

|                    |   |
|--------------------|---|
| Country Name       | <b>The Project for Development of Digital Basic State Mapping in Serbia</b> |
| Republic of Serbia |   |

**I. Project Outline**

|                             |   |                |   |              |   |
|-----------------------------|---|----------------|---|--------------|---|
| Background                  | In Serbia, development of social infrastructure was a key issue to reconstruct the weakened national economy due to the civil wars. Developing spatial information based on digital topographic maps was vital, particularly in the business sector, to invigorate the economy such as through urban and tourism development. In addition, Serbia needed to adopt the ISO geographical information standards which had been applied by the European Union (EU) in order to ensure usability for users. However, the Republic Geodetic Authority (RGA) has produced topographic maps in analog form for approximately 50% of the territory. Last production was in 1980's. New age and new technologies requested maps in digital form and that had led to needs for establishment of system for production of national maps in digital form.. Under those situations, technical transfer for digital mapping was an urgent issue to develop digital national basic map. |                |   |              |   |
| Objectives of the Project   | Through development of specifications, system configuration diagrams for each process of digital topographic mapping, and work manuals, the on-the-job training (OJT) for RGA staff and establishment of training program of digital topographic mapping, the project aimed at establishment of sustainable system to produce and provide the digital basic state maps, thereby contributing to utilization of the maps by the central and local governments as well as the private sector in Serbia. The project objectives are as follows:  |                |   |              |   |
| Activities of the project   | 1. Overall Goal: Government, local government and private sector utilize digital topographic map provided by RGA.   |                |   |              |   |
|                             | 2. Project Purpose: Sustainable system to make, revise and provide digital topographic map (Digital Basic State Map) is established.  |                |   |              |   |
|                             | 1. Project site: Whole of Serbia<br>2. Main activities: 1) Preparation of development of map, including preparation of work specification, product specification, inspection manuals, topographic map data specification, 2) installation of necessary equipment and customization of software, 3) Development of work manuals and implementation of OJTs on techniques of aerial photography plan, ground control point survey, digital plotting, GIS data structurization, etc. for RGA staffs, 4) Development of training curriculum and materials and delivery of trainings of digital topographic mapping for RGA staff  |                |   |              |   |
|                             | 3. Inputs   |                |   |              |   |
|                             | Japanese Side   |                | Serbian side  |              |   |
|                             | (1) Dispatch of experts: 13   |                | (1) Counterpart personnel: 36   |              |   |
|                             | (2) Acceptance of trainees in Japan: 7  |                | (2) Office space for experts, space and facilities for installation and operation of equipment provided |              |   |
|                             | (3) Provision of equipment: software and hardware for OJT on aerial mapping surveillance  |                |   |              |   |
| Ex-Ante Evaluation          | 2009  | Project Period | November 2009 –March 2012<br>(Extension Period: November 2011 – March 2012)                             | Project Cost | (Ex-Ante)<br>220 million yen<br>(Actual)<br>282 million yen |
| Implementing Agency         | Republic Geodetic Authority   |                |   |              |   |
| Cooperation Agency in Japan | Kokusai Kogyo Co., Ltd.   |                |   |              |   |

<Special perspectives considered in the ex-post evaluation>

[Project Purpose and Verifiable Indicator]

In PDM of the English Version, the verifiable indicator for the Project Purpose is defined as “the digital topographic mapping project is launched”. However, at the time of ex-post evaluation it is defined as “Development of digital topographic mapping is started by RGA themselves.” Although no revision of the indicator in the PDM officially agreed by RGA and JICA, it can be understood that the indicator for the Project Purpose means “starting development of digital topographic maps” as mentioned in the existing project documents such as the ex-ante evaluation sheet in Japanese and the terminal evaluation. In those documents, “digital topographic mapping project” means “task” or “operation” of digital topographic mapping and never mentioned as “specific project to produce digital topographic mapping”.

[Overall Goal and Verifiable Indicator]

The verifiable indicator for the overall goal is “Digital topographic maps are utilized by public and private sectors” without no specific quantitative target. Therefore, at the time of ex-post evaluation, it was verified by the number of government organization/agencies using the digital topographic map for development of NIGD (National Infrastructure of Geospatial Data) <sup>1</sup>, the number of plans for regional development, urban development, infrastructure development, based on the digital topographic map by RGA and the number of private users of the map.

**II. Result of the Evaluation**

<sup>1</sup> NIGD includes metadata, services and geodata sets relating to: 1) geodetic and cadastral information system, 2) environmental protection, 3) spatial and design documents, 4) transport and communication networks, 5) mineral and energy source, 6) water management regime, 7) protected immovable cultural property, 8) important areas for tourism development and touristic places, 9) geology, geophysics, meteorology, agriculture and soil, 10) demography and health, 11) industrial and production capacities.

## 1 Relevance

<Consistency with Development Policy of Serbian Government at the time of ex-ante evaluation and the project completion>

The project was consistent with the Serbia's development policy of "development of digital topographic maps as the national base maps" as set forth in the policy documents including the Law on State Survey and Real Estate Cadastre (enacted in 2008 and revised in 2009) and the 10-year Plan of RGA (2006-2015).

<Consistency with Development Needs of Serbian at the time of ex-ante evaluation and the project completion>

The project met the development needs of Serbia to acquire appropriate technologies and knowledge for creating digital topographic maps which are the basis of NIGD and for the standardization of basic spatial data according to the international standard.

<Consistency with Japan's ODA Policy for Serbia at the time of ex-ante evaluation>

The project was consistent with the Japan's ODA policy toward Serbia prioritizing development of social and economic infrastructure.

<Evaluation Results> In the light of above, the relevance of this 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 project completion. Under the project, three sheets of the digital topographic maps were developed by using the technologies and skills for digital topographic mapping, such as specifications, system configuration diagrams, work manuals, and so on. As mentioned below, since RGA has continued production of the Digital Basic State Map since the project completion, the sustainable system to produce the Digital Basic State Map was established.

<Continuation Status of the Project Effects at the time of ex-post evaluation>

After the project completion, the coverage of the Digital Basic State Map in the three pilot areas of Jagodina, Bor and Palic was extended 30% in 2012 to 90% in 2014 by the continuous efforts of RGA to produce 73 map sheets for the 3 pilot areas. Since the sustainable system for digital map production in RGA was established by the project through development of the necessary work process and qualified technical personnel as well as provision of necessary hardware and software for digital mapping, the production of digital topographic maps by RGA has been progressed. RGA has conducted the production activities for the Digital Basic State Map in accordance with the adequate process management including schedule control which had been transferred by the project. In addition, the specifications and work manuals developed by the project have been improved by RGA themselves.

<Status of Achievement of the Overall Goal at the time of ex-post evaluation>

The Overall Goal has been partially achieved. The digital topographic maps developed by RGA have been utilized for development of NIGD which is an integrated geospatial data system, but not for the formulation of development plans by the central government organization/agencies and municipalities as well as private sector since they have not published yet. New revision of the Regulation for Basic State Map has been published in January 2015, as well as amendments and supplements to the Cartographic Key. In this regard, update and revision of the digital maps for the pilot areas is ongoing and drafting of technical documentation for the pilot areas is under preparation. Upon its completion, RGA is planning to share the digital topographic maps through the national geoportal despite of no precise schedule.

Since NIGD has been functioning and utilized by other related ministries and agencies the digital topographic maps developed by the RGA have been indirectly utilized through NIGD. NIGD users are enabled to identify and access spatial information acquired from different sources, from local, via national to global level, in a comprehensive manner. In addition, RGA has already started the activities to promote utilization of the digital topographic maps, such as development of specification of the National Base Maps (NBM) which will be developed based on the digital topographic maps, policy and road map to develop NBM and establishment of systems to guarantee quality of NBM and to manage and update NBM.

<Other Positive and Negative Impacts>

No other positive and negative impact of the project has been observed.

<Evaluation Results>

Although the overall goal of utilization of the digital topographic maps produced by RGA has been partially achieved yet, the Project Purpose was achieved by the end of the project and RGA has continued the activities to produce the digital national base maps by using the technologies and skills transferred by the project after the project completion. Also, the digital topographic maps developed by RGA have been utilized for development of NIGD. Therefore, effectiveness/Impact of the project is fair.

### Achievement of project purpose and overall goal

| Aim   | Indicators                                       | Results   |      |      |      |     |     |     |
|---|--|---|------|------|------|-----|-----|-----|
| (Project Purpose) Establishment of sustainable system to make, revise and provide digital topographic map (Digital Basic State Map) | Digital topographic mapping project is launched. | (Terminal Evaluation) Achieved.<br>In addition to the achievement of Output 1 (preparation of technical documents), Output 2 (development of system configuration diagram and work manuals) and Output 3 (delivery of technical trainings for RGA staff), RGA developed three sheets of the digital topographic map based on draft specifications and technology transferred in the project.<br><br>(Ex-post Evaluation) Continued.<br>Despite of no new specific project to produce digital topographic maps launched, RGA have been continuously engaged in production of the digital topographic maps in the three pilot areas.<br>[Coverage of the digital topographic map for the three pilot areas] |      |      |      |     |     |     |
|   |  | <table border="1"> <thead> <tr> <th>2012</th> <th>2013</th> <th>2014</th> </tr> </thead> <tbody> <tr> <td>30%</td> <td>70%</td> <td>90%</td> </tr> </tbody> </table>  | 2012 | 2013 | 2014 | 30% | 70% | 90% |
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| 30%   | 70%  | 90%   |      |      |      |     |     |     |

|  |  |  |
|--|--|--|
| (Overall goal)<br>Utilization of the digital topographic maps by government, local government and private sector | Digital topographic maps are utilized by public and private sectors. | (Ex-post Evaluation) Partially achieved.<br><ul style="list-style-type: none"> <li>● The digital topographic maps developed by RGA have been utilized for development of NIGD*.</li> <li>● The utilization of digital topographic map by the central government organizations and by municipalities as well as by the private sector will be started after the completion of updating and revisions of the digital maps for the pilot areas according to the revised regulations.</li> </ul> |
|--|--|--|

Source : Terminal Evaluation Report, interview with RGA

Note: The National Spatial Data Infrastructure (NSDI) is used in the line with the EU (European Union) regulations.

### 3 Efficiency

Both of the project cost and the project period exceeded the plan (ratio against the plan: 128%, 117%) because of additional activities including elaboration of roadmap to establish common basic data and network of relevant government organizations for promotion utilization of digital topographic maps in order to achieve the Overall Goal after the project completion despite that the Project Purpose was expected to be achieved by the end of the project. Therefore, efficiency of the project is fair.

### 4 Sustainability

#### <Policy Aspects>

There was no change in the government policies of Serbia to promote utilization of the digital topographic maps. Development and utilization of NIGD has been proposed by the Law of State Survey and Cadaster and the draft version of the new Law of NIGD. In addition, RGA is preparing the Mid-term Operation Plan for the period 2015-2019 addressing continuous digital map production.

#### <Institutional Aspects>

There was no organizational change in RGA to develop digital topographic maps. As mentioned above, RGA has been continuously engaged in development and provision of digital topographic maps. Also, the support system of the map specification is available for users of the digital topographic maps. At the time of ex-post evaluation, the equipment and software installed by the project are properly upgraded for using development of the digital topographic maps. Although the number of the staff has not been sufficient to expand production of digital topographic maps because of the budget constraints, RGA has not had serious problem with the current number of staff deployed of 42 in order to conduct the current activities. According to the Budget System Law since 2014, all the institutions using the state budget cannot employ new staff until end of December, 2015. RGA plans to improve the situation through establishment of production norms as well as deployment of more personnel.

#### <Technical Aspects>

The RGA staffs trained by the project have been continuously engaged in the activities to develop digital topographic maps and they have sustained the skills and knowledge for their works. In addition, they properly revised or updated the specification and their work manuals for development of digital topographic maps when the equipment and the software had been upgraded. The training on digital topographic map developed by the project was delivered in 2012 and 2013 but there was no training on digital topographic maps in 2014 and 2015 because all the staffs had been already well trained and skilled.

#### <Financial Aspects>

As mentioned above, the fiscal retrenchment policy of the government of Serbia reduced the annual budget of RGA from 5.2 billion RSD in 2012 to 3.6 billion RSD in 2015. However, RGA has continuously secured the necessary budget for development of the digital topographic maps and there seems to be a certain level of financial sustainability to continue production of digital topographic maps despite of no available data. Although no other revenue than the governmental budget for RGA has been generated so far, it is expected that RGA can generate the revenue from the users of the digital topographic maps when the service starts.

#### <Evaluation Results>

Despite of the insufficient number of staff deployed for development of digital topographic maps in RGA, there has no serious problem observed in all the aspects of sustainability. Therefore, sustainability of the project is high.

### 5 Summary of the Evaluation

This project has achieved the Project Purpose of establishment of sustainable system to develop digital topographic maps in RGA and partially achieved the Overall Goal of utilization of the digital topographic maps by the public and private sectors. The government of Serbia has promoted utilization of the digital topographic maps and RGA has been continuously engaged in development of them but it is necessary to deploy more skillful staff for accelerating production of the digital topographic maps in future. The project cost and the project period exceeded the plan because of the extension of the project activities to ensure financial sustainability.

In the light of above, this project is evaluated to be satisfactory.

## III. Recommendations & Lessons Learned

#### Recommendations for RGA:

(Improvement of a system for large-scale digital topographic map production)

- RGA needs to work on promotion and distribution of digital topographic maps through establishment of appropriate production norms and preparation of personnel plan and to start generating revenue from the users in order to enhance the RGA's financial base.

(Continuation of practice of the technical skills and knowledge for digital topographic map production)

- It is strongly recommended for RGA to continue with the practice to follow technical and technological trends in the field of the production of digital topographic maps and to preserve established system with very skilled staff in order to scale up of digital topographic map production with newly recruited personnel which requires trainings for them including transfer of the skills and knowledge introduced by the project.

#### Lessons Learned for JICA:

(Appropriate design of the pilot activities based on capacity assessment for capacity building at individual level as well as of institutional level)

- At the beginning stage of the project, the capacity assessment on RGA has been conducted in order to design appropriate pilot activities

for effective capacity development on production of digital topographic maps. The well designed pilot activities, including OJTs, with the appropriate scale based on the results of the capacity assessment enabled an effective capacity building of RGA staff for digital topographic map production as well as establishment of sustainable production process and system in RGA. Furthermore, the successful capacity development at individual level and the successful institutional building brought about sustainable production activities of digital topographic maps by RGA. Namely, capacity assessment at the time of project planning or the beginning stage of project implementation is essential to appropriately design the pilot activities for necessary capacity development and establishment of sustainable system.