

Ex-Ante Evaluation (for Japanese ODA Loan)
Southeast Asia Division 2, Southeast Asia and Pacific Department,
Japan International Cooperation Agency

1. Name of the Project

- (1) Country: Kingdom of Cambodia (Cambodia)
- (2) Project: The Project for the Establishment of Nationwide Continuously Operating Reference Station Network
- (3) Project site / target area: the whole of Cambodia

Grant agreement: November 6, 2023

2. Background and Necessity of Project

(1) Current State and Issues of Surveying Sector Development and the Priority of the Project in Cambodia

In Cambodia, the 2001 amendment to the Land Law established government responsibility for the protection of private land rights, and the Ministry of Land Management, Urban Planning and Construction (MLMUPC) has started to conduct land boundary surveys, register ownership in the land registry and operate a land registration system throughout Cambodia. Even today, position methods that use measurement equipment at each location are common in Cambodia, which is notably lagging behind in the modernization of surveying technology. Land registration forms the basis for clarification of ownership and land development, the delays in registration lead to problems over ownership, stagnation of real estate transactions, and delays in new development projects, as well as lost of opportunities for the government to collect land transactions taxes.

Cambodia's most important development strategy, the Rectangular Strategy – Phase IV (2018-2023), identifies “strengthening the management of urbanization” as a priority, and the efficient implementation of land surveying, topographic mapping, and civil works for development are challenges. Moreover, with Cambodia's strong economic growth in recent years and the need for further infrastructure development, it is essential to modernize and accelerate surveying technology. To solve these issues, an effective method to improve the efficiency of survey work is to survey based on Continuously Operating Reference Stations (CORS), which use satellite positioning to obtain accurate position information at all times. In addition, the installation of CORS will enable highly accurate positioning, which is expected to create businesses

for digital transformation utilizing new high-precision positioning services in various fields, such as autonomous driving of agricultural machinery.

In light of the above context, the MLMUPC, with the General Department of Cadastre and Geography (DGCG), which handles land registration and assessment, land management, cadastral surveying, topographic map development, and geographical coordinate system management, as its executing agency, requested technical cooperation to Japan with the aim of speeding up cadastral surveying and gaining the ability to supply high-accuracy positioning services, and since 2021, JICA has been implementing a preliminary technical cooperation project, the Project on Establishment of Continuously Operating Reference Stations (CORS) for Land Management and Infrastructure Development (2021-2023). This project is providing cooperation for the purpose of introducing CORS in the pilot areas of Phnom Penh, Siem Reap, and Stung Treng (5 stations), strengthening data center development, operation, maintenance, and management capabilities, and promoting the utilization of high-accuracy positioning information. To expand the benefits across Cambodia, it is vital that a CORS network covering the entire country be developed.

The Project for the Establishment of Nationwide Continuously Operating Reference Station Network (hereinafter “the Project”) will strengthen administrative services for land registration and land transactions through establishing the CORS network for rapid and accurate measurement and Data Center to provide integrated management of these, by contributing to improving the promotion of development projects in Cambodia. It is recognized as a high-priority development project aligned with the direction of the Rectangular Strategy – Phase IV. It is also expected to create new high-accuracy positioning business in various fields and further boost socio-economic growth in Cambodia in addition to resolving issues in the survey field.

(2) Japan’s and JICA’s Policy Cooperation Policy and Operations in the Surveying Sector

In the Japanese Development Cooperation Policy for the Kingdom of Cambodia (July 2017), Japan recognizes “better quality of life” as a priority area and states that it will engage in “support in fields that contribute to developing the urban life environment.” Furthermore, the JICA Country Analysis Paper for the Kingdom of Cambodia (March 2014) states that it will “consider support for formulating and implementing higher-standard infrastructure development projects with the aim of developing Infrastructure in the medium to long term.”

The Project is consistent with this policy and analysis. Promoting the development and utilization of the CORS network is also consistent with “supporting the development and utilization of geospatial information” in JICA’s Global Agenda, and in conjunction with cooperation activities in the CORS sector carried out in Thailand, Myanmar, and Bangladesh, area expansion in the Asia region would be expected. It will contribute to the promotion of efficient land management and infrastructure development and business development and innovation creation that leverage real-time, high-accuracy positioning information as well.

Furthermore, 2025 Policy Program for Promotion of Overseas Infrastructure Systems (determined at the bureau's infrastructure strategic meeting in December 2020) states that it will promote CORS installation, operational support, and high-accuracy positioning services aimed at spreading its positioning system methods, while the Third Basic Plan for the Advancement of Utilizing Geospatial Information (decided by the Cabinet in March 2017) stipulates "overseas expansion of high-accuracy positioning services leveraging the CORS network and quasi-zenith satellite system Michibiki" as one of its priority measures. The Project will contribute to the realization of these plans.

(3) Other Donors’ Activities

Not applicable.

3. Project Description

(1) Project Description

① Project Objective: Through establishing the CORS network and developing Data Center for land registration and land transactions, the Project aims to strengthen administrative services for land registration and land transactions, thereby contributing to the promotion of development projects in Cambodia.

② Project Components

a) Details of Facilities, Equipment, Etc.:

Facilities – antennae for CORS

Equipment – equipment for CORS (94 stations), equipment for Data Centers (servers, software, etc.)

b) Details of Consulting Services / Non-Physical Components:

Detailed design, bidding assistance, construction and procurement supervision, training (CORS daily management, maintenance and repairs,

data management)

c) Procurement and Construction Methods:

Equipment will be procured in Japan or locally in Cambodia. Construction materials will be procured locally. Facility and equipment suppliers will be specified for the full amounts.

③ Project Beneficiaries (Target Group)

Direct beneficiaries: MLMUPC, surveying stakeholders

Final beneficiaries: all residents (population: approx. 16 million)

(2) Estimated Project Cost

1.348 billion yen (estimated share: Japan side – 1.338 billion yen, Cambodia side – 10 million yen)

(3) Schedule (Cooperation Period)

September 2023 to August 2025 (total of 24 months). The Project will be considered to be completed when all equipment has started to be in service (August 2025).

(4) Project Implementation Structure

1) Executing Agency: GDCG, MLMUPC

2) Operation and Maintenance System: GDCG, MLMUPC

(5) Collaboration and Sharing of Roles with Other Donors

1) Japan's Activity

Personnel developed by the Project on Establishment of Continuously Operating Reference Stations (CORS) for Land Management and Infrastructure Development (2021-2023), which is a technical cooperation project, are expected to handle operation, maintenance, and management of the CORS developed by the Project and to promote their utilization.

2) Other Donors' Activity

Not applicable.

(6) Environmental and Social Consideration

1) Environmental and Social Consideration

① Category: C

② Reason for Categorization: The Project's undesirable impact on the environment, according to the JICA Guidelines for Environmental and Social Considerations (promulgated in January 2022), is deemed to be minimal.

(7) Cross-Sectoral Issues: Not applicable.

(8) Gender Category: GI (gender-activity integration project)

<Details of Activities/Reason for Categorization> The Project has agreed to consider the participation of women in daily management of the CORS' non-physical components.

(9) Other Important Issues: Not applicable.

4 . Targeted Outcomes

(1) Quantitative Effects

Indicator	Baseline (actual value in 2023)	Target (2028) [3 years after project completion]
Number of CORS	5 stations	99 stations
Area surveyed by CORS (40-km radius)	5,024 km ² (2.8% of country's land)	177,867 km ² (98.1% of country's land)
Number of CORS users	338	1,200

(2) Qualitative Effects

- Speeding up and increasing the efficiency of surveying work, improving administrative services related to land transactions, promoting infrastructure development based on improvements.
- Promoting activities leveraging high-accuracy positioning information (automated operation of agricultural machinery, drone deliveries, etc.).

5 . External Factors and Risk Control

There will be no delays in supplying installation locations by the counterparty government.

6 . Lessons Learned from Past Projects

In the ex-post evaluation of the Digital Topographic Mapping Project for Burkina Faso (evaluated in 2018), the counterparty government's capacity to continue securing funds for maintenance and management expenses following the project's completion was identified as an issue. Based on the lesson of reducing the fiscal burden by lowering the required maintenance and management expenses, the Project has selected equipment specifications that limit maintenance and management expenses, such as considering equipment that rarely breaks down.

7 . Evaluation Results

The Project is consistent with Cambodia's development issues and policies and with Japan's and JICA's cooperation policies and analyses, and through developing a CORS network that will make it possible to speed up surveying and conduct high-accuracy positioning across Cambodia and developing Data Center equipment, it aims to enhance administrative services related to land registration and land transactions, thereby improving the quality of living by developing Cambodia's urban living environments. Since it may be considered to contribute to SDG Goal 9 (build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation) and Goal 11 (make cities and human settlements inclusive, safe, resilient, and sustainable), there is a strong need to support its implementation.

8 . Plan for Future Evaluation

(1) Indicators to Be Used

As indicated in Section 4.

(2) Future Evaluation Schedule

Ex-post evaluation: 3 years after project completion

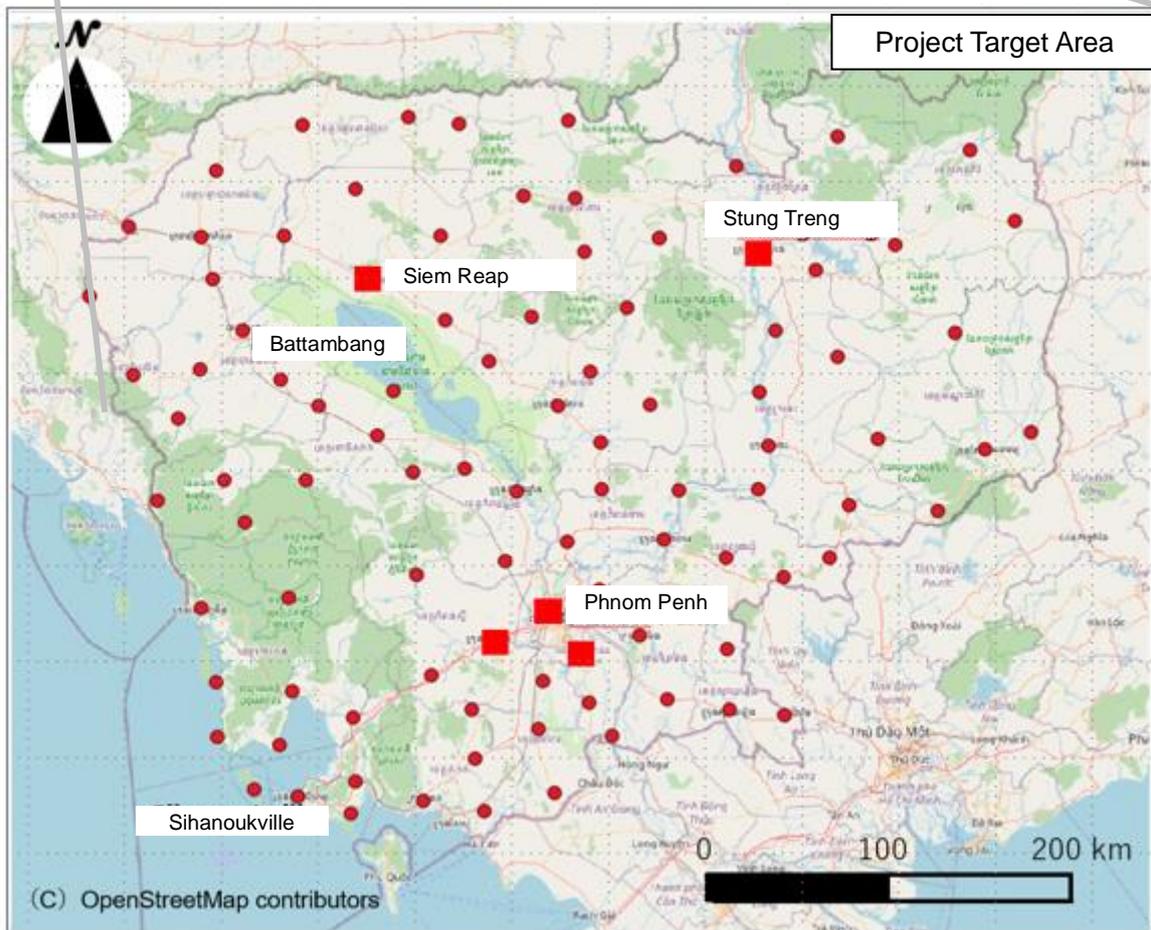
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Appendix: Project for the Establishment of Nationwide Continuously Operating Reference Station Network – Maps

Project for the Establishment of Nationwide Continuously Operating Reference Station Network – Maps



(Source: Ministry of Foreign Affairs website)



Legend	
■	Existing stations (TC Project) = 5
●	Planned stations = 94

(Source: created by JICA study team)