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Using Field Maps to monitor environmental and social impacts on Morava Corridor motorway construction in Serbia

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Abstract:

Environmental and Social Impact Assessment (ESIA) is a systematic process that evaluates the potential environmental and social impacts of a proposed project or intervention before its implementation. It aims to predict and mitigate adverse effects on the environment and communities. Project impacts can be examined through various approaches, ranging from basic qualitative analysis to comprehensive quantitative surveys or modelling (IUCN, 2020). The aim of this presentation is to demonstrate how the utilization of ArcGIS Field Maps improved data collection to predict the impacts mentioned above, to visualize them and elevate both project workflow and quality. The example that is going to be used is Morava Corridor motorway construction in Serbia, for which the necessary Environmental and Social Monitoring was conducted. Arup, a multinational professional services firm, has been appointed as an Environmental and Social Consultant for the project.

The project, which is 112 km long, is located in the West Morava Region of Serbia. It involves the design and construction of the motorway and its facilities, river regulation, protection, and relocation of existing utilities, and associated temporary facilities such as camps, equipment maintenance yards, batch plants, and asphalt plants. Arup's role is to ensure effective control and minimization of the project's environmental and social impacts, and the fulfilment of ESIA commitments. This involves creating a comprehensive database cataloguing various issues such as waste management, dust emissions, road conditions, noise pollution, and river crossings.

Arup's Belgrade office, supported by the Ireland Geospatial team, created a web map to enhance monitoring of environmental and social activities of the project. Each issue is accompanied by detailed descriptions, geolocation data, on-site photographs, and proposed mitigation measures. Some of the descriptions include chainage, structure (alignment, waste area, borrow pit, batch plant) and type of situation (general waste management, road condition, watercourse protection, noise).

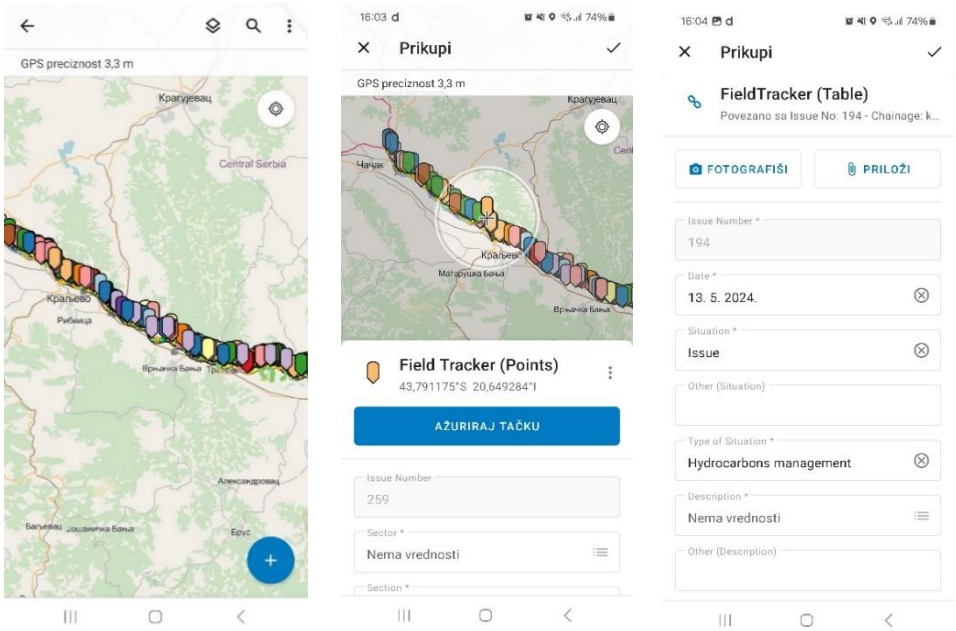

Figure 1. 2. and 3. Field Maps mobile app of Morava Corridor project

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Prior to implementing Field Maps, issues were documented and gathered in a spreadsheet named Field Tracker. The previous recorded issues from Field Tracker and its attribute values were then imported and visualized as points feature class. In addition to point features, polyline and polygon feature classes were created for new issues that require visualization in such formats. Given the necessity to depict issues chronologically according to the dates of site visits, a table dataset was created. The table includes attributes whose values vary with each site visit. Attribute domains and contingent values were implemented for the process of obtaining issue attribute values for table and feature classes. Attribute domains enable the restriction of valid entries within a field to predefined lists or ranges of values. Contingent values build upon this functionality by linking the selection of a value in one field to the constraint of acceptable values in another field (“Create and manage contingent values”, 2024). This streamlined the survey result entry for the team, enabling quicker data input and ensuring the acquisition of 'clean' results.

The web map used for both the Field Maps mobile app and the desktop web app was published on Atlas, Arup's geospatial data platform, for the wider use between team members and client. The mobile app is utilized during site visits for the real-time addition, editing, and updating of observed issues, along with the incorporation of supplementary media such as pictures and videos, if required, along with precise location tagging. The web app, on the other hand, is designed for office-based utilization and presentation purposes, offering identical functionalities as the mobile app. The web app offers the additional functionality to filter data and to export results as tables and maps. Exported tables and maps, along with accompanying media, are later used for composing site visit reports and ESIA quarterly reports.

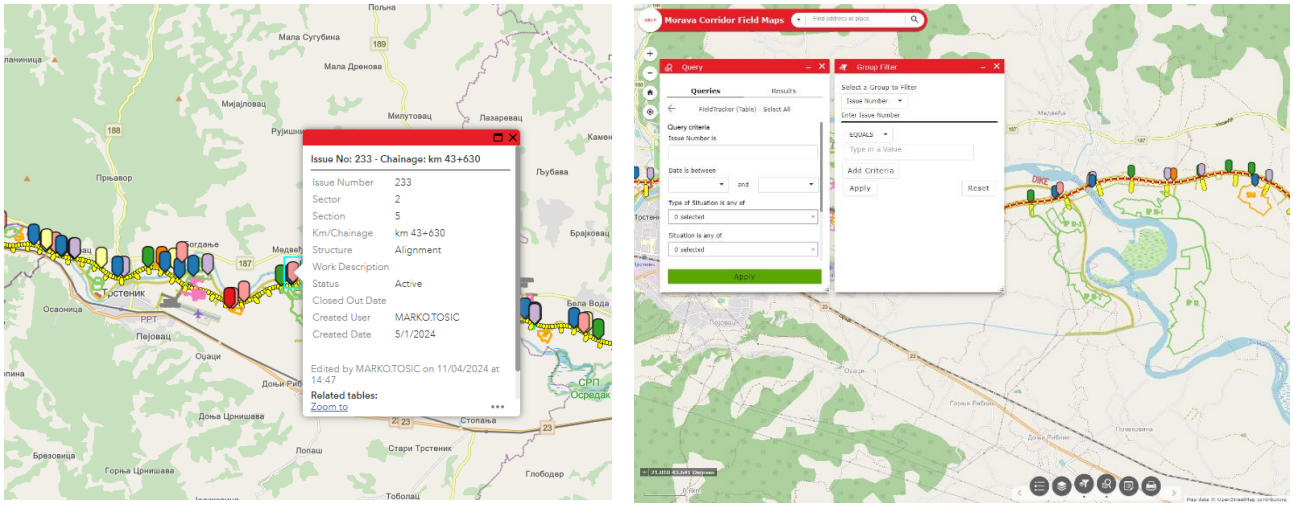

Figure 4. and 5. Field Maps web app of Morava Corridor project

Field Maps is a user-friendly application with an intuitive interface, facilitating easy navigation and addition of new issues, editing of existing ones, and seamless filling in of attribute values through customizable forms. By leveraging Field Maps, users can streamline data collection processes, enable faster and more accurate real-time data gathering with multiple users. Rather than employing various software for site visit data acquisition, Field Maps consolidates all necessary functions into one platform, enhancing both data collection and management processes. Environmental and social monitoring were significantly enhanced, enabling clear visualization of impacts. Crucially, Field Maps ensures the creation of a database that presents issues chronologically. This enables users and clients to access and review the data, to gain a clear understanding of the environmental challenges involved and to facilitate prompt action to address them. Ultimately, Field Maps enhanced data integrity and quality of the project, making it a successful method for future implementation in similar evaluations of potential environmental and social impacts.

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