

Country Name	The Project for Managing Digital Topographic Data in Djibouti City
Republic of Djibouti	

I. Project Outline

Background	<p>The City of Djibouti, the capital city of the Republic of Djibouti, where the International Autonomous Port of Djibouti, the leading port in the country and the region, is located, was a strategic place for regional economy as well as for domestic economy. The population of the city was approximately 350 thousand persons (as of 2009), and approximately 43% of the total population of the country lived in the city. Economic development in the country and advancement of desertification in the countryside had accelerated the inflow of population into the city, and these migrants chaotically lived in suburbs of the city center where residential lands were not developed properly. In such suburbs, infrastructure such as roads and water and sewerage systems was underdeveloped, and as a result, aggravation of the living and working environment was progressed, obstructing socio-economic stabilization in the city and surrounding suburbs. Under such circumstances, the Government of Djibouti was preparing to establish a development plan in order to address urban problems in the suburbs of the city. However, the existing basic data to be used for planning was the topographic map which showed the city center only of 1989 on the scale of 1/5,000, which was needed to be updated, and the existing data did not identify the range of the urban area that was expanding year by year in accordance with the population growth.</p>										
Objectives of the Project	<p>The project aimed at creating digital topographic maps on the scale of 1/2,500 and orthophotos¹ with a ground resolution of 20cm and technology transfer for independently utilizing and updating the geographic information data in Djibouti City, thereby promoting utilization of the geographic information data in related organizations and for determining policy priorities in national land plans and national development plans and improvement of living environment and developing urban infrastructure.</p> <ol style="list-style-type: none"> Expected Goals through the proposed plan²: (1) Improvement of living environment and development of urban infrastructure are promoted through utilization of the geographic information data. (2) Utilization of the geographic information data is promoted in related organizations. Expected utilization of the proposed plan: Through creating the latest digital topographic maps reflecting the latest information on the national land such as topography and land use, the geographic information data is utilized for determining policy priorities in national land plans and national development plans. 										
Activities of the Project	<ol style="list-style-type: none"> Project Site: Djibouti City Main Activities: (1) Collect and study existing documents and discuss on schema, measurement rules and specifications; (2) Create digital topographic maps (photocontrol points survey, aerial photographing, aerial triangulation, field identification, digital plotting, digital compilation, field completion, complement editing, map symbolization and GIS structuralization); (3) Transfer technologies for independently utilizing and updating the geographic information data; and (4) Issue and promote utilization of the geographic information data etc. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Djibouti Side</td> </tr> <tr> <td>1) Mission members: 13 persons</td> <td>1. Staff Allocated: 17 persons</td> </tr> <tr> <td>2) Trainees Received: 0 person</td> <td>2. Project office</td> </tr> <tr> <td>3) Equipment: GPS and a set of digital mapping equipment</td> <td></td> </tr> </table> 			Japanese Side	Djibouti Side	1) Mission members: 13 persons	1. Staff Allocated: 17 persons	2) Trainees Received: 0 person	2. Project office	3) Equipment: GPS and a set of digital mapping equipment	
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3) Equipment: GPS and a set of digital mapping equipment											
Project Period	March 2012 – February 2014	Project Cost	(ex-ante) 250 million yen, (actual) 217 million yen								
Implementing Agency	Topographic Section, Department of Planning, Djiboutian Road Agency (ADR)										
Cooperation Agency in Japan	PASCO Corporation										

II. Result of the Evaluation

<Constraints on Evaluation >

- Evaluation judgment was made by analyzing the information/data collected by questionnaire and interviews through telephone/email. Site surveys were not conducted under this ex-post evaluation.

<Special Perspectives Considered in the Ex-Post Evaluation >

- [Evaluation of Impact] It is not stated in related documents of this project to what extent digital topographic maps and orthophotos produced under the project were planned to be utilized after project completion. On the other hand, in the ex-ante evaluation sheet, three indicators, (1) national development strategies/plans that were formulated utilizing the digital topographic maps (expected utilization of the proposed plan), (2) records of development projects in various sectors such as infrastructure development including roads and water and sewerage systems which utilize the digital topographic maps (expected goals through the proposed plan), and (3)

¹ An orthophoto is geospatial information in which an image is converted to one shown with a correct size in a right position without a position gap and tilt as if it is a view from a direct top (an image shape is corrected and an image is accurately located), which enables to measure position, an area and distance accurately on an image in geographical information system (GIS) and can be used together with map data (Source: homepage of Geospatial Information Authority of Japan).

² 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).

records of utilization of the digital topographic maps in related organizations (names of projects and plans)(expected goals through the proposed plan), are set as ‘targets expected to be achieved after project completion’ (indicators to be used for ex-post evaluation). In the ex-post evaluation, in evaluating Impact, if records of utilization (see below for the definition of utilization) that fulfill all these three indicators are confirmed, Effectiveness/Impact is judged as “high”, if records of utilization that fulfill one or more indicators are confirmed, Effectiveness/Impact is judged as “fair”, and if no record of utilization that fulfill these indicators is confirmed, Effectiveness/Impact is judged as “low” (however, there is a possibility that the indicators (2) and (3) above overlap depending on how the digital topographic maps are utilized). While in development planning projects, in principle, projects are to be evaluated emphasizing ‘expected utilization of the proposed plan’ (see the footnote 2), as there seems to be no major difference in time required for achieving the indicators (1) to (3) above, in this ex-post evaluation, the indicators (1) to (3) are evaluated equally.

- [Definition of Utilization³] Indicator (1) National development strategies/plans that were formulated utilizing the digital topographic maps: the digital topographic maps produced under the project are utilized as basic information for determining policy priorities in order to achieve goals of current national development policies.

Indicator (2) Records of development projects in various sectors such as infrastructure development including roads and water and sewerage systems which utilize the digital topographic maps: the digital topographic maps produced under the project are utilized as basic information in two to three development projects.

Indicator (3) Records of utilization of the digital topographic maps in related organizations (names of projects and plans): the digital topographic maps produced under the project are shared with five to six organizations and utilized as basic information for project planning in two to three organizations.

1 Relevance

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

The project was consistent with Djibouti’s development policy on ‘urban and rural development’ as set forth in the “National Initiative for Social Development (INSD)(2008-2012)” and “Vision Djibouti 2035 (2013-2035)”, as preparation of topographic map data is required in urban (city) planning for urban and rural development.

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

At the time of ex-ante evaluation (2011), donors such as the World Bank and French Agency for Development were implementing projects for developing infrastructure such as water and sewerage systems in the suburbs of Djibouti City, however, the lack of topographic maps required them to conduct current-condition surveys and topographic surveys in each project. Therefore, there was a high need for developing comprehensive, large-scale digital topographic maps for the entire city that could be used for current-condition identification and outline design. At the time of project completion, the inflow of population into the city progressed further and consequently, the city was further expanded, and there was a high need for developing digital topographic maps to expand areas of digital topographic maps in the city and develop digital topographic maps of regional cities etc.

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

In the Overseas Economic Cooperation Policy Consultation between Japan and Djibouti held in April 2010, Japan’s ODA policy was stated to continue cooperation with a focus on infrastructure development for basic human needs in order to support Djibouti’s economic and social development⁴, and thus this project was consistent with Japan’s ODA policy.

<Evaluation Result>

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

2 Effectiveness/Impact

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

The objectives were achieved by the time of project completion. Digital topographic maps of Djibouti City (an area about 110km², on the scale of 1/2,500) and orthophotos including the suburbs of Djibouti City (an area of about 300km², a ground resolution of 20cm) were created. Moreover, according to the report prepared by mission members (document provided by JICA), as a result of technology transfer, staffs of Topographic Section, Department of Equipment (TSDE)⁵ became technically able to undertake “partial correction (updating the geographic information data)”, and understood the theory on “topographic mapping technique”. In order for the geographic information data prepared under the project to be effectively and widely utilized, TSDE and mission members conducted an actual condition survey to promote dissemination of the geographic information data, stakeholder meetings and utilization promotion seminars etc., in which surveys and information sharing with stakeholder organizations and potential user organizations were conducted, and established stakeholder meetings for the geographic information data.

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

The digital topographic maps and the orthophotos have been partially utilized (limited use) since project completion. The digital topographic maps and the orthophotos have been shared with the Ministry of Equipment and Transports (MET), the Ministry of Housing, Urban Planning and Environment (MHUPE), Electricity of Djibouti (EDD), National Office for Water and Sanitation of Djibouti (ONEAD), and Djibouti Telecom etc., and utilized for preparation of plans in each organization etc. However, as the subject area of the digital topographic maps and the orthophotos is Djibouti City only, they are not utilized for determining policy priorities in national land plans and national development plans. On the other hand, regarding the technical capacity of C/P staffs to independently utilize and update the geographic information data, which was strengthened under the project, most C/P staffs who received technology transfer under the

³ The extent of utilization was defined considering to what extent the geographic information data prepared under the project was supposed to be utilized in what kinds of organizations, based on inquiries to the consultants involved in this project and the sectoral department in JICA and existing documents.

⁴ Source: ODA Country Data Book 2010.

⁵ The implementing agency of the project was Topographic Section, Department of Equipment (TSDE) of the Ministry of Equipment and Transports (MET) in the beginning, however, it was changed to Topographic Section, Department of Planning, Djiboutian Road Agency (ADR) in November 2013 due to the organizational change.

project still work in the Topographic Section, while only one staff was transferred to other section, and equipment for updating the geographic information data provided under the project are operated without problems except for a part of them (a plotter scanner was broken down and is under repair). Moreover, stakeholder meetings for the geographic information data mentioned above were held once in both 2015 and 2016, and as a result, it was determined in a guideline that the owner of for the geographic information data is to be Djiboutian Road Agency (ADR) (Topographic Section, Department of Planning) and ADR needs to distribute the geographic information data to governmental organizations/stakeholders in need of the data. ADR updates the digital topographic maps only when new roads are constructed, and the map data was updated once in 2016.

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

Expected Goals through the Proposed Plan have been achieved by the time of ex-post evaluation. As stated above, the digital topographic maps and the orthophotos are shared with approximately five organizations and utilized as basic information in five development projects and preparation of plans as shown in the table below.

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

No negative impact on natural and social environment has been occurred under the project.

<Evaluation Result>

In light of the above, through the project, the objectives were achieved by the time of project completion. At the time of ex-post evaluation, while it was turned out that the digital topographic maps and the orthophotos are not utilized for determining policy priorities in national land plans and national development plans, Expected Goals through the Proposed Plan have been achieved. Therefore, the effectiveness/impact of the project is high.

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

Aim	Indicators	Results
Create digital topographic maps on the scale of 1/2,500 of Djibouti City (an area about 110km ²) and orthophotos of surrounding areas of Djibouti City (an area of about 300km ²).	1. Digital topographic maps of Djibouti City (an area about 110km ² , on the scale of 1/2,500) are created. 2. Orthophotos including the suburbs of Djibouti City (an area of about 300km ² , a ground resolution of 20cm) are created. 3. Technical capacities of project counterparts (C/Ps) to independently utilize and update the geographic information data are enhanced.	Status of the Achievement: (Project Completion) achieved Digital topographic maps of Djibouti City (an area about 110km ² , on the scale of 1/2,500) were created by February 2014. Status of the Achievement: (Project Completion) achieved Orthophotos including the suburbs of Djibouti City (an area of about 300km ² , a ground resolution of 20cm) were created by February 2014. Status of the Achievement: (Project Completion) achieved As a result of technology transfer, staffs of TSDE became technically able to undertake “partial correction (updating the geographic information data)”. TSDE and mission members conducted an actual condition survey to promote dissemination of the geographic information data, stakeholder meetings and utilization promotion seminars etc., in which surveys and information sharing with stakeholder organizations and potential user organizations were conducted, and established stakeholder meetings for the geographic information data. (Ex-post Evaluation) continued C/P staffs who received technology transfer under the project still work in the Topographic Section except for one staff, and equipment for updating the geographic information data provided under the project are operated without problems except for a part of them. Stakeholder meetings for the geographic information data were held once in both 2015 and 2016, and as a result, ADR became the owner of for the geographic information data. ADR updated digital topographic maps in 2016 following the construction of new roads.
(Utilization Status of the Proposed Plan) Through creating the latest digital topographic maps reflecting the latest information on the national land such as topography and land use, the geographic information data is utilized for determining policy priorities in national land plans and national development plans.	National development strategies/plans that were formulated utilizing the digital topographic maps (The digital topographic maps produced under the project are utilized as basic information for determining policy priorities in order to achieve goals of current national development policies)	(Ex-post Evaluation) not achieved As the subject area of the digital topographic maps and the orthophotos is Djibouti City only, they are not utilized for determining policy priorities in national land plans and national development plans.

<p>(Expected Goals through the Proposed Plan 1) Improvement of living environment and development of urban infrastructure are promoted through utilization of the geographic information data.</p>	<p>Records of development projects in various sectors such as infrastructure development including roads and water and sewerage systems which utilize the digital topographic maps (The digital topographic maps produced under the project are utilized as basic information in two to three development projects)</p>	<p>(Ex-post Evaluation) achieved The digital topographic maps and the orthophotos are utilized in development projects in each sector as shown in the table below.</p> <table border="1" data-bbox="769 145 1560 1303"> <thead> <tr> <th data-bbox="769 145 965 338">Organization in charge</th> <th data-bbox="965 145 1142 338">Projects/Plans that utilize digital topographic maps and orthophotos</th> <th data-bbox="1142 145 1319 338">Progress of projects/plans in the left</th> <th data-bbox="1319 145 1560 338">How digital topographic maps and orthophotos are utilized in projects/plans</th> </tr> </thead> <tbody> <tr> <td data-bbox="769 338 965 501">Ministry of Housing, Urban Planning and Environment (MHUPE)</td> <td data-bbox="965 338 1142 501">Djibouti City Reform Plan (2013-2015)</td> <td data-bbox="1142 338 1319 501">Approved</td> <td data-bbox="1319 338 1560 501">Basic data on urban area related to Djibouti City Reform Plan</td> </tr> <tr> <td data-bbox="769 501 965 757">Electricity of Djibouti (EDD)</td> <td data-bbox="965 501 1142 757">International Transmission Network Construction Plan (duration is unknown, as the plan is under preparation)</td> <td data-bbox="1142 501 1319 757">Under preparation</td> <td data-bbox="1319 501 1560 757">Basic data on urban area related to the transmission network construction plan of Djibouti City</td> </tr> <tr> <td data-bbox="769 757 965 949">Ministry of Equipment and Transport (MET)</td> <td data-bbox="965 757 1142 949">Tram Introduction Plan (duration is unknown, as the plan is under preparation)</td> <td data-bbox="1142 757 1319 949">Under preparation</td> <td data-bbox="1319 757 1560 949">Basic data on urban area related to introducing trams in Djibouti City</td> </tr> <tr> <td data-bbox="769 949 965 1113">Djiboutian Road Agency (ADR)</td> <td data-bbox="965 949 1142 1113">Road Rehabilitation Plan (2015-2016)</td> <td data-bbox="1142 949 1319 1113">Approved</td> <td data-bbox="1319 949 1560 1113">Basic data on urban area related to the road rehabilitation plan in Djibouti City</td> </tr> <tr> <td data-bbox="769 1113 965 1303">National Office for Water and Sanitation of Djibouti (ONEAD)</td> <td data-bbox="965 1113 1142 1303">Sewerage Improvement Plan (duration is unknown, as the plan is under preparation)</td> <td data-bbox="1142 1113 1319 1303">Under preparation</td> <td data-bbox="1319 1113 1560 1303">Basic data on urban area related to the sewerage improvement plan in Djibouti City</td> </tr> </tbody> </table>	Organization in charge	Projects/Plans that utilize digital topographic maps and orthophotos	Progress of projects/plans in the left	How digital topographic maps and orthophotos are utilized in projects/plans	Ministry of Housing, Urban Planning and Environment (MHUPE)	Djibouti City Reform Plan (2013-2015)	Approved	Basic data on urban area related to Djibouti City Reform Plan	Electricity of Djibouti (EDD)	International Transmission Network Construction Plan (duration is unknown, as the plan is under preparation)	Under preparation	Basic data on urban area related to the transmission network construction plan of Djibouti City	Ministry of Equipment and Transport (MET)	Tram Introduction Plan (duration is unknown, as the plan is under preparation)	Under preparation	Basic data on urban area related to introducing trams in Djibouti City	Djiboutian Road Agency (ADR)	Road Rehabilitation Plan (2015-2016)	Approved	Basic data on urban area related to the road rehabilitation plan in Djibouti City	National Office for Water and Sanitation of Djibouti (ONEAD)	Sewerage Improvement Plan (duration is unknown, as the plan is under preparation)	Under preparation	Basic data on urban area related to the sewerage improvement plan in Djibouti City
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<p>(Expected Goals through the Proposed Plan 2) Utilization of the geographic information data is promoted in related organizations.</p>	<p>Records of utilization of the digital topographic maps in related organizations (names of projects and plans) (The digital topographic maps produced under the project are shared with five to six organizations and utilized as basic information for project planning in two to three organizations)</p>	<p>(Ex-post Evaluation) achieved The digital topographic maps and the orthophotos have been distributed to related organizations and utilized as basic data in plans/project planning as shown above.</p>																								

Source : JICA internal document, questionnaire survey and interview with Topographic Section

3 Efficiency

Both project cost and project period were within the plan (the ratio against the plan: 87% and 100%, respectively). Therefore the efficiency of the project is high.

4 Sustainability

<Policy Aspect>

‘Urban and rural development’ and ‘social infrastructure development’ (including preparation of topographic map data) are still emphasized as important issues in “Vision Djibouti 2035 (2013-2035)” and “Strategy for Accelerated Growth and Promotion of Employment (SCAPE)(2015-2019)” which are effective at the time of ex-post evaluation.

<Institutional Aspect>

During the project implementation, it was recommended to upgrade TSDE to the National Directorate of Topography and Geodesy and increase the number of staff from 12 at the time of project completion to 25 in future, as strengthening of TSDE institutionally and financially is necessary in order to sustainably update and utilize the geographic information data. On the other hand, the Department of Equipment of MET has become a public corporation as ADR due to a structural reform of the Djiboutian government, and TSDE has been transferred to ADR and become the Topographic Section, Department of Planning of ADR. As the Topographic Section has become beyond the jurisdiction of MET, it was not upgraded to the National Directorate of Topography and Geodesy, and the Section has not become able to facilitate collaboration with other related organizations regarding updating the geographic information data (it has not reached the level

yet that the data is updated by other organizations and the Section manages it in an integrated manner in future). The Section is composed of the Topography Team, which is responsible for planning and making topographic maps and managing the digital topographic maps and orthophotos etc., and the Geodesy Team, which is responsible for geodetic planning and managing geodetic networks etc., and the number of staff in the Section is 23. At the time of ex-post evaluation, the digital topographic maps and the orthophotos produced under the project have been shared with related organizations and the data has been updated as needed, and thus it can be said that the current number of staff is sufficient. In addition, as stated above, stakeholder meetings to promote utilization of the geographic information data were held in 2015 and 2016 after project completion, and the organizers of the meetings are MET and MHUPE, and participating organizations are ADR, EDD, ONEAD, Djibouti Telecom and Djibouti Center for Research Studies (CERD). MET has established the Department of Digital Topography, in which one staff has been assigned in charge of promoting utilization of the geographic information data and organizing stakeholder meetings.

<Technical Aspect>

As stated above, technology transfer for “partial correction (updating the geographic information data)” was conducted under the project, then the data was updated by the Topographic Section, Department of Planning of ADR in 2016, and stakeholder meetings to promote utilization of the data have been continuously held. Thus, it can be said that the technical level has been maintained after project completion. On the other hand, while technology transfer for partial correction was conducted in the form of on-the-job (OJT) training under the project, analysis related to aerial triangulation for producing original data for geographical information, digital plotting, map symbolization and creating orthophotos were conducted in Japan. While there is no problem on sustainability of project effects, technical transfer on these aspects would be required in the future.

<Financial Aspect>

As stated above, the geographic information data prepared under the project has been updated, and thus it can be said that financial resource to sustain project effects is secured. However, financial data on updating the geographic information data and utilization promotion could not be obtained, as budget management is not conducted in the Topographic Section alone, and thus there are some uncertainties for securing financial resource in future.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of the institutional and financial aspects of the implementing agency. Therefore, the sustainability of the effectiveness through the project is fair.

5 Summary of the Evaluation

Through the project, the objectives were achieved by the time of project completion. At the time of ex-post evaluation, while it was turned out that the digital topographic maps and the orthophotos are not utilized for determining policy priorities in national land plans and national development plans, Expected Goals through the Proposed Plan have been achieved. As for sustainability, slight problems have been observed in terms of the institutional and financial aspects, while policy background and technical aspect are secured.

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

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- As stated above, while the Topographic Section has not been upgraded, collaboration for updating the topographic map data (the data is updated by other organizations and the Section manages it in an integrated manner in future) is desired to be promoted through upgrading of the Section or through strengthening of collaboration with MET, in order to enhance sustainability of project effects.
- In order to enhance sustainability of project effects, skills of technical staff should be developed in other related organizations as well as in ADR so that they can update the digital topographic maps.
- As stated above, financial data on updating the geographic information data and utilization promotion could not be obtained, as budget management is not conducted in the Topographic Section alone. In order to secure sustainability of project effects, proper budget management in the Section is desired.
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Lessons Learned for JICA:

- As stated above, as the subject area of the digital topographic maps and the orthophotos is Djibouti City only, they are not utilized for determining policy priorities in national land plans and national development plans. When implementing a similar project in future, it should be checked whether there is no discrepancy between the project area (Djibouti City in this project) and the proposed plan area (a country as a whole in this project), and targets that are possible to be achieved by the time of ex-post evaluation should be set during project planning.