

Country Name	<b>Digital Topographic Mapping Project in Burkina Faso</b>
Burkina Faso	

**I. Project Outline**

Background	<p>In Burkina Faso, rural poverty was more severe. In response to the situation, the government of Burkina Faso had addressed agriculture development, education and resource exploitation based on the principal policy for poverty reduction through economic growth in the “Strategy for Accelerated Growth and Sustainable Development (Strategie de croissance accélérée et développement durable: SCADD)” (2011-2015). On the other hand, development of national base maps was essential for the country since the maps was basic information for national development. Therefore, JICA supported “Study for National Topographic Mapping of Southwestern Area in Burkina Faso” for Burkina Geographic Institute (IGB) from 1998 to 2000. However, owing to technical and financial problems in IGB, only 36% of all the 1/50,000 topographic maps had been created, and the delay of the map development on the northern area had hindered the development of mineral resource and water resources in the area and so on.</p>										
Objectives of the Project	<p>1. Expected goals through the proposed plan<sup>1</sup>: 1) National development plans are implemented in more efficiently and effectively, 2) The regional economy in the northern area is vitalized through development and investment promotions and projects including agriculture and livestock in the northern area are efficiently implemented.</p> <p>2. Expected utilization of the proposed plan: 1) The latest digital topographic maps, which reflects the latest information on national land, including topography and land use, area utilized for preparation of national land plans and policy priorities in the national development strategy, 2) The latest digital topographic maps are utilized for various planning, including mineral resource exploitation, livestock development and natural resource conservation in the northern area.</p>										
Activities of the Project	<p>1. Project site: Northern area (approximately 23,000km<sup>2</sup>) for survey and Ouagadougou district (approximately 3,000km<sup>2</sup>) for technical transfer.</p> <p>2. Main activities: 1) Survey for digital topographic mapping including specification, aerial triangulation, digital plotting and compilation, 2) Promotion of data utilization plan, including seminars and website, 3) technical transfer on ground control point survey, aerial triangulation, field identification and verification, digital plotting and compilation, GIS data structurization and map symbolization.</p> <p>3. Inputs (to carry out above activities)</p> <table border="0"> <tr> <td>Japanese Side</td> <td>Burkina Faso Side</td> </tr> <tr> <td>(1) Experts from Japan: 15 persons</td> <td>(1) Staff allocated: 14 persons</td> </tr> <tr> <td>(2) Equipment: UPS, printer, each software for a digital topographic map, etc.</td> <td>(2) Land and facilities: Office space in IGB</td> </tr> <tr> <td>(3) Cost: Cost for interpreters</td> <td></td> </tr> </table>			Japanese Side	Burkina Faso Side	(1) Experts from Japan: 15 persons	(1) Staff allocated: 14 persons	(2) Equipment: UPS, printer, each software for a digital topographic map, etc.	(2) Land and facilities: Office space in IGB	(3) Cost: Cost for interpreters	
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Project Period	February, 2012 - August, 2014	Project Cost	(ex-ante) 400 million yen (actual) 440 million yen								
Implementing Agency	Burkina Geographic Institute (IGB)										
Cooperation Agency in Japan	Aero Asahi Corporation, Kokusai Kogyo Co., Ltd.										

**II. Result of the Evaluation**

1 Relevance
<p>&lt;Consistency with the Development Policy of Burkina Faso at the Time of Ex-Ante Evaluation and Project Completion&gt;</p> <p>The project was consistent with the development policies of Burkina Faso at the time of ex-ante evaluation and project completion. The “Strategy for Accelerated Growth and Sustainable Development” (2011-2015) considered that a national base map served as basic information for national development closely related to important issues such as development planning and border demarcation.</p> <p>&lt;Consistency with the Development Needs of Burkina Faso at the Time of Ex-Ante Evaluation and Project Completion&gt;</p> <p>The project was consistent with the needs of Burkina Faso at the time of ex-ante evaluation and project completion. For developing national base maps, IGB had technical problems in some processes of topographic map creation and construction of a system for mass production. Therefore, acquisition of technology for medium-scale topographic mapping using satellite images have been a key issue for not only for IGB but also for both public and private sectors of Burkina Faso.</p> <p>&lt;Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation&gt;</p> <p>The project was consistent with the Japan’s ODA policy for Burkina Faso<sup>2</sup>, prioritizing “Basic Human Needs” at the time of ex-ante evaluation.</p> <p>&lt;Evaluation Result&gt;</p> <p>In light of the above, the relevance of the project is high.</p>
2 Effectiveness/Impact

<sup>1</sup> The degree of achievement of expected goals is not to be assessed in principle at the time of ex-post evaluation, since it is defined as the medium-to-long-term goals which will be attained as a result of crystallizing the proposed plan (“output” of the project).

<sup>2</sup> Ministry of Foreign Affairs, “ODA Databook” 2011

<Status of Achievement for the Objectives at the time of Project Completion>

The objectives of the project were achieved by the time of project completion. The digital topographic maps at the scale of 1/50,000 was developed (Output 1). IGB staff partly acquired the necessary technologies to develop digital topographic maps by using satellite images (Output 2). The technical transfer of digital topographic mapping, including point survey, aerial triangulation, digital plotting, field identification/verification, GIS data structure, quality control, and promotion of data utilization were implemented for 12 IGB staffs in total as planned and IGB staffs acquired the technology to create the digital topographic map through the on-the-job trainings provided by the project. However, their level seemed to be still inadequate to independently create the maps, dealing with unexpected issues.

<Utilization Status of the Proposed Plan at the time of Ex-post Evaluation>

The proposed plan has been partially utilized at the time of ex-post evaluation. The digital topographic maps developed by the project were used by the Ministry of Mine for the “Project Supporting the Development of Mining Sector” (2015-2018) with the target areas of North, East and South West of Burkina Faso. In addition, they were utilized for 13 geological maps of the South West of the country. Although the production of topographic maps was suspended because of lack of funding following the political turmoil since 2014, the activities for producing topographic maps have been resumed in 2016 and started the production of 12 topographic maps at a scale of 1/50,000 for the localities around Ouagadougou. While the digital topographic maps developed by the project have been uploaded in the IGB’s website, no promotional activities for using the maps were conducted by IGB. However, the open days allowed various social layers to understand mission of IGB. Also, at the celebration of the 40<sup>th</sup> anniversary of IGB under the patronage of the President of Burkina Faso, public and private authorities paid attention to importance to maps.

<Status of Achievement for Expected Goals through the Proposed Plan at the time of Ex-post Evaluation>

One of the expected goals through the proposed plans has been achieved. The digital topographic maps developed by the project were used for a geophysical study conducted by the Ministry of Mine for highlighting mining as a part of the framework of the PASEM project (2015-2016) in the northern region (The Expected Goal 2). For more efficient and effective implementation of national development plans, the achievement level was not able to be verified due to no information provided by the ministries.

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

No negative impact, including impact on natural environment and social environment, was observed at the time of ex-post evaluation.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is fair.

Status of Achievement of Utilization Status of the Proposed Plan and Expected Goals through the Proposed Plan

Aim	Indicators	Results
Utilization Status of the Proposed Plan: 1) The latest digital topographic maps, which reflects the latest information on national land, including topography and land use, are utilized for preparation of national land plans and policy priorities in the national development strategy. 2) The latest digital topographic maps are utilized for various planning, including mineral resource exploitation, livestock development and natural resource conservation in the northern area.	The digital topographic maps are utilized by the relevant ministries and government institutions.	(Ex-post Evaluation) Partially achieved The digital topographic maps developed by the project were used for the “Project Supporting the Development of Mining Sector” (2015-2018) under the Ministry of Mine. The following maps were developed based on the digital topographic maps: ➢ 13 geological maps at a scale of 1/200,000, ➢ 3 maps at 1/50,000 scale, ➢ A synthesis geological map at 1/1,000,000 scale, ➢ Geochemical maps of the Southwest of the country. The mapping work was carried out by a Canadian company while the geochemistry work was carried out by a French company.
Expected Goals through the Proposed Plan 1) National development plans are implemented in more efficiently and effectively.	Plans in the national development plan are materialized through utilization of the digital topographic maps.	(Ex-post Evaluation) Not verified. No information provided by any ministries.
2) The regional economy in the northern area is vitalized through development and investment promotions and projects including agriculture and livestock in the northern area are efficiently implemented.	Projects of mineral resource exploitation and promotion of rural development and livestock industries are implemented by using the digital topographic maps.	(Ex-post Evaluation) Achieved The Digital topographic maps were used for the geophysical survey took place within the framework of the PADSEM) The objective of this project is to secure and increase private investment in the mining sector, to increase the value of Burkina Faso's profits from these investments, and to strengthen the institutional capacity of the State and others stakeholders for effective and transparent management of the mining sector

Source: Information provided by IGB, Ministry of Mine

3 Efficiency

Both of the project cost and period exceeded the plan (ratio against the plan: 117% and 140%, respectively). The outputs were produced as planned. Therefore, efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

There is no specific policy to promote production and utilization of digital topographic maps. However, for promotion of digital topographic maps, IGB has annually organized open days with sponsorship and patronage by the highest authorities of the government. In 2019, IGB plans to reorganize the open days with the patronage of the Minister of Infrastructure and sponsorship of at least two (2) ministers (Economy and Finance, Urban Planning or Territorial Administration) The government has supported promotional sales or donations of map products for oriented national security and social protection use

For protection of property rights in the digital data, the digital data is the subject of a formal request (form existing at the IGB) followed by the signing of a license agreement. This action aims, monitoring of the distribution of digital data, to limit abuse and data hacking worst, legal protection of national cartographic production etc.

<Institutional Aspect>

The reorganization carried out in 2015 resulted in the redistribution of technical staff in several departments of the two new technical departments, the Directorate of Delivery and Research and the Directorate of Mapping of the Territory. The 2018 recruitment took place and both directorates have been, therefore, strengthened in human resources. At the time of ex-post evaluation, the 1/50,000 card production has been going well.

In 2019, the geodetic service, including border work, geodetic work, grading and gravimetry work, is going to be reinforced again by two topography engineers, one senior technician and two geometer technicians. Also, the Cartographic Production Room (1/50,000) is going to be reinforced by two senior geomatics technicians to allow the production of 1/500,000 maps by generalization of the 1/200,000 map and 1/100,000 by generalization of the 1/50,000 card.

Usage rules of the digital topographic maps produced by IGB have been developed and based on the signing of agreements between the IGB and users. Therefore, a system for utilization of the digital topographic maps has been organized.

<Technical Aspect>

It is judged and highly expected that the technical staff members of IGB have sustained sufficient technical capacity for digital topographic map production and will maintain it for future. Manuals for the production of topographic maps have been used by IG. Training for the layout was completed in late 2018 and the six sheets of the year 2017 have been currently being formatted and the six sheets of 2018 were fully completed. The fact is proof of the complete control of the 1/50,000 map production process within the IGB. Training is a new feature which the Directorate General has integrated into the new management policy of the structure. All occupational profiles had to participate in at least one week of training in 2018. The ultimate objective is to make the different segments of the structure performance. In the future, IGB intends to create within the ITT department a section responsible for computer development (applications) in order to automate their tasks in production. Currently, the IGB is in full revitalization and in this context, the current Director General has proposed to the Board of Directors a Project Management and training of human resources. In terms of utilization of the website by IGB to provide information about the digital topographic maps, the website was not used because of difficulties. The data are housed on the government site which encountered connection problems. Also, the flow is extremely slow when it seems to work. Attempts to set up the optical fiber also remained without concrete results. The site has been virtually broken.

<Financial Aspect>

The updating of digital topographic maps and the promotion of their use are usually taken into account in the overall budget of the IGB. For the last five years from 2014 to 2018, 200-300 million West African CFA have been allocated to IGB. The state budget enables to produce six map sheets each year. However, unfortunately, this funding is experiencing enormous difficulties: i) Uneven funding (2019 line will not be fed); ii) Budgetary regulations that impede production enormously. Initial amounts are never effective; iii) Untitled production finance on time. Delays in funding often result in production suspensions. Budget line fueled in late September and mid-October. On the other hand, production capacity could be increased if the finance component were much more consolidated and especially available on time from the beginning of each year. For conclusion, the budget is not sufficient for production of digital topographic maps as planned.

- As for the website of the IGB it is hosted on the government website and benefits from the security of the latter.

<Evaluation Result>

In light of the above, there have been a slight problem in the policy aspect and some problems observed in terms of institutional, technical and financial aspects of the implementing agency. Therefore, the sustainability of the project effects is fair.

5 Summary of the Evaluation

The digital topographic maps at the scale of 50,000 developed by the project were used by the Ministry of Mine for the study of the mining project and the development of geological maps of the Southwest of Burkina Faso. As for sustainability, the organizational setting for production of digital topographic maps has been reinforced through the establishment of the two departments and redeployment of the technical staff for the two departments in IGB. On the other hand, the unstable budget allocation has constrained the constant production of digital topographic maps on an annual basis. As for efficiency, the project cost and the project period exceeded the plan.

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

### III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

(For IGB)

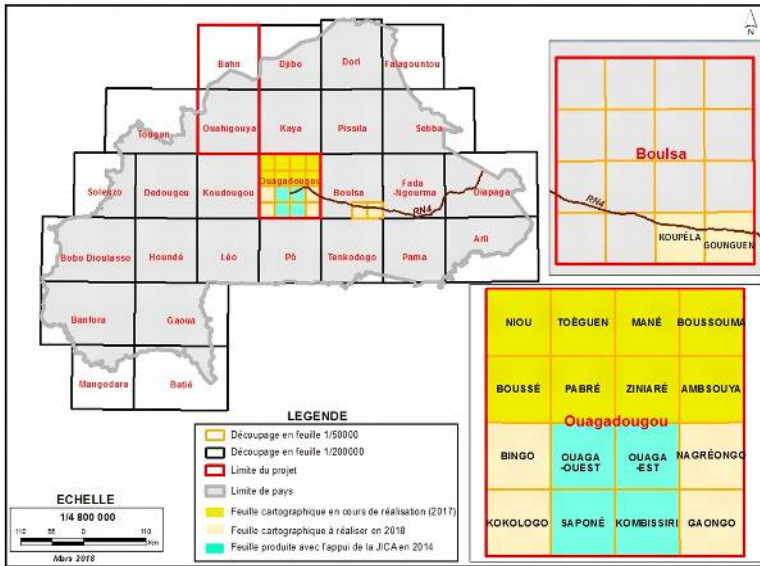
- For the production of digital topographic maps of good quality, IGB must continue with the strengthening of the capacity of the agents and the proper use of the equipment provided. It must also work on the coverage of the whole territory with maps at 1/50,000.
- For the effective use of digital topographic maps, IGB must establish an effective communication system through a dynamic website accessible to users.

Lessons Learned for JICA:

The Project has made progress in modernizing and updating digital topographic map. Also, in West Africa, IGB is one of the best institutes in charge of producing digital topographic maps. As a result, in fact, it is considering the creation of a regional training center for digital topography mapping. Although there is a still room for improvement their technical capacity to produce more complicated and more sophisticated digital maps, the approach of the project covering not only the production of digital topographic maps but also the promotion of utilization of the produced maps through website was effective for enhancement of the technical capacity of IGB, including facilitation of possible users by a user meeting and workshop in the project. As a good practice, it is effective to carefully consider needs and demands of users of digital topographic maps and to carefully design an approach of technical capacity development of the implementing agency at the time of project planning.

For securing financial sustainability for production of the digital topographic maps, in addition to the quality of digital topographic maps and accessibility of users to the maps, the public's awareness of their usefulness is another key issue. It may be more effective to

consider utilize conventional channels communication channels including TV programs and newspapers as well as social networks at the time of project design and/or during the project implementation in order to enhance functionality of the website for promoting sales of the produced maps.



Sites of digital topographic maps produced