promote exchange of people and smooth logistics and secure safe traffic both in RS and FBiH.

Grant Limit Amount / Actual Grant Amount		1,023 million yen / 1,002 million yen
Exchange Date of Signature		May 2004
Executing Agency		Public Company Republic of Srpska Roads
Project Completion Date		December 2006
Project's	Main Contractors	Obayashi Corporation

<sup>1</sup> BiH is composed of the two entities (FBiH and RS) and Brcko Administrative District which belongs to the aforementioned two entities. The main industries are forestry and mining.

<sup>2</sup> It is M5 in BiH, but E73 as international road (European main road).

Participants	Main Consultants	Nippon Koei / Central Consultant (JV)
Basic Design Study		October 2002 - July 2003
Detail Design Study		December 2003 – August 2004
Related Projects		N/A

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Kenichi Inazawa, Evaluation Consultant, Octavia Japan Co., Ltd.

### 2.2 Duration of Evaluation Study

Duration of the Study: December 2010 – November 2011

Duration of the Field Study: March 13–18, 2011 (first study)

June 26–28, 2011 (second study)

### 2.3 Constraints during the Evaluation Study

N/A

## 3. Results of the Evaluation (Overall Rating: A<sup>3</sup>)

### 3.1 Relevance (Rating: ③<sup>4</sup>)

#### 3.1.1 Relevance with the Development Plan of Bosnia and Herzegovina

In 1996, before the time of the ex-ante evaluation, BiH formulated the Emergency Transport Reconstruction Program (ETRP). Also, BiH had injected aid funds received from international organizations, such as the World Bank and EBRD, as well as donor countries, such as EU countries, the United States, and Japan, into the recovery and restoration of the transportation network. However, seventeen roads and bridges in the country (including Dobož and Modrica Bridges) could not be funded from the ETRP, and thus, further support and cooperation were required for the restoration of these roads and bridges.

Even at the time of the ex-post evaluation, the reconstruction and improvement of road network are still considered important. In RS, the Public Company Republic of Srpska Roads, the Executing Agency of this project, developed the “Mid-term Plan Regarding Road Maintenance, Conservation and Recovery (2011-2013)” in January 2011, in order to develop

<sup>3</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>4</sup> ③: High, ② Fair, ① Low



and construct roads, bridges, tunnels, and so on. In addition, in the whole BiH, international aid agencies such as the World Bank, European Bank for Reconstruction and Development (EBRD), and European Investment Bank (EIB) have been financing to support streamlining the transportation infrastructure.

Since the development of transport development has been continuously recognized as important, consistency of policies and measures with this project both at the time of the ex-ante evaluation and the ex-post evaluation can be recognized.

### 3.1.2. Relevance with the Development Needs of Bosnia and Herzegovina

At the time of the ex-ante evaluation, the Doboj Bridge had become increasingly deteriorated and old, which led to the restriction of heavy vehicle passage. Meanwhile, the Modrica Bridge faced the risks of structural disorder and collapse due to the influences by the interethnic conflicts. As a result, development needs to ensure safe traffic on both bridges were high.

At the time of the ex-post evaluation, smoother traffic has been realized and the traffic volume of goods has been revitalized because the Doboj and Modrica Bridges<sup>5</sup> have been reconstructed. On the other hand, the total road length of RS is approximately 3,870km with a road extension figure of 16.5km for every 100 km<sup>2</sup>, which is still about half of neighboring Slovenia's 30.5km and Croatia's 31.0km (the European average is approximately 77.0km). Moreover, since approximately twenty percent of all its bridges<sup>6</sup> are made of wood<sup>7</sup>, strength/durability and maintenance was still considered as serious issues. Thus, it can be said that development needs for a road network in RS have been continuously high.

Since the development of roads and bridges at the time of the ex-post evaluation in BiH (RS) has continuously been regarded as important, it can be said that this project is consistent with development needs both at the time of the ex-ante evaluation and the time of the ex-post evaluation.

### 3.1.3. Relevance with Japan's ODA Policy

At the "Ministerial Meeting on Peace Consolidation and Economic Development of the Western Balkans" jointly hosted with the EU which was held in April 2004 in Tokyo, Japan addressed "peace consolidation," "economic development," and "regional cooperation" as the

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<sup>5</sup> The population of Doboj City where the Doboj Bridge is located is approximately eighty thousand. The population of Modrica City where the Modrica Bridge is located is approximately forty thousand. Both bridges span the Bosnia River, Danube River system.

<sup>6</sup> The total number of bridges is 702 at the time of the ex-post evaluation.

<sup>7</sup> According to RS's "Mid-term Plan for Road Maintenance, Conservation, Recovery and Construction (2011-13)"

three major issues focused on the Western Balkans including BiH. While keeping in mind the conditions of economic development in BiH, based on the Poverty Reduction Strategy Paper (PRSP) and the three major issues, Japan decided to provide aid assistance to the sectors where the needs and impact as well as the comparative advantage of Japan were expected to be high. Among those, infrastructure development was regarded as a priority to promote the market economy. This project is to support the transportation infrastructure, which in turn leads to the recovery from interethnic war and the economic development of BiH. Therefore, it can be concluded that the project is consistent with the relevant policy of BiH as well as Japan's aid policy.

This project has been highly relevant with Bosnia and Herzegovina's development plan and development needs, as well as to Japan's ODA policy, therefore, its relevance is considered high.

### 3.2 Efficiency (Rating: ②)

#### 3.2.1 Project Outputs

Table 1 shows the planned and actual major outputs of the project. The outputs planned at the time of the ex-ante evaluation were implemented as planned. There is no additional output.

Table 1: Comparison of Planned and Actual Major Outputs of the Project

Plan at the Time of Ex-ante Evaluation	Actual at the Time of Ex-post Evaluation
<b>【Japan's outputs】</b>	
1) Dobož Bridge (total length including roads installed: 350m) 2) Modrica Bridge (total length including roads installed: 390m)	1) 2) As planned
<b>【BiH's outputs】</b>	
(Dobož Bridge) 1) Construction of connection road (length: 807m) 2) Construction of crossing road beneath railroad tracks (length: 43m) 3) Improvement and construction of intersection (one for each bridge)	(Dobož Bridge) 1) 2) 3) As planned
(Modrica Bridge) 1) Construction of connection road (length: 1,510m) 2) Improvement and construction of intersections (one for each bridge)	(Modrica Bridge) 1) 2) As planned

Source: JICA documents, Answers on questionnaires



Figure 1: Project Site

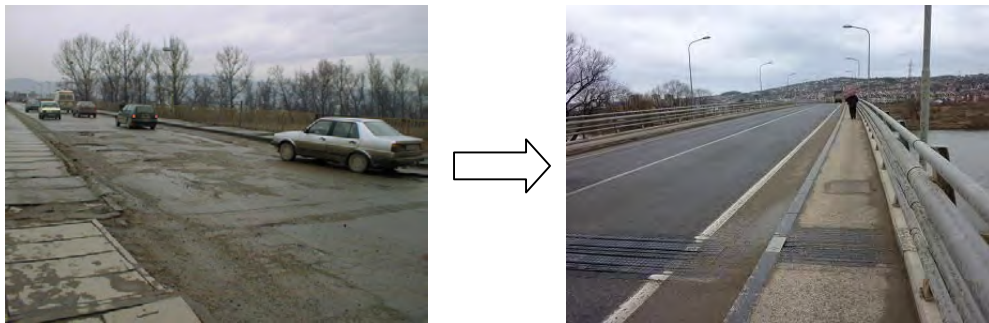


Figure 2: Change Before and After the Project Implementation (Dobož Bridge)



Figure 3: Change Before and After the Project Implementation (Modrica Bridge)

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Period

At the time of the ex-ante evaluation, the planned period was thirty-two months, while the actual period was exactly thirty-two months, from May 2004 to December 2006 (100% of the plan).

#### 3.2.2.2 Project Cost

The E/N amount limit of this project was 1,023 million yen and the RS side planned to cover 273 million yen. The total planned project cost was 1,345 million yen. In fact, the actual amount of 1,002 million yen was used by Japan's side (98% of the plan) and RS side covered 343 million yen (125% of the plan). Therefore, the actual amount covered by Japan's side became lower than planned but the RS's amount increased. The reasons the amount covered by the RS increased slightly were because the amount necessary for land acquisition<sup>8</sup> around both bridges became higher<sup>9</sup> than estimated, and in addition there was the influences of Japanese yen's depreciation (Euro's appreciation).

Thus, the project period was as planned while the project cost was slightly higher than planned, therefore efficiency of the project is fair.

### 3.3 Effectiveness (Rating: ③)<sup>10</sup>

#### 3.3.1 Quantitative Effects

##### 3.3.1.1 Results from Operation and Effect Indicators

Regarding the effectiveness evaluation (quantitative evaluation) of this project, the results of detour situation for heavy vehicles (20t or more), traveling speed (design speed), number of vehicles retained as a result of waiting for the others to pass, and average daily traffic volume are examined as follows.

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<sup>8</sup> It was planned that the amount would be covered by the local municipality. Details will be mentioned later in "3.4.2.2 Land Acquisition and Resettlement".

<sup>9</sup> Regarding this increase, the Executing Agency commented "The initial estimated budget for land acquisition was a rough estimation. As a result, the difference occurred."

<sup>10</sup> The result of "Impact," the following section, is included in this "Effectiveness" for the purpose of rating.

Table 2: Respective Index Data Related to the Effectiveness Evaluation  
(Quantitative evaluation)

At the time of the Ex-ante Evaluation			At the time of the Ex-post Evaluation		
1) Detour situation for heavy vehicles (20t or more) (Unit: yes/no)			1) Detour situation for heavy vehicles (20t or more) (Unit: yes/no)		
	2002	Target after completion		Upon completion (2007)	At the time of the ex-post evaluation (2011)
Doboj Bridge	Yes	No	Doboj Bridge	No	No
Modrica Bridge	No	No	Modrica Bridge	No	No
2) Traveling speed (design speed) <sup>11</sup> (Unit: km/h)			2) Traveling speed (design speed) (Unit: km/h)		
	2002	Target after completion		Upon completion (2007)	At the time of the ex-post evaluation (2011)
Doboj Bridge	34	80	Doboj Bridge	60	60
Modrica Bridge	43	80	Modrica Bridge	60	60
3) Number of vehicles retained as a result of waiting for the others to pass (Unit: maximum number of vehicles per day)			3) Number of vehicles retained as a result of waiting for the others to pass (Unit: maximum number of vehicles per day)		
	2002	Target after completion		Upon completion (2007)	At the time of the ex-post evaluation (2011)
Doboj Bridge	14	0	Doboj Bridge	0	0
Modrica Bridge	0	0	Modrica Bridge	0	0
4) Average daily traffic volume <sup>12</sup> (Unit: number of vehicles per day)			4) Average daily traffic volume (Unit: number of vehicles per day)		
	2003	Future forecast (2020)		2007	2008 <sup>13</sup>
Doboj Bridge	6-7,000	7,100	Doboj Bridge	7,528	7,594
Modrica Bridge	7,700	15,100	Modrica Bridge	5,126	5,108

Source: JICA documents, Answers on questionnaires

Analysis of difference and review for the data mentioned above is explained as follows:

1) Detour Situation for Heavy Vehicles (20t or more)

As for the former Doboj Bridge at the time of ex-ante evaluation, heavy vehicles carrying

<sup>11</sup> The speed in 2002 was the average speed of passenger vehicles when passing through the bridge.

<sup>12</sup> According to JICA document (Basic Design Study Report), Doboj Bridge's traffic volume in 2003 was the estimated value supposing that the new bridge would be constructed in the future. Modrica Bridge's traffic volume was the observational result retrieved during the basic design study.

<sup>13</sup> As for data after 2009, according to the Executing Agency, the data will be released in the Traffic White Paper, etc. later this year but should not be too different from the values in 2008.

loads of 20t or more had to take detours to other bridges 10km downstream. As a result of the new bridge construction, it is no longer necessary to take detours to other bridges, and smoother traffic has been realized.

## 2) Traveling Speed (design speed)

At the both bridges before the project implementation, the crank-shaped road alignment that curved almost at a right angle gave vehicles no choice but to reduce their speeds when passing through. However, it is no longer necessary to reduce the speed after the new bridges have been constructed. Although the traveling speed at both bridges was set at 80km/h upon completion, it is currently designated as 60km/h. This is because the Executing Agency has given consideration to the living environment and safety of residents since the bridges were both constructed quite close to the residential areas.

## 3) Number of Vehicles Retained as a result of Waiting for the Others to Pass

On the former Dobož Bridge before the project implementation, the road and bridge width were narrow, which caused vehicles to be retained on the bridge because of congestion. However, since the new bridge was constructed, the width of road and bridge has been widened and vehicles no longer must wait to cross.

## 4) Average Daily Traffic Volume

The traffic volume (actual figure) of 2007-2008 is not measured on the bridge and connection road, but it was rather calculated by averaging the values measured at respective traffic volume measuring points (closest to both bridges) set up by the Executing Agency. It should be noted that vehicles which pass the respective measuring points might have entered other roads prior to passing the bridges since the measuring points were set somewhat far from both bridges. On the other hand, since the actual values at the time of the ex-ante evaluation (2003) were based on the traffic volume study implemented in the vicinity of the bridge construction sites, it is difficult to compare with the traffic volume of 2007-2008 precisely. Furthermore, according to the Basic Design Study Report of this project, the future predicted value of the Modrica Bridge at the time of the ex-ante evaluation (15,100 vehicles per day) was considered the predicted values of 2020<sup>14</sup>, which also makes it difficult to conduct comparison and review in order to measure and analyze the effectiveness of this project.

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<sup>14</sup> Through interviews with the Executing Agency, it was confirmed that there is possibility of the reason that the increased predicted value is based on the consideration to construct a new major road in the future called "5C", almost parallel with M5 (E73) passing through Modrica Bridge.

### 3.3.2 Qualitative Effect (Ensuring smooth and safe traffic)

Through interviews with the local municipalities and police stations where Doboj and Modrica Bridges are located, positive comments were received, such as “Sending out ambulances, fire trucks and police cars in emergency situations became much easier. Although the bridges and connection roads were congested in the past due to heavy vehicles passing, traffic is much smoother now thanks to the construction of the new bridges. The transportation conditions in the areas nearby have also improved.” In addition, as indicated in the beneficiary survey results in the following section, it is assumed that the project has contributed to alleviate the burden of carriers and drivers and to reduce the traveling time thanks to the elimination of congestion.

Thus, based on the interview and beneficiary survey results, it can be considered that smooth and safe traffic has now been ensured.

As discussed above, this project has largely achieved its objectives, therefore its effectiveness is high.

## 3.4 Impact

### 3.4.1 Intended Impacts

#### 3.4.1.1 Implementation of Beneficiary Survey

Through this survey, an interview-style beneficiary survey was conducted<sup>15</sup>, targeting for residents who live in the respective vicinities of Doboj and Modrica Bridges as well as drivers/carriers using both bridges. As shown in Figures 4 to 10, questions pertaining to level of satisfaction of the project, improvement of transport conditions, and so forth were asked, and respective answers were obtained.

As for the level of satisfaction regarding the construction of Doboj and Modrica Bridges as mentioned in Figure 4, all the respondents either replied that they were “Satisfied” or even more so. It is considered that the reason why quite a lot of them replied such as “Very satisfied” especially in regard to the Doboj Bridge is because prior to the project implementation, heavy vehicles had to take detours or were retained as a result of waiting for the others to pass, which had created significant congestion. In addition, as shown in Figures 5 and 6 which explain the reasons for high levels of satisfaction, since a lot of answers regarding elimination of congestion and safety improvement have been given, therefore it is judged that smooth and safe traffic has

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<sup>15</sup> Number of samples: 120 total for each of the 60 bridges (breakdown: 40 residents and 20 carriers/drivers). Random sampling was employed to draw out these figures.

been realized through this project.

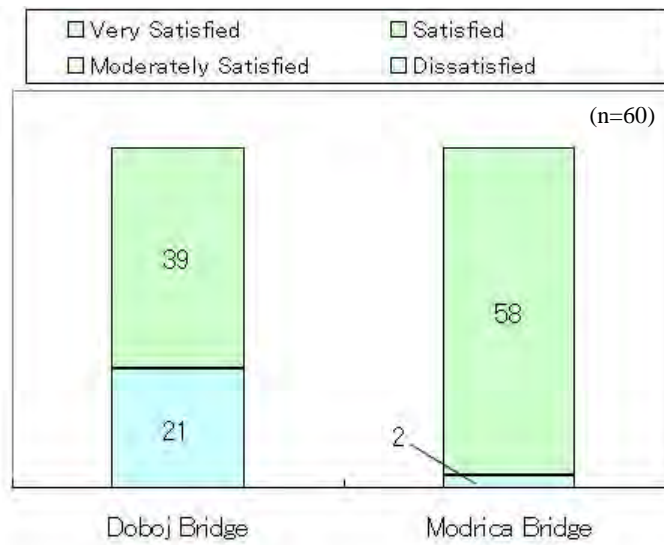


Figure 4: Are you satisfied with this project?

(Two or more answers included.)

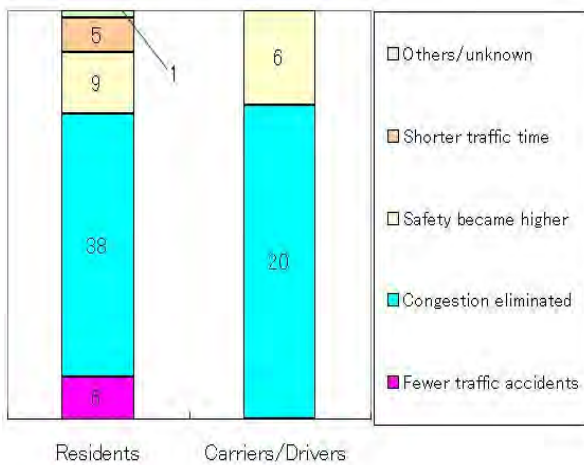


Figure 5: Reason why you chose "Very satisfied" or "Satisfied" in Figure 4 (Dobož Bridge)

(Two or more answers included.)

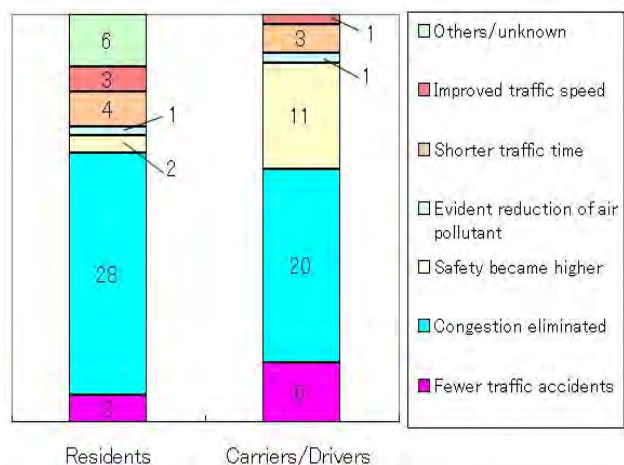


Figure 6: Reason why you chose "Very satisfied" or "Satisfied" in Figure 4 (Modrica Bridge)

With regard to the question to residents in Figures 7 and 8, many of the respondents replied "I don't know." This may have been a result due to the visiting places and the number of visits regarding the respondents. Nevertheless, there are few answers of "No" and the replies can be considered generally positive. In general, it is assumed that residents in Dobož and Modrica City have recognized the improvement of transport access between both FBiH and RS. As a special point to keep in mind, regarding "The construction of the bridges became a symbol of peace after the end of the interethnic conflicts" in 5), the majority of the respondents replied "I don't



know.” It can be speculated that they may feel such a delicate question pertaining to ethnic and political issues difficult to answer or people’s awareness of restoration from interethnic conflicts has possibly become weaker because more than fifteen years have already passed since the interethnic conflicts ended. Some of the respondents did not know how to answer this question even during the interviews<sup>16</sup>. As for 7), a large percentage of the Dobož residents replied “Yes.” It can be speculated that the Dobož Bridge serves as a border with FBiH approximately 5km eastward on Route M4-3 and southward on Route M5(E73) and is considered a bridge in a good location not only by residents of RS but also by those of FBiH, thus, frequency of traffic of both residents may be relatively high. As a result of this project, it can also be speculated that interchange between both residents has also improved.

Even as to the questions to carriers and drivers under Figures 9 and 10, although many replied “I don’t know” to some of the question items, positive answers were obtained in general. There are many of the replies, “contributed to improve working condition” and “contributed to improve transportation access between RS and FBiH” for both bridges. It can be speculated the respondents are satisfied with traffic conditions for the flow of goods along with its access improvement. Simultaneously, it can be speculated that they recognize the revitalization of goods transportation between both entities.

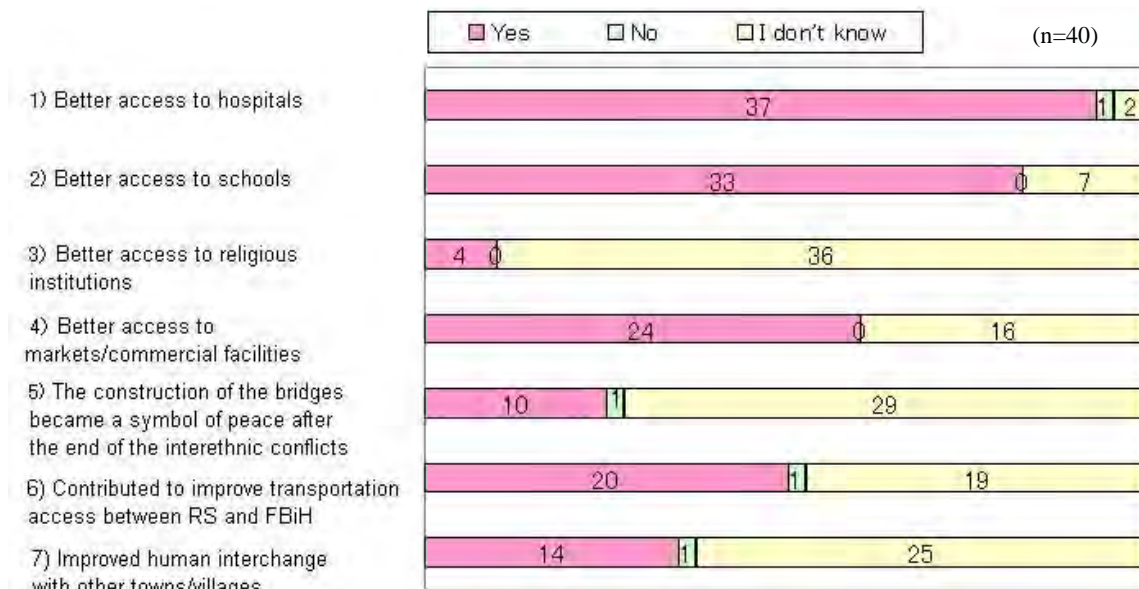


Figure 7: Impacts on Living Environments (questions to residents: Dobož Bridge)

<sup>16</sup> Impressions of respondents during the interviews conducted at the actual sites are as follows: 1) “Cannot/do not want to answer because ethnic/political issues are delicate matters” and 2) “It is difficult to speculate the relationship between bridge construction and ethnic collaboration/peace establishment because fifteen years have already passed since the end of the interethnic conflicts”

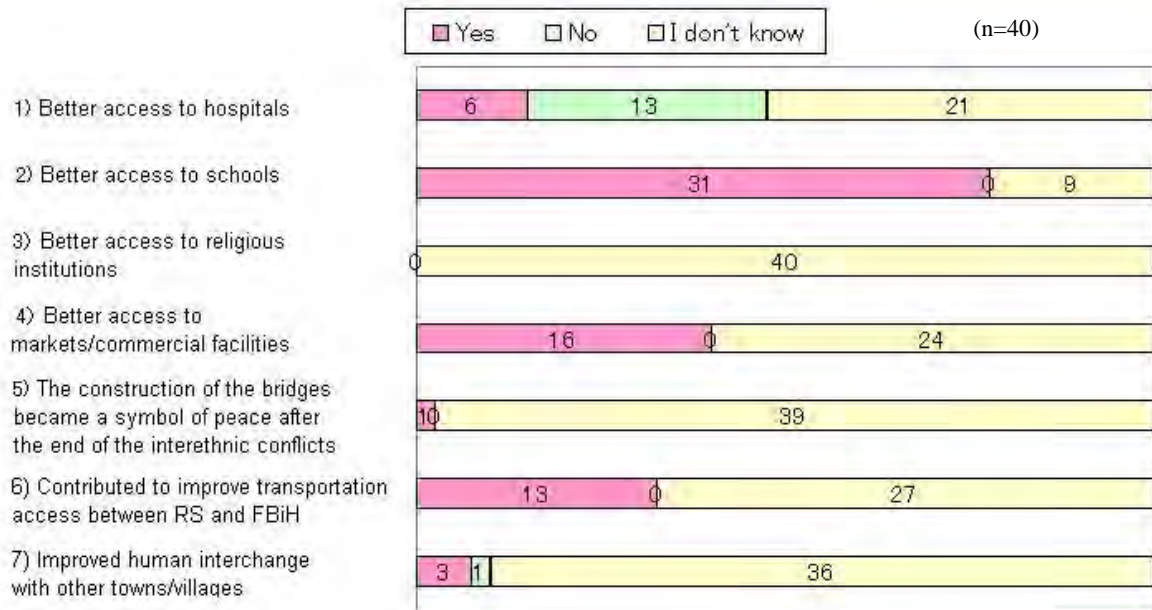


Figure 8: Impacts on Living Environments (questions to residents: Modrica Bridge)

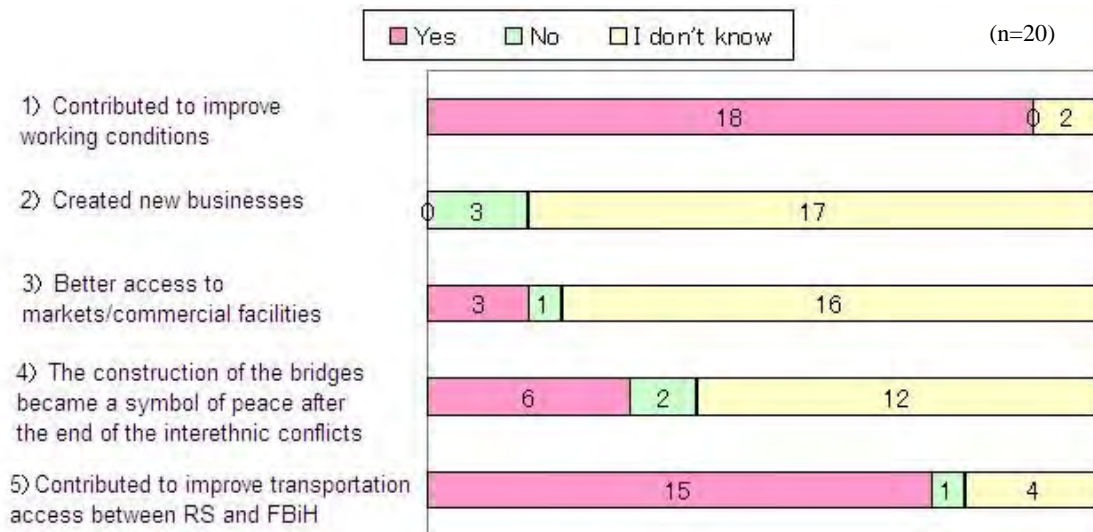


Figure 9: Impacts on Corporate Operations and Convenience (questions to carriers/drivers: Doboj Bridge)

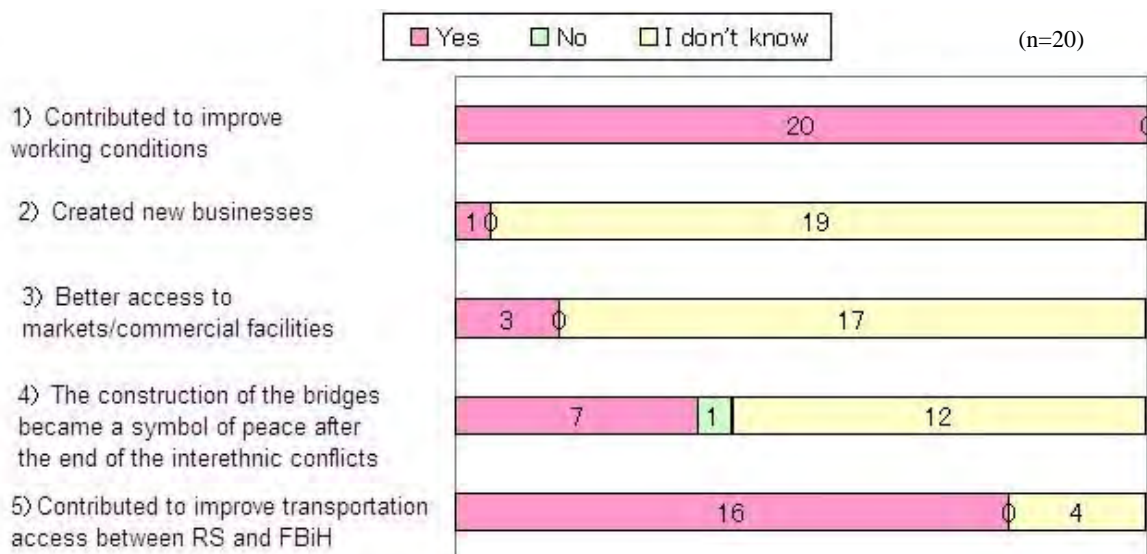


Figure 10: Impacts on Corporate Operations and Convenience (questions to carriers/drivers: Modrica Bridge)

### 3.4.2 Other Impacts

#### 3.4.2.1 Impacts on the Natural Environment

There is not any negative impact on the environment regarding this project. During this ex-post evaluation survey, interviews to the Executing Agency, local municipalities and police stations were conducted, in addition to visiting the project sites. Then, no negative impact was particularly found in regards to the natural environment as a result of the bridge construction.

With regard to the environmental monitoring system of road and bridge facilities, the Traffic Planning/Environmental Conservation Department of the Executing Agency (Public Company Republic of Srpska Roads) is in charge. Periodically, the department implements testing and monitoring. The Environmental Impact Assessment (EIA) for both bridges was conducted in February 2004<sup>17</sup>.

#### 3.4.2.2 Land Acquisition and Resettlement

In this project, resettlement did not occur, but as shown in Table 3, land acquisition occurred, targeting farmlands and hybrid zones along the roads connected to the bridges. The Executing Agency came up with the land acquisition plan and local municipalities (Doboj and Modrica city governments) were in charge of the acquisition procedures and paid the compensations. Compensations were paid from the governmental budgets to the land owners, because the local

<sup>17</sup> The EIA was approved by the Residential Planning and Civil Engineering Department, Ministry of Environmental Conservation, Republic of Srpska.

governments were also considered beneficiaries of the project. According to the governments, the land owners were generally satisfied with the amounts of the compensations. Moreover, negotiations and procedures pertaining to the sales were also conducted smoothly.

Table 3: Land Acquisition of the Project

	Number of the Land Owners	Acquired Area	Compensation Amounts Paid from the Local Governments to the Land Owners
Doboj Bridge	20 residents	26,835 m <sup>2</sup>	700,000KM (approx. 350,000 euro)
Modrica Bridge	Approx. 40 residents <sup>18</sup>	52,493 m <sup>2</sup>	450,000KM <sup>19</sup> (approx. 225,000 euro)

Source: Documents from Doboj and Modrica Cities

### 3.4.2.3 Other Indirect Impacts (contributions to revitalization of economic relationship)

Table 4 indicates the amount of RS and FBiH's gross regional domestic product (GRDP) while Table 5 reveals the data pertaining to the traffic volume of goods transported on RS roads<sup>20</sup>. Since the project commencement (2004), both the GRDP and traffic volume of goods have been basically demonstrating an upward trend. However, between 2008 and 2009, it declined due to influences of the world financial crisis. As it is assumed that the data regarding the GRDP and traffic volume of goods is also affected by other factors other than the project, direct economic impacts cannot be verified. However, it can still be speculated that the project has at least realized the promotion of smooth traffic and distribution of goods as well as has supported the economic relationship of both regions.

<sup>18</sup> The number of co-ownership representatives with whom Modrica City negotiated and whom the city paid compensations. This indicates that there were quite a few co-ownerships in the areas of land acquisition (i.e., a number of landowners per piece of land). Accurate information pertaining to the number of landowners could not be obtained.

<sup>19</sup> The acquisition price was cheaper even though the acquired area around the Modrica Bridge compared to Doboj Bridge was larger, because the actual market prices of the respective lands near the bridges were not the same. Doboj City is larger in terms of its urban area and population size. Thus, the roadside value per square meter is also more expensive. Therefore, this fact affects the amount of appraisal regarding farmlands and hybrid zones and, in comparison, they become more expensive.

<sup>20</sup> Data of FBiH could not be obtained.

Table 4: Gross Regional Domestic Product (GRDP)

(Unit: million KM)

	2004	2005	2006	2007
RS	5,116	5,763	6,544	7,351
FBiH	10,350	10,945	12,261	13,879
	2008	2009	2010	
RS	8,489	8,223	N/A	
FBiH	15,647	15,231	N/A	

Sources: Documents from the Bureau of Statistics of RS, Statistics White Paper of BiH

Table 5: Traffic Volume of Goods Transported on RS Roads

(Unit: thousand tons)

2004	2005	2006	2007	2008	2009
506	576	960	1,310	1,548	1,397

Source: Documents from the Bureau of Statistics of RS

### 3.5 Sustainability (Rating: ③)

#### 3.5.1 Structural Aspects of Operation and Maintenance

The Public Company Republic of Srpska Roads is the Executing Agency at the time of the ex-post evaluation. As the Public Road Law was revised in 2004, the Road Department, Ministry of Transport until then was abolished and the Public Company Republic of Srpska Roads was established<sup>21</sup>. According to the Executing Agency, this organizational change was implemented without any major confusion or problem.

The organizational structure of the Executing Agency is comprised of three bureaus (Financial Bureau, Technical Bureau, and Legal Affairs Bureau) and twelve departments (Construction Department, Maintenance Department, Traffic Planning and Environmental Conservation Department, Finance Department, Accounting Department, and others) that are all under the Head of the Executive Bureau. The number of total staff is sixty-two at present, while it was fifty-nine at the time of the ex-ante evaluation.

Five staffs from the Maintenance Department are in charge of the maintenance work for the Doboj and Modrica Bridges. However, the actual maintenance work has been conducted by a private maintenance service company tasked by the department. The company's engineering

<sup>21</sup> The government of RS plays a role in the management of the council, the Executing Agency's decision-making body. Board members are appointed for the council that governs the personal affairs of the Head of the Executive Bureau.

supervisor is in charge of inspecting the work conditions<sup>22</sup>. Every four years, the Maintenance Department selects a private maintenance service company to improve maintenance work and quality.

Based on the above, it can be judged that there are no major concerns regarding the O&M structure of Dobož and Modrica Bridges.

### 3.5.2 Technical Aspects of Operation and Maintenance

The staff of the Public Company Republic of Srpska Roads has abundant work experience regarding O&M. They have participated in training programs once or twice a year that feature road O&M as well as the latest civil engineering theories and practices<sup>23</sup>, and have strengthened their work abilities so far. Additionally, OJT training for new staff is also conducted on an as-needed basis.

Based on the above, it can be judged that the technical level of the Executing Agency with regard to O&M is sufficient and there is no problem.

### 3.5.3 Financial Aspects of Operation and Maintenance

Table 6 indicates the Public Company Republic of Srpska Roads' actual maintenance costs for the last three years while the profit-and-loss statement (P/L) is shown in Table 7. In recent years, the actual maintenance costs tend to increase. According to the Executing Agency, there are sufficient funds in the budget<sup>24</sup> to conduct maintenance works for the Dobož and Modrica Bridges.

According to the P/L statement, the last three years have ended in the black. The maintenance costs mentioned above have been paid out of the operating expenses. Since profits (current term net profit: 9,134,000 KM) have still been secured even if the costs are paid out, it can be considered that there is no financial problem in this organization<sup>25</sup>.

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<sup>22</sup> Currently, all RS road maintenance works are being outsourced.

<sup>23</sup> Sponsors are mainly consulting firms and government ministries. Four staff in 2009 and six staff in 2010 participated in the respective two to three-day training courses.

<sup>24</sup> In RS, the law states that 4% of the indirect tax revenues must become the budget of the Executing Agency. Additionally, vehicle registration tax revenues and so forth are also deemed as financial resources.

<sup>25</sup> The amount of indirect tax revenues/operating income was high in 2008 because the special subsidy (20,521,000 KM) was paid by the RS government. This subsidy was used to construct and repair local roads in RS (a joint project with the local municipalities). As a result, it can be considered that the relevant year's operating and other expenses were also relatively high (100,848,000 KM).

Table 6: Record of the Public Company Republic of Srpska Roads' Maintenance Costs

(Unit: thousand KM)

2008	2009	2010
59,000	62,396	67,426

Source: Answers on questionnaires

Table 7: Public Company Republic of Srpska Roads' Profit-and-Loss Statement

(Unit: thousand KM)

	2008	2009	2010
Indirect tax revenues/operating income	87,431	76,406	72,865
Non-operating income/other earnings	22,552	16,298	14,598
Operating expenses/financial expenses	100,849	88,707	81,883
Current term net profit or loss	9,134	3,997	5,580

Source: Executing Agency's documents

Therefore, it can be judged that there is no special problem regarding the maintenance costs and organizational finances, and the finance level of O&M for the Executing Agency has no problems.

### 3.5.4 Current Status of Operation and Maintenance

There is no problem regarding the maintenance condition of the Dobož and Modrica Bridges. As stated previously, the maintenance works for both bridges are being conducted regularly by a private maintenance service company<sup>26</sup>. Their work performance and experience are sufficient. As a general rule, sewerage cleaning and side-ditch repairs of the connection roads to the bridges and the bridges themselves as well as asphalt repairs are conducted in the beginning and latter part of the winter season (a total of two times). Additionally, if the need arises, the asphalt is repaired and traffic lane lines are painted again (damaged guardrails as a result of accidents are dealt with immediately to the utmost extent). Maintenance and cleaning of ODA plaques, road signs are being conducted on a timely basis.

Equipment and spare parts of the bridges have been obtained appropriately whenever they need to be exchanged and repaired. The equipment and parts are not always kept in stock, but procured on an as-needed basis. Moreover, the maintenance manual is kept and utilized by the staff of the private maintenance service company.

In relation to the above, no major problems have been observed in the operation and maintenance system, therefore sustainability of the project effect is high.

<sup>26</sup> The employees of the private maintenance service company are in charge of the maintenance works of the roads and bridges, on a three-shift, twenty-four-hour system.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

At the time of the ex-post evaluation, it is evident that the project is consistent with policies such as development of transport infrastructure and developmental needs such as development of road network and its expansion. Although the project period was as planned, the project cost slightly exceeded the planned. The detour situation for heavy vehicles (20t or more) and traveling speed (design speed) have progressed as planned at the time of the ex-ante evaluation. Additionally, the beneficiary survey results show the positive impacts on the living conditions of residents in the adjacent areas of both bridges as well as on the working condition of carriers. Furthermore, no major problems have been observed in the operation and maintenance (O&M). In light of the above, this project is evaluated to be highly satisfactory.

### 4.2 Recommendations

None

### 4.3 Lessons Learned

Traffic volume data is important as a quantitative index in order to measure project effects of roads and bridges. Although future traffic volume was predicted for the Modrica Bridge at the time of ex-ante evaluation, it was not appropriate for this ex-post evaluation because the predicted figure is for 2020. Furthermore, as there is a difference between the measurement method on traffic volume at the time of the ex-ante evaluation and the method which the Executing Agency is now applying, it has been difficult to know the change of traffic volume referring the respective results. Therefore, at the time of ex-ante evaluation, it is desirable to set practical indicators considering the implementation of ex-post evaluation and the possibility of continuous measurement.



Bosnia and Herzegovina

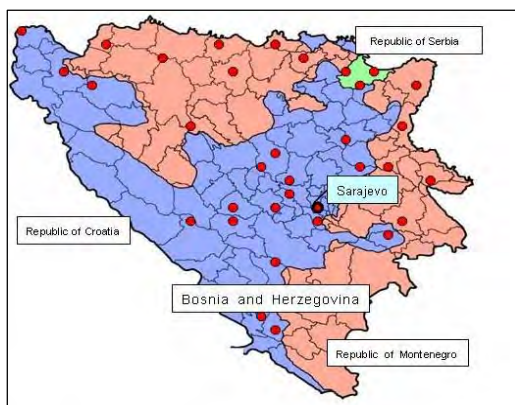
Ex-Post Evaluation of Japanese Grant Aid Project  
**Project for Improvement of Medical Equipment in  
Primary Health Care Institutions (Phase III)**

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

**0. Summary**

At the time of the ex-post evaluation, the improvement and enhancement of the health and medical sectors have been continuously regarded as important in the Federation of Bosnia and Herzegovina, Republic of Srpska, and Brčko District. Therefore, its relevance is high. In addition, output (procurement of medical equipment and renovation of X-ray facilities) was realized as planned. The project cost did not exceed the planned budget, and the project period did not go off the schedule. As a result of procuring medical equipment and renovating X-ray facilities, the number of radiation diagnoses and biochemical examinations is now more than predicted at the time of the ex-ante evaluation. Furthermore, through this ex-post evaluation survey, it was confirmed that the equipment has been used very frequently. Moreover, the beneficiary survey results show that the medical staff's level of satisfaction and the residents' degree of confidence in the health care institutions (DZ) are generally high. As for the sustainability, no major problems have been observed in the operation and maintenance system. In light of the above, this project is evaluated to be highly satisfactory.

**1. Project Profile**



Project Locations



Procured Medical Equipment  
(RTG Apparatus)

## 1.1 Background

In Bosnia and Herzegovina (hereinafter referred to as “BiH”)<sup>1</sup> in the 1990s, many primary healthcare institutions known as Dom Zdravlja (hereinafter referred to as “DZ”)<sup>2</sup> were affected by the interethnic conflicts and thus became non-functional. Aided by the World Health Organization (WHO), BiH formulated the “Health Sector Rehabilitation and Improvement Plan” in 1997, which focused on the primary healthcare (hereinafter referred to as “PHC”) program and established reform objectives comprised of (1) medical service and system reform, (2) functional improvement of medical institutions and optimum allocation of healthcare staffs, and (3) financial reform for healthcare. Including this plan, BiH was planning to improve function of primary healthcare institutions and increase its health budget. However, because the domestic health agencies faced chronic financial difficulties, the procurement of medical equipment as well as renovations of facilities did not progress. Therefore, procuring medical equipment and improving the functions of primary healthcare institutions and medical services were deemed as pressing issues.

## 1.2 Project Outline

The purpose of the project is to strengthen the preventive and diagnostic function at PHC (e.g., increase the diagnosis and examinations), targeting for the PHC institutions sustained damages from the interethnic conflicts, by procuring the medical equipment and renovating X-ray facilities; thereby contributing to improve the medical services and resident’s health condition.

Grant Limit Amount / Actual Grant Amount	1,273 million yen / 764 million yen
Exchange Date of Signature	November 2004 (first phase) December 2005 (second phase <sup>3</sup> )

<sup>1</sup> BiH is composed of the two entities (FBiH and RS) and Brcko District which belongs to the aforementioned two entities. The main industries are forestry and mining.

<sup>2</sup> Healthcare/PHC service facilities are primarily accessible, in general, to residents. There is one such facility in every administrative district (towns and villages). Generally, no beds are available, and diagnoses and medical care are mainly provided. The main departments are internal medicine, obstetrics and gynecology, psychiatry, etc., with emergency healthcare also available.

<sup>3</sup> The project was implemented, dividing into two phase, in accordance with the respective equipment items. It was planned and conducted that X-ray equipment for diagnostic imaging as well as image development equipment would be procured in the first half (2004), and clinical examination equipment, physiological function testing equipment, and emergency-related equipment were procured in the latter half (2005). Details are described in “3.2.1 Output” at Efficiency section.

Executing Agencies		Federal Ministry of Health (Federation of Bosnia and Herzegovina)
		Ministry of Health and Social Affairs (Republic of Srpska)
		Division of Primary Health Care, Department of Health (Brčko District)
Project Completion Date		November 2005 (first phase) December 2006 (second phase)
Project's Participants	Main Contractors	Shimazu International, Ogawa Seiki (first phase) Iwatani (second phase)
	Main Consultants	Matsuda Consultants/Inter Techno Center (JV)
Basic Design Study		February to March, 2004 (first phase) April to September, 2004 (second phase)
Detailed Design Study		N/A
Related Projects		Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase I: 1997)  Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase II: 1998) (Both projects are Japan's Grant Aid Project. <sup>4</sup> )

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Kenichi Inazawa, Evaluation Consultant, Octavia Japan Co., Ltd.

### 2.2 Duration of Evaluation Study

Duration of the Study: December 2010–November 2011

Duration of the Field Study: March 21–April 10, 2011 (first study)

July 1–9, 2011 (second study)

### 2.3 Constraints during the Evaluation Study

Through the field survey of this ex-post evaluation, detail data regarding local project costs,

<sup>4</sup> As a project prior to this project, medical equipment were procured through the "Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase I)" in 1997 for 27 DZ and "Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase II)" in 1998 for 25 DZ.

which the BiH side had to owe, were not obtained. Therefore, the actual precise costs were not judged, at Efficiency section.

### 3. Results of the Evaluation (Overall Rating: A<sup>5</sup>)

#### 3.1 Relevance (Rating: ③<sup>6</sup>)

##### 3.1.1 Relevance with the Development Plan of Bosnia and Herzegovina

In BiH, strengthening PHC and streamlining the health sector by adopting Family Medicine<sup>7</sup> were advocated in the Poverty Reduction Strategy Paper (PRSP) written in 2004 at the time of the ex-ante evaluation. As for the action plans of PRSP, the enhancement of health and medical sectors was regarded as important, and improving the function of DZ facilities and increasing the amount of the health budget were planned.

Even at the time of the ex-post evaluation, improving and enhancing the health and medical care sectors has been regarded as important. The Federal Ministry of Health, Federation of Bosnia and Herzegovina (hereinafter referred to as “FBiH”) formulated “Federation of Bosnia and Herzegovina Healthcare Maintenance Strategy Plan” (2008–2018) in April 2008, aiming to modernize the level of medical care including medical equipment, improve quality, and change views on costs. In the Republic of Srpska (hereinafter referred to as “RS”), the government formulated the “Republic of Srpska Medical Policy and Strategy Program” (2002–2010), before at the time of the ex-ante evaluation, and it is now scheduled to be revised and continued. In addition, upgrading medical facilities and equipment, and educating healthcare staff are regarded important. In Brčko District, although specific medical programs and plans have not been formulated, currently the Brčko City Council is deliberating on a bill that aims to functionally and systematically improve primary and secondary healthcare institutions.<sup>8</sup>

Since the development and enhancement of the medical sector have been continuously recognized as important, the consistency of policies and measures with this project both at the time of the ex-ante evaluation and the ex-post evaluation can be recognized.

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<sup>5</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>6</sup> ③: High, ②: Fair, ①: Low

<sup>7</sup> It is a medical system and concept that provide care by treating patients holistically (psychologically and socially), examine families as a whole, maintain a high level of closeness for patients when providing care and enable promotion of health and disease prevention through care that includes medical care, health and welfare. It is more or less compared with major hospital-oriented healthcare.

<sup>8</sup> Secondary healthcare institutions mainly refer to general hospitals. Namely, they are major general healthcare institutions with beds available that are larger in size than primary healthcare institutions. In many cases, they also have special departments which are not available at the primary healthcare institutions. They are recognized as canton (prefectural)/regional level healthcare institutions.

### 3.1.2. Relevance with the Development Needs of Bosnia and Herzegovina

At the time of the ex-ante evaluation, there was a lack of medical equipment because approximately 30% of the primary healthcare institutions sustained damage from the interethnic conflicts. Moreover, respective health and medical agencies (Executing Agencies of the project) such as the Federal Ministry of Health (FBiH), the Ministry of Health and Social Affairs (RS), and the Division of Primary Health Care of the Department of Health (Brčko District) could not afford to procure medical equipment, because they were facing financial difficulties. Therefore, needs from primary healthcare institutions with regard to procuring medical equipment were considered to be high.

Meanwhile, at the time of the ex-post evaluation, the needs have been high on promoting Family Medicine, improving management abilities at medical institutions, and training medical staff, in addition to improving the function of PHC institutions. These not only realize improvement of the tangible aspect (i.e., procuring equipment) but also put effort into the intangible aspect, which aims to improve the comprehensive medical service. Therefore, the needs related to improvements of healthcare service continue to be high.

Therefore, even at the time of the ex-post evaluation, since the improvement of the PHC's function and service in BiH has continuously been regarded as important, it can be said that this project is consistent with developmental needs both at the time of the ex-ante evaluation and the time of the ex-post evaluation.

### 3.1.3. Relevance with Japan's ODA Policy

Japan has sufficient experiences engaging in humanitarian assistance for BiH during and after the interethnic conflicts. At the Conference of Supporting Nations in April 1996, Japan expressed its policy of pledging approximately US\$500 million in aid to BiH over a period of 4 years from 1996 to 1999. So far, Japan also has been proactively offering its support in the medical and health sectors from the standpoint of supporting the recovery of BiH. This project has been requested as one to follow the "Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase I)" (1997) and the "Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase II)" (1998), making it Phase III. Therefore, it is said that it is also consistent with Japan's aid policy.

This project has been highly relevant with Bosnia and Herzegovina's development plan and development needs, as well as to Japan's ODA policy, therefore, its relevance is considered high.

## 3.2 Efficiency (Rating: ③)

### 3.2.1 Project Outputs

Through this project, X-ray, ultrasound, physiological examination, clinical examination equipment, ambulance vehicles, etc. were procured. Renovations of X-ray examination rooms were also implemented. 33 DZ received medical equipment (18 DZ in FBiH, 12 DZ in RS, and 3 DZ in Brčko District),<sup>9</sup> while door/window openings were renovated in 23 of the 33 DZ.

The planned and actual outputs of the project are shown in Table 1. Outputs from Japan's side were implemented as planned, and the procurement process was implemented in two phases. In the first half (2004), X-ray photography equipment and film processing machines were procured, and X-ray facilities were renovated, while equipment for ultrasound diagnoses, physiological/laboratory examinations, and emergency measures were mainly procured in the latter half (2005).<sup>10</sup> Outputs from BiH's side, which were renovation of the door/window openings in X-ray examination rooms, were also implemented as planned. There is no additional output.

Table 1: Planned and Actual of the Outputs of the Project

Plan at the Time of the Ex-ante Evaluation	Actual at the Time of the Ex-post Evaluation
<b>【Japan's Outputs】</b>	
<u>All 21 Items (number of items scheduled to be procured):</u> RTG apparatus (30), Film X-ray development machine (26), Ultrasound (29) Spirometer (23) <sup>11</sup> , Electrocardiographs (ECG) (29), Biochemistry analyzer (10) <sup>12</sup> , Spectrophotometer (18) <sup>13</sup> , Blood cell counter (22), Microscope (24), Centrifuge (32), Sterilizer (27), Balance (25), Destilator (29), Washing machine for lab glassware (10), Ambulance vehicle (29), Defibrillator (25), Reanimation set (33), Laryngoscope (28), Aspirator (28), X-Ray sealed door	<u>First Half: All 4 Items (actual procurement):</u> RTG apparatus (30), Film X-ray development machine (26), X-Ray sealed door (900W:17, 600w : 15), Monitor Window (600w : 8, 900w : 18) <u>Latter Half: All 17 Items (in parentheses: actual procurement):</u> Ultrasound (29), Spirometer (23), Electrocardiographs (ECG) (29), Biochemistry analyzer (10), Spectrophotometer (18), Blood cell counter (22), Microscope (24), Centrifuge (32), Sterilizer (27), Balance (25), Destilator (29),

<sup>9</sup> Only ballpark figures can be used in terms of the total population covered by DZ at the time of the ex-post evaluation because exact statistics do not exist. Nevertheless, according to the respective Executing Agencies, the figures are as follows: approximately 1.08 million to 1.26 million people in FBiH, approximately 674,000 people in RS and approximately 85,000 people in Brčko District. Assuming the present total population of approximately 3.7 million in BiH, it can be considered that the population ratio covered by the project is 50 to 55%. However, it should be taken into consideration that the total population is not accurate, because a census has not been conducted in the country since 1991. The total number of DZ in BiH is 131.

<sup>10</sup> Before the project implementation, diagnostic imaging by X-ray photography at the respective DZ was far from satisfactory and so its priority and urgency were relatively high. Therefore, it was determined to procure the X-ray related equipment in the first half and procure clinical examination and emergency equipment in the latter half.

<sup>11</sup> Used for health examinations or to diagnose patients suspected of respiratory diseases.

<sup>12</sup> Examine the functions pertaining to blood and urine in kidneys, liver, etc. through automatic operation.

<sup>13</sup> Examine the functions pertaining to blood and urine in kidneys, liver, etc. through manual operation.

(900W:17, 600W : 15), Monitor Window (600W : 8, 900W : 18)	Washing machine for lab. glassware (10), Ambulance vehicle (29), Defibrillator (25), Reanimation set (33), Laryngoscope (28), Aspirator (28)
<b>【BiH's Outputs】</b>	
Repair work that includes renovating door/window openings, removing existing walls, constructing new walls, relocating wiring and pipes, setting up air vents and lights, securing power source and insulating existing walls (for 23 DZ among a total of 33 that requested renovations or were deemed to be in need of repairs).	Implemented as planned (Implemented at the first phase)

Source: JICA documents, Answers on questionnaires

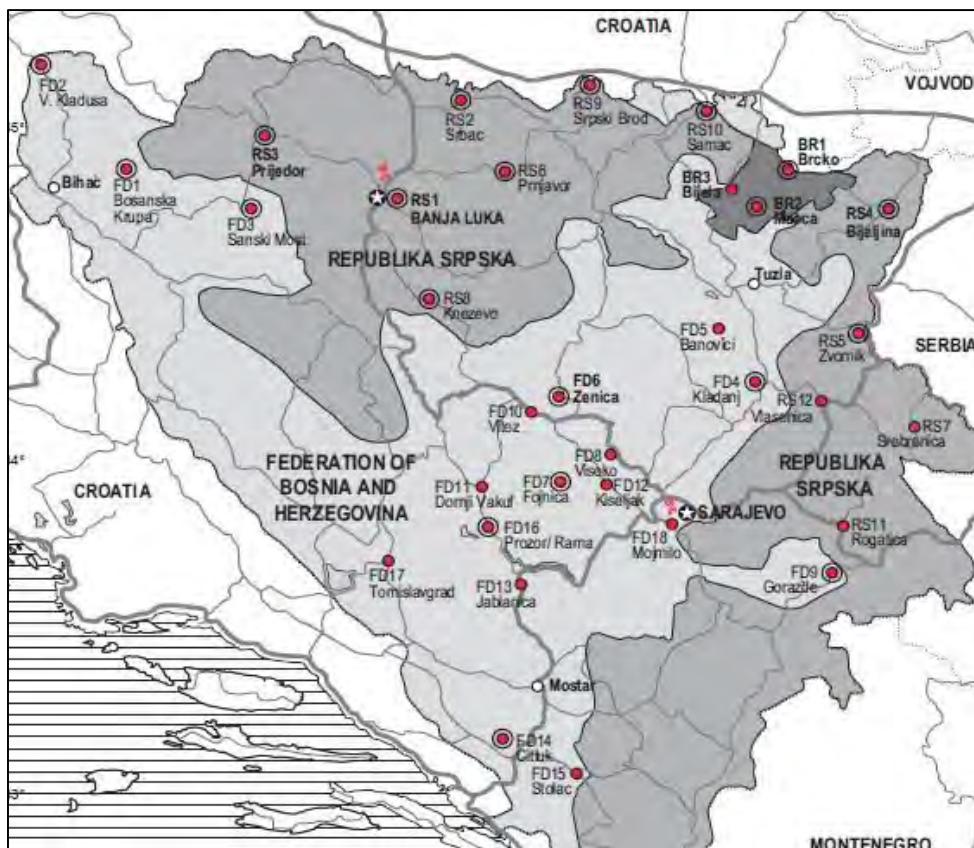


Figure 1: Project Site<sup>14</sup>

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Period

<sup>14</sup> Cited from JICA document (Basic Design Study Report). As for the approximate size of DZ in the figure, ○ indicates relatively large DZ (e.g., the number of medical staff is more than approx. 100.), ○ indicates relatively small DZ (e.g., the said number is less than approximately 100).

The planned period at the time of the ex-ante evaluation was 26 months, while the actual period was exactly the same as planned (26 months: 100% of the plan) from November 2004 to December 2006<sup>15</sup>. The periods pertaining to bidding, contract and procurement implementation are indicated as follows.

Table 2: Actual Project Period

Bidding/Contract/Detail Design (1/2 phase)	November 2004 to March 2005
Procurement/Installation (1/2 phase)	April 2005 to November 2005
Bidding/Contract/Detail Design (2/2 phase)	December 2005 to June 2006
Procurement/Installation (1/2 phase)	June 2006 to December 2006

### 3.2.2.2 Project Cost

The total planned project cost was 1,299 million yen (with the E/N amount limit of 1,273 million yen and approximately 25 million yen as BiH's portion), while the total actual amount was approximately 794 million yen (with Japan's portion of 764 million yen and BiH's portion of approximately 30 million yen). Thus, the actual cost was lower than planned. The reason why the actual cost became lower is that competitive biddings were conducted when procuring the medical equipment and in fact the contracts were efficient, providing lower prices than expected. The reason why the actual amount of BiH's portion was "approximately 30 million yen," is that because seven DZ<sup>16</sup> have not recorded the cost data, the whole BiH's portion could not be precisely calculated<sup>17</sup>. Nevertheless, as the BiH's portion was only used for renovating X-ray examination rooms, it can be thought that the actual amount is not too large.<sup>18</sup> In fact, as the BiH's portion in the whole project cost is relatively small, it can be speculated that the whole actual cost would have not exceeded the planned value, even if BiH's portion have exceeded the planned value.

Thus, the project cost was lower than planned and the project period was as planned,

<sup>15</sup> Regarding which no delay for the project period occurred, the Executing Agencies commented "Japan and the local counterpart (i.e., BiH's agencies) worked together cooperatively in promoting the project avoiding delays". They also commented that, "Although there were many sites and lots of time had to be spent for adjustments and procedures, it was great that both parties deepened their partnership avoiding any delay. It was fine that everything went smoothly in fact."

<sup>16</sup> The seven DZ are from FBiH and Brčko District.

<sup>17</sup> "Approximately 30 million yen" indicates the total amount confirmed virtually.

<sup>18</sup> According to the interviews with DZ, the actual amount seems a bit higher than the planned 25 million yen of BiH's portion.



therefore efficiency of the project is high.



Figure 2: Renovated Monitor Window and X-ray Sealed Door (X-ray Room) (Banja Luka, RS)



Figure 3: RTG Apparatus (Banja Luka, RS)

### 3.3 Effectiveness (Rating: ③)<sup>19</sup>

#### 3.3.1 Quantitative Effects

##### 3.3.1.1 Results from Operation and Effect Indicators

Throughout the project, it was expected that highly precise examinations and accurate diagnoses would realize at the PHC institutions, by procuring medical equipment and renovating X-ray examination rooms. Specifically, the numbers of radiodiagnoses, ultrasonography tests, biochemical tests, physiological examinations, and number of patients transferred to the DZ as well as number of patients transferred to higher levels' medical institutions were expected to increase. The following data indicate respective diagnoses and examinations.

Table 3: Number of Respective Diagnoses and Examinations at PHC Institutions (total of 33DZ)

Effect Indicators	Predicted Values <sup>20</sup>	2009	2010
Number of Radiodiagnoses	More than 14,000 per month	17,798 per month	20,672 per month

<sup>19</sup> The result of "Impact" in the following section is included in this "Effectiveness" section for the purpose of rating.

<sup>20</sup> The predicted values at the time of the ex-ante evaluation were based on the values actually achieved before the project implementation (2004), according to JICA's document "Basic Design Study Report". The forecast after the project completion considered an "achievement larger than the values actually achieved in 2004 as the project's outcome goal (i.e., attaining quantitative effects)." This was because, at the time of the ex-ante evaluation, it was not clear how many refugees due to the interethnic conflicts would be returning home in the future while population outflow was also estimated. Therefore, future prospects on numbers of diagnoses and examinations were difficult to determine. (In other words, it cannot be avoided that an index of "more than the current value" was set.)

Number of Ultrasonography Tests	More than 9,500 per month	11,551 per month	12,224 per month
Number of Biochemical Tests	More than 82,000 per month	335,816 per month	334,381 per month
Number of Physiological Examinations	More than 16,000 per month	225,369 per month	230,524 per month
Number of Patients Transferred to the DZ as well as Number of Patients Transferred to Higher Levels' Medical Institutions	More than 3,000 per month	N/A	N/A

Source: JICA documents (predicted figures at the time of the ex-ante evaluation), Answers on questionnaire (results from submitted data by 33 DZ in 2009 and 2010)

The analysis of difference and review of the numbers pertaining to the above-mentioned respective diagnoses and examinations are explained below. In addition, as explained later in 3.4.1.1, because the number of patients visiting DZ has increased in recent years, it is necessary to consider that the increase has somewhat affected the increase of diagnoses and examinations shown in Table 3.

#### 1) Number of Radiodiagnoses and Ultrasonography Tests

The number of radiodiagnoses is steadily increasing. Both the procurement of X-ray photography equipment, film processing machines, etc and the renovation of X-ray-sealed doors have become major contributing factors and it seems that the number of examinations has been on the rise. Compared to the time of the ex-ante evaluation, the number of ultrasonography tests has also increased. It can be assumed that the increase in the number of procured and installed ultrasonographs is the major factor.

#### 2) Number of Biochemical Tests

The basis for the predicted values at the time of the ex-ante evaluation was as the “monthly number of tests (82,417 tests) conducted through the use of biochemical analyzers and spectrophotometers.”<sup>21</sup> The actual data at the time of the ex-post evaluation have exceeded greatly the predicted values. According to interviews with DZ, the reasons are explained as follows; 1) Biochemical analyzers examine liver functions through automatic operation. Procuring a large amount of the equipment boosts the efficiency of tests, significantly increasing items and the number of tests, 2) In order to analyze proteins, reagents are necessary when conducting biochemical tests. At the time of the ex-ante evaluation, they were not sufficiently secured, and the number of tests also remained low. However, there are enough reagents at every DZ and the number of tests has increased using the sufficient reagents. In addition, the

<sup>21</sup> Based on the JICA document (Basic Design Study Report). The same goes for the number of physiological examinations.

number of tests is increasing greatly, because the biochemical analyzers have also been newly procured. Therefore, it is evident that medical equipment is being properly used while medical practice needs are appropriately met.

### 3) Number of Physiological Examinations

The basis for the predicted values at the time of the ex-ante evaluation is the “monthly number of examinations (15,626 examinations) conducted through the use of electrocardiographs (ECG) and spirometers.” In this case as well, the actual data at the time of the ex-post evaluation has greatly exceeded the predicted values. According to interviews with DZ, the reasons are explained as follows; 1) At the time of the ex-ante evaluation, the 33 targeted DZ did not have any spirometers, which could have been in use. Many DZ were conducting health diagnoses almost exclusively by ECG. As a result, the number of physiological examinations was low. However, because spirometers have been newly procured through this project, the number has significantly increased at many DZ, 2) Mining is one of main industries in BiH and there are many coal miners. There are many whose lung functions have become worse and many also suffer from respiratory diseases caused by dust, smoke and soot. Therefore, spirometers and ECG used to diagnose the conditions are indispensable and the frequency of their use is relatively high. In other words, needs of medical practice have been met, by procuring spirometers and ECG. It can be said that this project has contributed to the treatment and promotion of patients’ health.

### 4) Number of Patients Transferred to the DZ as well as Number of Patients Transferred to Higher Levels’ Medical Institutions

It was difficult to obtain and analyze the actual data, because many DZ have not been measuring it. Nevertheless, according to interviews with four DZ, the ambulance vehicles procured by the project have been in use sufficiently and the number of patients transferred to the DZ as well as to higher levels’ medical institutions has increased compared to six or seven years ago, the time prior to project commencement. Moreover, as mentioned below, because the procured ambulance vehicles have high mileage, it can be speculated that the numbers of patients transferred to the DZ as well as to higher levels’ medical institutions are higher than the predicted values.

### 5) Mileage of Ambulance Vehicles

In terms of the usage condition of other procured medical equipment, ambulance vehicles (i.e.,

a fairly expensive procurement) are discussed here. Table 4 shows the actual mileage until the beginning of April 2011, regarding the three new ambulance vehicles procured in Brčko District in 2006.

Table 4: Mileage of Ambulance Vehicles in Brčko District

Ambulance No.1	Ambulance No.2	Ambulance No.3
172,965 km	125,679 km	126,825 km

*Source:* 3DZ from Brčko District (Brčko, Maoca, Bijela)

According to interviews with ambulance drivers, “about more than half of the durable travel distance (assumed to be 200,000 to 250,000 km) perhaps have been driven, but conditions are good without any major failure so far. We feel that we can transport patients without any worry.” The ambulance vehicles were procured in 2006. As for the distance traveled, approximately 30,000 km to 40,000 km per vehicle is the annual average, while the daily average is approximately 80 km to 110 km per vehicle. It can also be speculated that they are heavily used as important means to transfer patients to DZ and to higher levels’ medical institutions.

### 3.3.2 Qualitative Effects (Improving X-ray Protective Environments)

Through visiting a few DZ, it was confirmed that X-ray equipment has been highly used in X-ray examination rooms and its protective environments have improved. Although project effects from procuring new X-ray examination equipment are large, renovation works of X-ray protective doors and operating windows have also raised security in medical practice sites as well as protected X-ray leakage. X-ray technicians working at the sites have given positive comments such as, “There were many troubles before the project implementation, because of deterioration and degradation of the old equipment. However, after the new equipment were procured, no troubles and accidents have been occurred any more in actual examinations, and we are also satisfied with the equipment’s performance. Patients’ needs for X-ray examination have been met. Examinations have been performed swiftly. If maintenance conditions are good, the equipment can be used for many years.” Visiting medical practice sites (checking X-ray protective environments) and judging the aforementioned comments, it can be assured that the project has improved respective DZs’ protective environments regarding X-ray examinations and its safety conditions at the sites have become better.

Therefore, this project has largely achieved its objectives, therefore its effectiveness is high.



Figure 4: External View of DZ (Kiseljak, FBiH)



Figure 5: X-ray Apparatus in Room (Zenica, FBiH)

### 3.4 Impact

#### 3.4.1 Intended Impacts

##### 3.4.1.1 Trends in the Number of Patients at Primary Healthcare Institutions

As shown in Table 5, the number of patients visiting the 33 targeted DZ is on the rise. According to interviews with the respective Executing Agencies as well as some DZ executives, the following comments were obtained as the contributing factors of the increase; 1) In recent years, enforcement and improvement of PHC's function have progressed as a series of medical system reform, 2) Cancer, diabetes, lifestyle-related diseases caused by changes in dietary habits, and stress in the workplace and society have been increasing, and 3) As a result of procuring medical equipment and renovating facilities, appropriate diagnoses and improved medical services have been realized. Therefore, multiple contributing factors have been pointed out. Although it may be difficult to find out the direct relation of cause and effect between the increase in the number of patients and this project, at least this project has helped the patients develop stronger trust in DZ. At the same time, the project will be a core position for Family Medicine and will also prepare for modern-day illnesses that are on the rise.

Table 5: Number of Patients Visiting the 33 Targeted DZ

(Unit: thousand people)

	2005	2006	2007	2008	2009	2010
18 DZ from FBiH	1,563	1,745	1,851	2,036	2,129	2,316
12 DZ from RS	1,228	1,886	2,152	2,495	2,714	2,769
3 DZ from Brčko District	300	379	378	382	417	490

Source: Answers on questionnaire (results from submitted data by 33 DZ)

### 3.4.1.2 Implementation of Beneficiary Survey

Throughout this survey, an interview-style beneficiary survey was conducted, targeting for DZ's medical staff (doctors, nurses, medical technicians, etc.) and for patients visiting DZ.<sup>22</sup> Due to the time and budget constraints, only four out of the 33 DZ were selected. The targeted DZ were as follow; 1) Banja Luka (RS), 2) Zenica and 3) Kiseljak (FBiH), and 4) Brčko (Brčko District).<sup>23</sup> Figures 6 to 9 show the beneficiary survey results, and the respective results are reviewed.

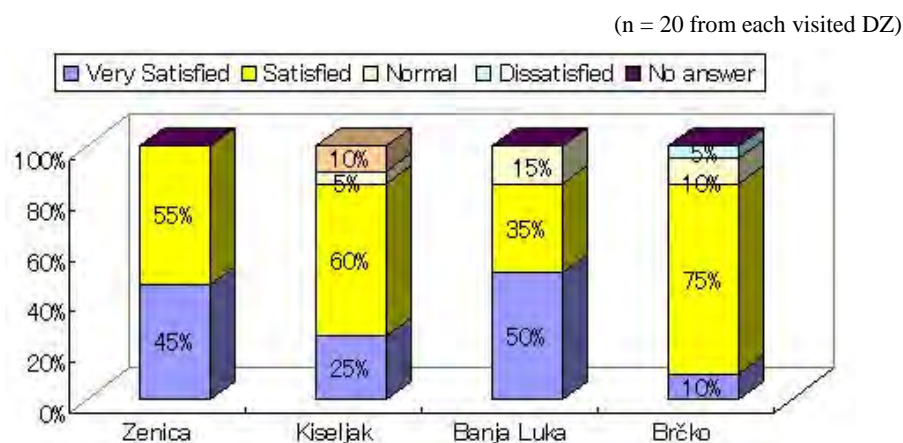


Figure 6: Are you satisfied with the procured medical equipment?

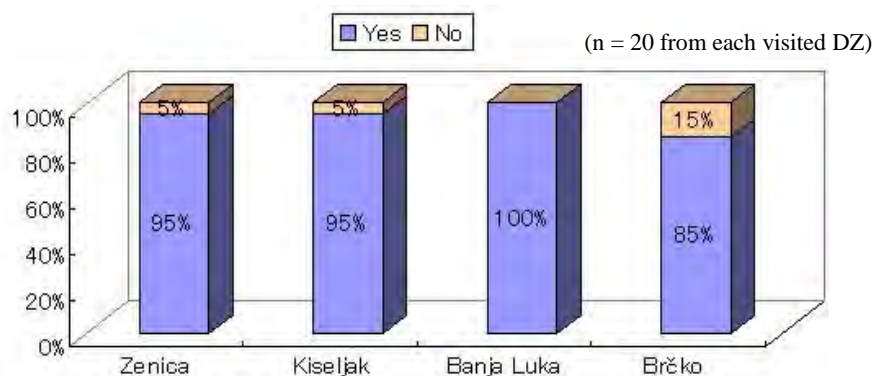


Figure 7: Do you think that DZ has been used by the local residents more than before?

<sup>22</sup> The sample size is 120, consisting of 20 medical staff at respective DZ (x 4 DZ) and 10 patients visiting DZ (x 4 DZ). The number itself was selected by random sampling.

<sup>23</sup> As for the selection criteria, 1) select one DZ from two entities (FBiH and RS) and Brčko District, 2) size of DZ facilities, and 3) ethnic balance were considered. As for 1), one or more DZ was selected without fail. As for 2), size balance was considered based on the following: (i) Banja Luka and (ii) Zenica were fairly large in size while (iii) Kiseljak was of small scale and (iv) Brčko was medium-sized. As for 3), it was considered that there were many Serbians in (i) Banja Luka, many Bosnians in (ii) Zenica, and many Croats in (iii) Kiseljak, while those in (iv) Brčko were of mixed race.

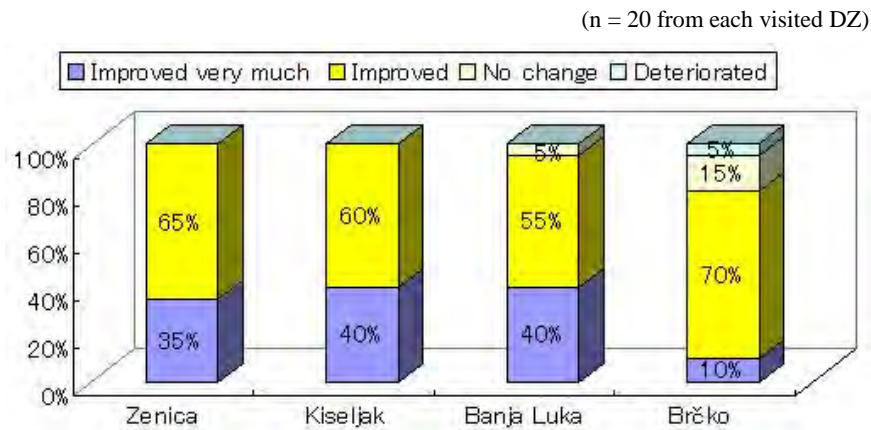


Figure 8: Compared to the time prior to project commencement, do you think that residents' health conditions have improved?

Many respondents answered that they were either “Very Satisfied” or “Satisfied” for the question addressing satisfaction in Figure 6. As for the reasons, a relatively large percentage of the respondents pointed out the safety improvement regarding use of medical equipment and the reduction of time regarding diagnosis and examinations. In Zenica and Banja Luka, a high percentage of the respondents replied “Very Satisfied.” The reason behind this can be speculated that the numbers of medical staff and patients visiting the institutions for both DZ are relatively high while medical equipment usage is also high accordingly and the needs of the medical staff are being met well. As for Figure 7, the results can be answers and evidences to back up those shown in Table 5. It is also evident that even the medical staffs themselves feel that the local residents have developed stronger trust in DZ. In addition, Figure 8 shows that many replied “Improved very much” or “Improved”. It is assumed that DZ’s functional improvements have progressed combined with project effects and thus positive results have been given, indicating that the residents’ health is showing a trend toward improvement.

Furthermore, another interview-style beneficiary survey was also conducted, targeting for patients visiting the DZ. The answers were obtained as shown in Figure 9. A relatively large percentage of the respondents pointed out the “quality and level of diagnoses improved” and “diagnostic time became faster.” Therefore, it can be determined that the residents’ trust in DZ is generally strong.

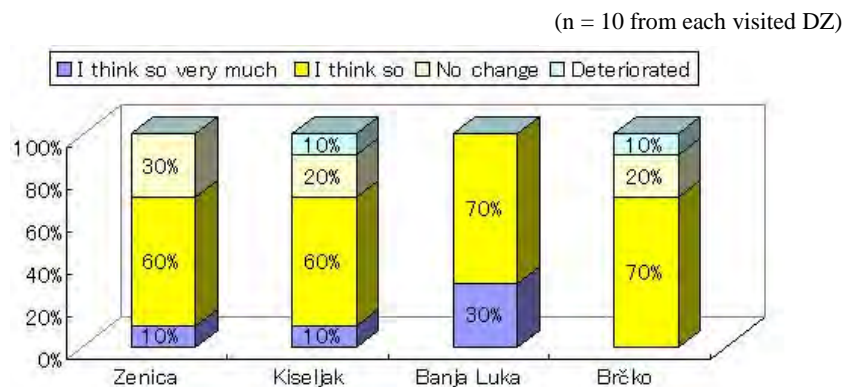


Figure 9: Do you think that DZ's medical services have improved compared to the time prior to project commencement?

### 3.4.2 Other Impacts

#### 3.4.2.1 Impacts on the Natural Environment

There is no negative impact on the environment caused by the project. No negative impact on the natural environment was confirmed even through the interviews with respective Executing Agencies and DZ managers.

At the time of the ex-ante evaluation, no regulation concerning the treatment of medical wastes was established in BiH. Although regulations stipulated from the former Yugoslavia were still valid from a legal standpoint, the former regulations did not include any provision with regards to liquid waste disposal of film processing. Only major institutions among all DZ were sending used developing fluids and fixing solutions to professional companies (silver recycling agents). In some cases, the fluids and solutions were directly dumped in the sewage. Thus, it was deemed necessary as future measures to establish a provision that required waste fluids of film processors to be independently collected and handled by professional companies as industrial wastes.

Meanwhile, it has been confirmed through this survey that regulation regarding medical wastes including the treatment of waste fluids of film processors has been enacted in FBiH since 2008. According to the Executing Agency, professional companies are now treating the wastes based on the new regulation. In Brčko District, although no regulation has particularly been established, the respective DZ are following guidelines of hospitals (secondary healthcare institutions) related to medical wastes, and thus the wastes are handled by professional companies. As for RS, the situation concerning treatment of the above-mentioned waste fluids



of film processors has not changed. Nevertheless, according to the Executing Agency, they are currently trying to establish guidelines regarding medical waste treatment including the waste fluids. In the near future, it can be considered that the waste fluids will be treated properly, however, it is necessary to watch the transition and change for the time being.



Figure 10: Biochemical Analyzer (Brčko, Brčko District)



Figure 11: Film X-ray Development Machine with Waste Fluid Container (Zenica, FBiH)

### 3.5 Sustainability (Rating: ③)

#### 3.5.1 Structural Aspects of Operation and Maintenance

The Executing Agencies of this project are the Federal Ministry of Health in FBiH, Ministry of Health and Social Affairs in RS, and Division of Primary Health Care, Department of Health in Brčko District.

As for the budgetary structure of the respective DZ, the maintenance budget in FBiH is allocated from the canton government<sup>24</sup> (prefectural level) to all DZ in the entity. Each DZ uses the budget to consign the maintenance works of medical equipment to private service agents. In RS, local governments in the entity allocate the maintenance budget to the respective DZ and, as is the case with FBiH, the DZ consign the maintenance works to private service agents. In Brčko District, the maintenance budget is allocated from the Division of Primary Health Care to the respective DZ, and the respective DZ consign the maintenance works to private service agents. Through interviews with DZ's managers, it was confirmed that no problem was found with regard to the process to consign the private service agents and administrative structure.

The Ministry of Health and Social Affairs in RS has currently been unifying the needs for DZ's medical equipment and is planning to establish the Medical Equipment Management

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<sup>24</sup> There are 10 cantons in FBiH.

Center (tentative name), which aims to use and operate medical equipment efficiently. Should this center be established, it can be expected that maintenance costs for medical equipment will be reduced in the future.

Therefore, it can be determined that no problem exists regarding the O&M structure of the targeted DZ of this project.

### 3.5.2 Technical Aspects of Operation and Maintenance

In terms of the DZ (Zenica, Kiseljak, Banja Luka, and Brčko), it was confirmed that trainings regarding medical equipment operation<sup>25</sup> (e.g., operational procedures of X-ray equipment and equipment for ultrasound diagnoses) as well as practical training regarding emergency delivery of pregnant females have been conducted. Internal training and OJT training for new staff have also been conducted on an as-needed basis. Furthermore, through interviews, it was confirmed that the medical staff’s technical level regarding use of the medical equipment was sufficient.

Therefore, it can be determined that no problem exists regarding the O&M technical level of the targeted DZ of this project.

### 3.5.3 Financial Aspects of Operation and Maintenance

The healthcare finance in BiH is mainly funded by the Health Insurance Fund.<sup>26</sup> This fund plays a central role in paying diagnosis and treatment costs, facility and equipment maintenance, healthcare staff salaries, and so on. Table 6 shows the current years’ total budget (top) and amount expended from the Health Insurance Fund.

Table 6: Total Budget of the Target DZ of the Project (top)/  
Amount Expended from the Health Insurance Fund (bottom)<sup>27</sup>

(Unit: thousand KM)

	2007	2008	2009	2010
DZ from FBiH	N/A	49,209	50,773	50,832
	N/A	38,045	40,159	41,081
DZ from RS	45,139	52,737	62,943	N/A
	33,096	38,701	52,541	N/A
DZ from Brčko District	N/A	7,356	8,232	8,283
	N/A	4,966	4,593	4,763

Source: Health Insurance Fund, Executing Agency’s document, Target 33 DZ

<sup>25</sup> Many DZ staff also commented; “When medical equipment were procured and installed, the consultant and contractor from Japan came to offer explanation and guidance regarding equipment operation. It has been very helpful for us to conduct daily operations.”

<sup>26</sup> Basically, the fund resource comes from imposed tax based on the earnings of both individual and corporate. The insurance ratio is set along with economic fluctuation. Currently, the ratio is 9% in FBiH, 11.5% in RS, and 12% in Brčko District.

<sup>27</sup> Only 14 out of 18 DZ from FBiH actually answered. All DZ from RS and Brčko District answered.

As shown in Table 6, it can be judged that the Health Insurance Fund's proportion in the total budget is high, implying the main financial source for all the DZ. In addition, both the total budget and the amount expended from the insurance fund are generally on the rise. Furthermore, according to the respective Executing Agencies, the budget that the DZ regards as necessary has been allocated in general, and maintenance costs for medical equipment have basically been covered.<sup>28</sup> Moreover, the DZ managers also commented; "There are no overdue maintenance costs. No major concern exists in generating the money".<sup>29</sup> As shown in Section 3.5.4 "Current Status of Operation and Maintenance", because medical equipment procured by this project has been in use without problem even at the time of the ex-post evaluation as well as maintenance works have been conducted sufficiently, it is likely that no major problems will exist, regarding the O&M financial aspects.

Therefore, it can be determined that no particular problem exists regarding the budgetary or financial aspect of the targeted DZ and that no problem also exists concerning the O&M financial level.

#### 3.5.4 Current Status of Operation and Maintenance

No concern exists regarding the O&M status of medical equipment procured through the project. As mentioned earlier, the equipment has been maintained by private service agents. Although the maintenance works should be conducted depending on the item and service life of the medical equipment, regular inspections and maintenance works are performed appropriately based on the information in the medical equipment ledger.<sup>30</sup> Even at the DZ (Zenica, Kiseljak, Banja Luka, and Brčko), it was judged that no particular problems exist regarding the equipment's operation and condition of usage.

Procuring and storing spare parts are not conducted on a regular basis. The medical equipment parts are basically not stocked at all times but private service agents visit the respective DZ for regular inspections and, whenever needed, replace or install the parts. Meanwhile, it was confirmed that the manual necessary for O&M has been kept appropriately.

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<sup>28</sup> It was difficult to obtain the detailed breakdown of the maintenance costs.

<sup>29</sup> It is expected that costs necessary to renew medical equipment will also be secured in the future. Basically, they will be purchased using the budget of cantons or local governments, subsidies from the central government, etc. According to interviews in the survey, comments were also obtained such as; "Considering the present allocated budget amount, budgets to purchase equipment for renewals will not be insufficient, although this is only what is being estimated at this point."

<sup>30</sup> The ledger contains detailed records of the medical equipment's service life and storage conditions. Basically, depreciation is determined from the ledger's records to decide the time when the maintenance works or parts should be conducted or exchanged. In terms of ambulance vehicle, for example, a regular inspection is conducted for every 10,000 km traveled and procedures such as oil change are conducted.



Figure 12: Ambulance Vehicle  
(Brčko, Brčko District)



Figure 13: Ultrasound  
(Kiseljak, FBiH)

In relation to the above, no major problems have been observed in the operation and maintenance system, therefore sustainability of the project is high.

#### 4. Conclusion, Lessons Learned, and Recommendations

##### 4.1 Conclusion

At the time of the ex-post evaluation, the improvement and enhancement of the health and medical sectors have been continuously regarded as important in the Federation of Bosnia and Herzegovina, Republic of Srpska, and Brčko District. Therefore, its relevance is high. In addition, output (procurement of medical equipment and renovation of X-ray facilities) was realized as planned. The project cost did not exceed the planned budget, and the project period did not go off schedule. As a result of procuring medical equipment and renovating X-ray facilities, the number of radiation diagnoses and biochemical examinations is now more than predicted numbers at the time of the ex-ante evaluation. Furthermore, through this ex-post evaluation survey, it was confirmed that the equipment has been used very frequently. Moreover, the beneficiary survey results show that the medical staff's level of satisfaction and the residents' degree of confidence in the health care institutions (DZ) are generally high. As for the sustainability, no major problems have been observed in the operation and maintenance system. In light of the above, this project is evaluated to be highly satisfactory.

##### 4.2 Recommendations

(Recommendation to Executing Agency)

Although RS is currently working on the guideline for medical wastes, it is desirable to speed up the enactment process. This is because ensuring the management and treatment of medical wastes by preparing and complying with the guideline directly contribute to the improvement

of DZ's medical services and the region's environment.

#### 4.3 Lessons Learned

Considering the fact that it was somewhat difficult to obtain BiH's actual project cost, it would be desirable for the Executing Agencies and the respective DZ to keep records appropriately since the project commencement. Moreover, it is also important to discuss and agree with the data collection method between the recipient side and Japan's side to facilitate the evaluation and monitoring..