

Country Name	Project on Development of Integrated System for Prevention and Early Warning of Forest Fires
The Former Yugoslav Republic of Macedonia	

I. Project Outline

Background	<p>Rate of occurrence of forest fires was high in Macedonia. In order to carry out prevention and early warning of forest fires properly, it was necessary to centrally manage information at Crisis Management Center (CMC), an independent administrative organization established under Crisis Management System (CMS) of the government of Macedonia, from which analysis results and recommendations based on such information should be reported to the decision-making body of the CMS. At the time of outbreak of large-scale forest fires, prompt issuance of instructions to the relevant institutions and public as well as well-coordinated measures were required. However, CMC did not have sufficient capacity for collecting, storing, and analyzing information for prevention and early warning of forest fire. Its ability of coordination to promote collaboration among the relevant institutions that own or use such information was also insufficient.</p>				
Objectives of the Project	<p>The project aimed at strengthening of the capacity of CMC in Macedonia for transmitting information to domestic relevant institutions¹ for prevention² and early warning of forest fire and coordinating them, through (i) development of national system for forest fire risk assessment³ with the use of integrated Geographic Information System (GIS)⁴ and (ii) reinforcement of national coordination mechanism of information sharing and cooperation among domestic relevant institutions; thereby strengthening the social capacity for prevention and early warning of forest fire.</p> <ol style="list-style-type: none"> Overall Goal: The occurrences of massive forest fire are reduced by strengthening the social capacity for prevention and early warning of forest fire. Project Purpose: The capacity of CMC for transmitting information to domestic relevant institutions for prevention and early warning of forest fire and coordinating them is strengthened. 				
Activities of the Project	<ol style="list-style-type: none"> Project Site: Skopje and model areas⁵ Main Activities: (i) Design and documentation of risk assessment methodology, collection of the relevant data/information, development of the integrated GIS, development of methodology on assessment of damages and consequences of forest fire, training on the integrated GIS & forest fire risk assessment tools; and sharing information from CMC to the relevant institutions through the integrated GIS; (ii) Development of coordination mechanism, organization of periodic Technical Coordination Group (TCG)⁶ meetings, baseline survey on coordination of information sharing and cooperation at the model areas, monitoring & assessment of the effectiveness of the integrated GIS at the model areas, and identification of supplementary measures. Inputs (to carry out above activities) (*As of Terminal Evaluation in December 2013) <table border="0"> <tr> <td style="vertical-align: top;"> <p>Japanese Side</p> <ol style="list-style-type: none"> Experts: (long-term) 2 persons; (short-term) 7 persons Trainees Received: 7 persons Equipment: servers for Integrated GIS, 111 PCs, 15 automatic weather stations (AWSs), etc. Local Activity Costs: maintenance cost of the provided equipment, training cost, etc. </td> <td style="vertical-align: top; text-align: center;"> <p>Macedonian Side</p> <ol style="list-style-type: none"> Staff Allocated: 14 persons (10 from CMC; 4 from 2 Regional CMCs (RCMCs) for model areas) Land, Building, Facilities: project office for experts at CMC Administrative and Operational Cost: cost for maintaining project office and information transmission </td> </tr> </table>			<p>Japanese Side</p> <ol style="list-style-type: none"> Experts: (long-term) 2 persons; (short-term) 7 persons Trainees Received: 7 persons Equipment: servers for Integrated GIS, 111 PCs, 15 automatic weather stations (AWSs), etc. Local Activity Costs: maintenance cost of the provided equipment, training cost, etc. 	<p>Macedonian Side</p> <ol style="list-style-type: none"> Staff Allocated: 14 persons (10 from CMC; 4 from 2 Regional CMCs (RCMCs) for model areas) Land, Building, Facilities: project office for experts at CMC Administrative and Operational Cost: cost for maintaining project office and information transmission
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Project Period	May 2011 - May 2014	Project Cost	(ex-ante) 300 million yen, (actual) 293 million yen		
Implementing Agency	Crisis Management Center (CMC)				
Cooperation Agency in Japan	Ministry of Agriculture, Forestry and Fisheries; Institute of Industrial Science, the University of Tokyo; YSK Consultants Co.,Ltd.; Kokusai Kogyo Co.,Ltd.				

II. Result of the Evaluation

<Special Perspective Considered in the Ex-Post Evaluation>

- The Overall Goal in the PDM consists of two levels, i.e., means (“by strengthening the social capacity for prevention and early warning of forest fire”) and effects (“occurrences of massive forest fire will be reduced”). In the ex-post evaluation, the former shall be regarded as “Overall Goal” and the

¹ “Domestic relevant institutions” targeted by the project were Ministry of Agriculture, Forestry and Water Economy (MAFWE), Public Enterprise Macedonian Forests (PEMF), Directorate for Protection and Rescue (DPR), municipal government, local fire fighting forces and others as required.

² “Prevention” included risk reduction among others.

³ Concept of “forest fire risk assessment” consisted of four elements (hazard, exposure, vulnerability, and capacity and measure).

⁴ The integrated GIS developed by the project is known as “Macedonian Forest Fire Information System (MKFFIS)”.

⁵ Two model areas were selected in Kichevo and Strumica.

⁶ TCG consisted of CMC and MAFWE, PMEF, DPR, and Hydro Meteorological Service (HM).

latter shall be treated as “Super Goal”. In this connection, an Indicator of the Overall Goal related to reduction of occurrence of massive forest fire (i.e. Indicator 2 “Rate of forest fire that reaches massive level⁷ will be reduced”) shall be regarded as an Indicator of “Super Goal”; therefore, its achievement status shall be checked under “Other Impact”.

- As Supplementary Information for the Overall Goal, improvement status of coordination/cooperation among the domestic relevant institutions, including the status of “strengthening of cooperation with local governments and regional offices of the relevant institutions”, which was recommended by the terminal evaluation as a key to strengthened “social capacity” stated in the Overall Goal, shall be examined.

1 Relevance

<Consistency with the Development Policy of Macedonia at the Time of Ex-Ante Evaluation and Project Completion>

The project was consistent with Macedonia’s development policies such as “prevention of all national threats including forest fires, early warning and effective countermeasures based on the coordination with related agencies” as set forth in “Law on Crisis Management (LCM)” (2005) and “establishment of an efficient system for early warning and suppression of forest fire” in “Strategy for Sustainable Development of Forestry (SSDS)” (2006) at the times of both ex-ante evaluation and project completion.

<Consistency with the Development Needs of Macedonia at the Time of Ex-Ante Evaluation and Project Completion >

The project was consistent with Macedonia’s development needs for improvement of prevention and early warning of forest fires at the times of both ex-ante evaluation and project completion.

<Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation>

The project was consistent with Japan’s ODA policy for Macedonia in 2010, which set environmental conservation as one of the priority areas⁸.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the time of Project Completion>

The Project Purpose was achieved by the time of project completion. Through activities of the project, the integrated GIS called “Macedonian Forest Fire Information System (MKFFIS)”, storing 8 forest fire risk assessment tools⁹, as well as MKFFIS Public, storing 4 out of the 8 tools¹⁰, was launched. In order to make MKFFIS fit in the legislative framework, modifications of a rulebook of Ministry of Agriculture, Forestry and Water Economy (MAFWE) were made and adopted by the relevant authorities (Indicator 1). Data/information contained in the forest fire risk assessment tools of MKFFIS were continuously updated by CMC with pre-determined frequency (Indicator 2). MKFFIS was utilized by CMC and the principal information users (i.e. Public Enterprise Macedonian Forests (PEMF), Directorate for Protection and Rescue (DPR), and MAFWE)¹¹ with agreed access rights (i.e. IDs and Passwords), and MKFFIS Public was utilized by other relevant institutions without access rights (Indicator 3).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been continued. Modifications of the rulebook of MAFWE related to MKFFIS have been published in the “Official Gazette”. Data/information stored in MKFFIS has been updated by CMC with pre-determined frequency. MKFFIS has been fully utilized by CMC and most of the principal information users, and MKFFIS Public by other relevant institutions. According to DPR, it does not have direct access to MKFFIS anymore because the initial IDs and Passwords issued during the project implementation have not been renewed after their expiration. It is noted that DPR indirectly utilizes the information stored in MKFFIS as Regional DPRs (RDPRs) receive the necessary information from RCMCs through collaborative relationship and provide it to the headquarters. DPR also utilizes the information stored in MKFFIS Public. TCG meetings, formalized through the project, have been discontinued as they have been transformed into communication and consultation among the relevant institutions on the regular basis. According to CMC, it has taken actions for improvement of coordination/cooperation among the relevant institutions using MKFFIS as recommended by the project based on the monitoring results of the model areas.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal has been achieved by the time of ex-post evaluation. All the institutions interviewed by the ex-post evaluators confirmed that data/information provision from CMC has become more prompt since MKFFIS connects all the relevant institutions into a single information platform where the data/information is exchanged, and that the provided data/information has become more adequate by using web-based application software since all data is analyzed automatically (Indicator 1). According to them, the overall cooperation and coordination among the relevant institutions at central as well as regional and local levels, including local governments, has been strengthened by using MKFFIS. However, according to DPR, coordination and information sharing between CMC and DPR at central level needs to be improved further as DPR’s access to MKFFIS is limited (Supplementary Information).

<Other Impacts at the time of Ex-post Evaluation>

No negative impacts of the project have been observed. As to other positive impacts, the achieved results of the project as well as the knowledge and experiences gained by CMC have been shared to 5 countries in Balkan region (i.e. Albania, Montenegro, Bosnia and Herzegovina, Kosovo and Serbia), which have common needs for strengthening national capacities and regional cooperation for prevention and early warning of forest fires, through a Third Country Training Program (TCTP) of JICA “Development of Integrated System for Prevention and Early Warning of Forest Fires” (2015-2017). Reduction of occurrence of massive forest fire (“Super Goal”) could not be confirmed due to lack of the data on the rate of forest fire that reached massive level (i.e. frequency of forest fires in which burnt area is over 200 ha).

<Evaluation Result>

⁷ “Rate of forest fire that reaches massive level” is defined as “frequency of forest fires in which burnt area is over 200 ha” as per the PDM.

⁸ The Country Data Book of Ministry of Foreign Affairs of Japan (2010).

⁹ Hot spot map and vegetation dryness map, covering all land of Macedonia; forest vegetation map and fire history map, covering 90% of forests in Macedonia; Fire Weather Index (FWI) map and suppression resource table, covering all land of Macedonia; damaged forest value table, covering 90% of forests; and topographic map.

¹⁰ Hot spot map, FWI map, vegetation dryness map, and topographic map.

¹¹ Principal information users targeted by the project are the relevant institutions to which the equipment for information users is provided.

In light of the above, through the project, the Project Purpose was achieved at the time of project completion. The project effects were continued, and the Overall Goal was achieved at the time of ex-post evaluation. Therefore, the effectiveness/impact of the project is high.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
<p>(Project Purpose) The capacity of CMC for transmitting information to domestic relevant institutions for prevention and early warning of forest fire and coordinating them is strengthened.</p>	<p>1. By the Project end, modifications in the existing government procedures, necessary to fit the integrated GIS, in legislative framework, are adopted by the relevant authorities.</p>	<p>Status of the Achievement: achieved (continued) (Project Completion) -Modifications of the relevant rulebook of MAFWE were adopted by the relevant authorities. (Ex-post Evaluation) -Modifications of the rulebook of MAFWE was published in the “Official Gazette” in May 2015 and they are still effective.</p>
	<p>2. By the Project end, information contained in forest fire risk assessment tools of the integrated GIS at CMC is updated with pre-determined frequency for transmission to the relevant institutions.</p>	<p>Status of the Achievement: achieved (continued) (Project Completion) (Ex-post Evaluation) -Information contained in the forest fire risk assessment tools of MKFFIS at CMC updated with pre-determined frequency for transmission to the relevant institutions.</p>
	<p>3. By the Project end, data/information from CMC based on the integrated GIS is utilized by the domestic relevant institutions for prevention and early warning of forest fire.</p>	<p>Status of the Achievement: achieved (mostly continued) (Project Completion) -Data/information of MKFFIS was utilized by CMC, PEMF, DPR, and MAFWE. Data/information of MKFFIS public was utilized by other relevant institutions. (Ex-post Evaluation) -Data/information of MKFFIS has been fully utilized by CMC, PEMF, and MAFWE. According to DPR, it does not have direct access to MKFFIS anymore because the initial IDs and passwords issued during the project implementation have not been renewed after their expiration. It is noted that DPR indirectly utilizes the information stored in MKFFIS as RDPRs receive the necessary information from RCMCs through collaborative relationship and provide it to the headquarters. Data/information of MKFFIS Public is utilized by DPR and other relevant institutions such as– police and central and local fire departments.</p>
<p>(Overall Goal) The social capacity for prevention and early warning of forest fire has been strengthened.</p>	<p>1.Data/information provided from CMC to institutions under CMS will become more promptly and adequately. -“more promptly“ means “more promptly than before the integrated GIS was introduced” -“more adequately” means “by using web based application software”</p>	<p>(Ex-post Evaluation) achieved -According to the relevant institutions, data/information provision has become more prompt since MKFFIS connects all the relevant institutions into a single information platform where the data/information is exchanged, and the provided data/information has become more adequate by using web-based application software since all data is analyzed automatically</p>

Sources: Terminal Evaluation Report; questionnaire and interview to CMC, MAFWE, PEMF, DPR, RCMC Kichevo, Regional PEMF (RPEMF) Kichevo, and RDPR Kichevo.

3 Efficiency

Both the project period and the project cost were within the plan (ratio against the plan: 100% and 98%). Therefore, the efficiency of the project is high.

4 Sustainability

<Policy Aspect>

LCM (2005) and SSDS (2006) mentioned in “Relevance” is still effective and in line with the aim of the project at the time of ex-post evaluation. In addition, modifications of a rulebook of MAFWE related to MKFFIS have been published as stated in “Effectiveness/Impact”.

<Institutional Aspect>

Organizational mandate and structure of CMC for coordination and information provision for prevention and early warning of forest fire have not been changed since the project completion. Information provision system based on MKFFIS, developed under the project, has been maintained. Through MKFFIS, CMC continuously receives the data/information from the principal information providers (i.e. PEMF and Hydro Meteorological Service (HM)) and transmits it to the relevant institutions. The number of staff allocated for the information provision at each organization, including system administrators, is 75 at CMC, 67 at 35 RCMCs, and 78 at PEMF/RPEMFs. At HM, there is always one person on duty in charge of MKFFIS. As for 2 RCMCs for the model areas, 5 and 7 staff members are allocated at Kichevo and Strumica respectively. The number of staff of these institutions is considered sufficient since MKFFIS has been functioning without a problem.

<Technical Aspect>

CMC and most of the principal information providers/users of MKFFIS have sufficient skills and knowledge to sustain the project effect. At CMC and the 2 RCMCs for the model areas, the staff allocated for the project remains with the respective organizations and

works with MKFFIS, and all the staff working with MKFFIS at CMC and 35 RCMCs have attended and passed the 2-level training courses for MKFFIS. They maintain the skills and knowledge through constant operation and with use of manual prepared by the project. CMC and RCMCs also sustain the capacity to implement training for MKFFIS. Since the project completion, 21 trainings were conducted at central and regional levels for about 160 participants from RCMCs and other relevant institutions. As for the principal information providers/users, PEMF, HM, and MAFWE consider that the staff members working with MKFFIS have necessary skills and knowledge because they have been trained for MKFFIS. However, DPR does not think the staff members maintain the skills and knowledge acquired through the project as they do not utilize them due to limited access to MKFFIS as stated in “Effectiveness/Impact”.

Regarding the provided equipment, persons in charge of the management have been assigned at CMC and all the principal information providers/users. According to the persons in charge and observation by the ex-post evaluators, most of the equipment is properly maintained and utilized. However, 3 out of 15 AWSs provided to HM are out of order. Information about causes of breakdown and repair/replacement plan was not available, but the Director of HM and the person in charge of the equipment management stated that HM will do its best to repair them as AWS is very important equipment for the institution. According to them, the area of the broken AWSs is covered by other AWSs so that there is no negative impact on the information provision to CMC.

<Financial Aspect>

Annual budget and expenditure of CMC for the information provision through MKFFIS were 500,000 Macedonia Dinar (MKD) in 2015 and 400,000MKD in 2016 and 2017. They include the costs for training at central and regional levels and operation and maintenance (O&M) of the equipment provided to CMC and the 2 RCMCs for the model areas. Since MKFFIS has been functioning and training has been continuously implemented, CMC is considered to have secured sufficient budget to sustain the project effect. In addition, most of the principal information providers/users are considered to have secured necessary budget for O&M of the provided equipment. DPR allocates annual budget of 300,000 MKD for O&M of all the PCs, including the ones provided by the project. Though the budget data is not available, PEMF secures the O&M budget of the provided equipment according to its Plan for Public Procurement and, at MAFWE, IT sector has the budget for O&M of all the PCs, including the ones provided by the project. HM, however, considers that necessary budget is not secured because additional budget for O&M of the provided equipment is not allocated by the government: it must manage with the existing budget. It is not clear if HM has budget for repair/replacement of the broken AWSs mentioned above.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of technical and financial aspects of the principal information providers/users of MKFFIS. Therefore, the sustainability of the effect through the project is fair.

5 Summary of the Evaluation

The project achieved the Project Purpose (i.e. The capacity of CMC for transmitting information to domestic relevant institutions for prevention and early warning of forest fire and coordinating them is strengthened). The effect of the project has been continued, and the Overall Goal (i.e. The social capacity for prevention and early warning of forest fire has been strengthened) has been achieved. Regarding the sustainability, no problem has been observed in terms of the policy and institutional aspects. Although slight problems have been observed in terms of technical and financial aspects of the principal information providers/users of MKFFIS (e.g. concern of DPR about maintenance of the skills and knowledge due to limited access to MKFFIS, lack of information about the plan and budget for repair/replacement of the broken AWSs provided to HM, and lack of budget data to judge financial aspect except for DPR), no problems have been observed in these aspects of CMC.

Considering all of the above points, this project is evaluated to be highly satisfactory.

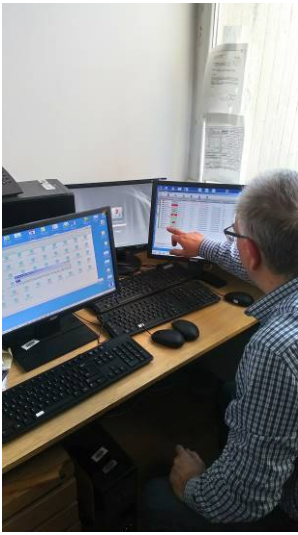
III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

It is recommended that CMC explain to DPR the procedure for renewal of the initial IDs and Passwords issued during the project implementation so that MKFFIS can be fully utilized.

Lessons Learned for JICA:

The Western Balkan countries have common needs for strengthening national capacities and regional cooperation for prevention and early warning of forest fires. After the project completion, CMC took initiative to develop a TCTP in cooperation with JICA to share the experience, knowledge and results related to development of integrated system for prevention and early warning of forest fires with the Western Balkan countries (i.e. Albania, Montenegro, Serbia, Bosnia and Herzegovina, and Kosovo). The main benefit was that CMC, from the implementing agency of the project and the recipient of the assistance, became the provider of knowledge related to forest fires risk reduction through TCTP. Another achievement was that some of the participating countries recognized the benefits of development of national forest information system, such as MKFFIS, and got the opportunity to propose similar cooperation to JICA following the good example of MKFFIS. They are also utilizing the knowledge they gained through TCTP. Therefore, development and implementation of a TCTP by the Implementing Agency should be encouraged after the completion of the technical cooperation project if neighboring countries have common needs.



Utilization of MKFFIS in daily work at HM



CMC employee in charge of maintenance of MKFFIS