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| Country Name | The Project for River Basin Water Resources Utilization in the Kingdom of Cambodia |
| Kingdom of Cambodia | |

I. Project Outline

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|---|--|--------------------------------------|---|---------------|----------------|------------------------|--------------------------------|---|---------------------------------|---|--|---|--|--|--|
| Background | Cambodia has abundant water resources, but the difficult control of the Tonle Sap Lake and the Mekong River has caused limited water resources in their tributaries suitable for use in irrigation and power generation. Projects for irrigation and hydroelectric power generation were carried out in the same river basin to utilize existing water resources effectively. However, there was a concern that these projects would not be able to secure the planned quantity of water resources due to inadequate coordination between relevant organizations, so the establishment of water resource management in the whole basin and a water resource use coordination mechanism for the above management were urgent matters. | | | | | | | | | | | | | | |
| Objectives of the Project | By collecting and managing meteorological and hydrological data and information, setting up an institutional framework for coordinating river basin water resource utilization, developing a river basin runoff model and water balance model, and formulating river basin water resource development/management plans in the western area of Tonle Sap Lake and the southwestern area of Phnom Penh, the project aims at developing the management and coordination mechanism for water resource utilization, thereby contributing to the operation of the mechanism on a trial basis toward effective, equitable and sustainable water resource management. | | | | | | | | | | | | | | |
| | <ol style="list-style-type: none"> Overall Goal: Management and coordination mechanism for water resource utilization is operated on a trial basis toward effective, equitable and sustainable water resource management. Project Purpose: Management and coordination mechanism for water resource utilization is developed. | | | | | | | | | | | | | | |
| Activities of the Project | <ol style="list-style-type: none"> Project site: Pursat, Battambang, Kampong Chhnang, Kampong Speu, Kandal and Takeo provinces Main activities: training of MOWRAM staff on meteorological and hydrological data analysis, setting up of pilot River Basin Management Committees (RBMC) and its secretariat, training of Farmer Water User Community (FWUC) representatives and commune chiefs on water resources use, development of materials for water use resources use coordination, development of draft river basin water resources development/management plans, 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%;">Cambodian Side</td> </tr> <tr> <td>1) Experts: 14 persons</td> <td>1) Staff allocated: 37 persons</td> </tr> <tr> <td>2) Trainees received in Japan: 11 persons</td> <td>2) Facility: Office space, etc.</td> </tr> <tr> <td>3) Trainees received in the third countries (Vietnam, Philippines, Indonesia, Malaysia, Thailand and Singapore): 10 persons</td> <td>3) Local cost: Survey cost for remaining landmines, maintenance of the equipment, etc.</td> </tr> <tr> <td>4) Equipment: Vehicles, rubber boats, meteorological and hydrological observation equipment, PC, GIS software, etc.</td> <td></td> </tr> <tr> <td>5) Local cost: training expenses, etc.</td> <td></td> </tr> </table> | | | Japanese Side | Cambodian Side | 1) Experts: 14 persons | 1) Staff allocated: 37 persons | 2) Trainees received in Japan: 11 persons | 2) Facility: Office space, etc. | 3) Trainees received in the third countries (Vietnam, Philippines, Indonesia, Malaysia, Thailand and Singapore): 10 persons | 3) Local cost: Survey cost for remaining landmines, maintenance of the equipment, etc. | 4) Equipment: Vehicles, rubber boats, meteorological and hydrological observation equipment, PC, GIS software, etc. | | 5) Local cost: training expenses, etc. | |
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| 5) Local cost: training expenses, etc. | | | | | | | | | | | | | | | |
| Project Period | (ex-ante) May 2014 to April 2019 (60 months) (actual) 17 May 2014 to 16 May 2019 (60 months) | Project Cost (Japanese side only) | (ex-ante) 603 million yen (actual) 538 million yen | | | | | | | | | | | | |
| Implementing Agency | Ministry of Water Resources and Meteorology (MOWRAM) | | | | | | | | | | | | | | |
| Cooperation Agency in Japan | None. | | | | | | | | | | | | | | |

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

[Confirmation of the continuation status with Indicators 1 and 2 of the Project Purpose]

- In the ex-post evaluation, the same survey could not be applied to measure the knowledge and expertise level of the staff of MOWRAM and the Provincial Department of Water Resources and Meteorology (PDWRAM) and the water users' satisfaction as they were evaluated during the project period. Supplemental information was collected and used to verify the continuity of the project effects.

[Confirmation of the achievement of Indicator 1 of the Overall Goal]

- Indicator 1 of the Overall Goal (The relevant departments in MOWRAM have enough staff number, system, and original budget for conducting river basin water resources management on their own) was not used to confirm the achievement status of the Overall Goal, but the information was used to verify the institutional and financial aspects of the sustainability.

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Cambodia at the Time of Ex-Ante Evaluation>

In the "Rectangular Strategy Phase III" (2014-2018), the Cambodian government considered the improvement and diversification of agricultural productivity as a key issue for the sustainable development of agriculture, focusing on the management of river basin water resources and irrigation systems to ensure effective use and sustainable development of water resources. The project was consistent with the development policy of Cambodia at the time of ex-ante evaluation.

<Consistency with the Development Needs of Cambodia at the Time of Ex-Ante Evaluation>

The river basin water resource management capacity of MOWRAM remained at a limited level due to the lack of knowledge of water resource management and coordination between the organizations concerned. The project was consistent with the development needs of Cambodia at the time of ex-ante evaluation.

<Appropriateness of Project Design/Approach>

The project design/approach was highly appropriate. First, the project considered gender equality in RBMC meetings' participants and supported a fair and equitable election of FWUCs' representatives. Second, based on the past projects' lessons regarding the capacity building of the counterpart personnel, the project conducted basic technical training at the early stage of the project period. Also, the project assigned a Khmer-Japanese interpreter to important meetings for better communication and mutual understanding of the project activities.

<Evaluation Result>

In light of the above, the relevance of the project is ③¹.

[Coherence]

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

In the "Country Assistance Policy for Cambodia" (2012), one of the priority areas was the strengthening of the economic infrastructure, in which agriculture and rural development is one of the main themes. The project was consistent with Japan's ODA policy to Cambodia at the time of ex-ante evaluation.

<Collaboration/Coordination with JICA's other interventions>

The collaboration/coordination between the project and the "West Tonle Sap Irrigation and Drainage Rehabilitation and Improvement Project I & II" (CP-P11 & CP-P23) (2011-2022) and the "Southwest Phnom Penh Irrigation and Drainage Rehabilitation Project I & II" (CP-P14 & CP-P28) (2014-2026) of JICA planned at the time of ex-ante evaluation was planned and implemented beyond the plan, and the positive effects expected were confirmed at the time of ex-post evaluation. The project invited the stakeholders of CP-P11 & CP-P23 to Pursat RBMC meetings and coordinated with new FWUCs established by CP-P11 & CP-P23 through discussions and field visits. Relevant organizations involved in CP-P11 & CP-P23 have kept utilizing the network function of Pursat FWUC-Net developed by the project, which has facilitated operation and maintenance activities for the rehabilitated irrigation facilities in CP-P11 & CP-P23. Also, the project experience in the operation and maintenance of the irrigation system has been utilized in CP-P14 & CP-P28, replicating the FWUC training program and extension services in Kampong Speu, Kandal and Takeo Provinces. Furthermore, the project exchanged information on meteorological and hydrological data collection such as observation stations and discharge measurement with the SATREPS Project titled "Project on Establishment of Environmental Conservation Platform of Tonle Sap Lake" (2016-2022) and contributed to strengthen the research platform, even though it had not been planned at the time of ex-ante evaluation.

<Cooperation with other institutions/ Coordination with international framework>

The cooperation/coordination with the French Development Agency (AFD) and the Asian Development Bank (ADB) was planned at the time of ex-ante evaluation and implemented as planned, and the positive effects were confirmed at the time of ex-post evaluation. The project shared the knowledge and experiences on the establishment of RBMC by participating in Stung Sen RBMC meeting which was supported by AFD. Also, the project established Pursat and Boribo-Bamnak RBMCs in accordance with the sub-decree on river basin management drafted by ADB.

<Evaluation Result>

In light of the above, the coherence of the project is ③.

[Evaluation Result of Relevance/Coherence]

In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the Time of Project Completion>

At the time of project completion, the Project Purpose was mostly achieved as planned. The staff of MOWRAM and the target PDWRAMs gained knowledge and expertise in the field of river basin planning, coordination, and management, although the achievement level could not reach the target (Indicator 1). On the other hand, the satisfaction level of water users on the Pursat River Basin Water Resources Use Plan exceeded the target (Indicator 2).

<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>

By the time of the ex-post evaluation, the project effects have continued. The staff of MOWRAM and PDWRAMs have sustained their knowledge and expertise in the field of river basin water resource planning, coordination, and management, as explained in the following table and the following information. The staff of MOWRAM and PDWRAMs have regularly collected data from 103 observation stations. PDWRAMs have worked as the RBMC secretariat. Although RBMCs were suspended due for some period to the Pandemic of COVID-19, they have been resumed and active as of the time of ex-post evaluation. With technical support from PDWRAM, all of FWUCs strengthened by the project have been active. Also, FWUC-Net has been functioning as a platform for sharing and discussing water conflicts and countermeasures. Pursat PDWRAM has developed comprehensive water distribution plans for all FWUCs, employing a rotational system to ensure equitable access for all users. FWUCs have been able to distribute water based on each user's location, and established schedules and priorities, ensuring an equitable allocation for all users, thus mediating potential conflicts that might arise.

All of the target PDWRAMs have operated all of the five calculation models of river basin water balance developed by the project for water distribution. For solving issues among water users, if any, PDWRAM coordinates with the local authority for solutions. For smooth communication, PDWRAMs have created the Telegram group (a popular social media platform in Cambodia) to provide updated information regarding water consumption and to solve any issues that happen in water consumption among all users.

<Status of Achievement of the Overall Goal at the Time of Ex-Post Evaluation>

At the time of ex-post evaluation, the Overall Goal has been mostly achieved as planned. MOWRAM has made efforts to diffuse the river basin water resources utilization coordination mechanism to other target river basins. As a result, the coordination mechanism has been implemented in all project's target provinces for distributing river basin water resources to all users (Indicator 2). This approach has minimized the risk of major conflicts concerning water utilization. Each target province has established FWUCs to manage water within their respective areas. Almost all farmland has been expanded into irrigated areas in the target river basins (Pursat and Boribo-Bomnak) during the rainy season (Indicator 3). To ensure sufficient water resources, MOWRAM has planned to construct the dam No.2 in the Pursat River basin upstream.

<Other Impacts at the Time of Ex-Post Evaluation>

Several positive impacts have been confirmed. First, farmers have reliable water access even during the dry season, which has enabled

¹ ④ : very high, ③ : high, ② : moderately low, ① : low

them to cultivate rice twice per year, leading to increased income and improved livelihoods, according to the Technical Services Center for Irrigation and Meteorology (TSC), Department of Hydrology and River Works (DHRW), and PDWRAMs. Second, thanks to the collected water level data, MOWRAM and PDWRAMs have been able to provide data on water level to relevant authorities for flood control, which has enhanced their flood response mechanisms. Third, by promoting women's participation in the project activities, more women have gotten involved in RBMC meetings and become empowered. According to TSC and PDWRAMs, women's active engagement has ensured more equitable and sustainable water management practices. For example, a woman who was elected as the representative of Kandieng Station FWUC has achieved a collection rate of around 99% of contributions from the member farmers. Furthermore, since 2022, that FWUC has started solar-powered water intake pump to ensure sufficient water and increase income of FWUC. Fourth, the project output has been referred to by other donors. For instance, ADB project on "Integrated Water Resources Management" (2023-2029) would support planning, managing and coordinating functions for water resource utilization targeted other river basins of Pursat and Battambang Provinces. The Guideline for Establishing and Operating RBMC which was prepared by the project would be utilized.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ③.

Achievement of Project Purpose and Overall Goal

| Aim | Indicators | Results | Source |
|--|---|---|--|
| (Project Purpose) Management and coordination mechanism for water resource utilization is developed. | 1. The level of knowledge and expertise of MOWRAM/PDWRAM staff as "River Basin specialists/experts" in the field of river basin planning, coordination and management is improved from 2.11 to 3.0. | Status of the Achievement (Status of the Continuation): mostly achieved as planned (continued) (Project Completion) <ul style="list-style-type: none"> The level of knowledge and expertise of MOWRAM/PDWRAM staff as "River Basin specialists/experts" in the field of river basin planning, coordination and management was improved from 2.11 to 2.71. (Ex-Post Evaluation) <ul style="list-style-type: none"> As supplemental information, MOWRAM has provided regular training with PDWRAM staff once or twice per year on river basin management mapping, river basin water resource utilization, river basin runoff, and water balance model, etc. The meteorological and hydrological data has been automatically recorded to MOWRAM, while manual observation stations have been managed by each PDWRAM. | PCR, TSC, DHRW, and PDWRAMs. |
| | 2. The rate of water users who are satisfied with the development/management plans in the target river basins is increased to 50%. | Status of the Achievement (Status of the Continuation): achieved beyond the plan (continued) (Project Completion) <ul style="list-style-type: none"> The rate of water users who were satisfied with the Pursat River Basin Water Resources Use Plan was increased to 95%. (Ex-Post Evaluation) <ul style="list-style-type: none"> As supplemental information, farmers at the target river basins have received enough water for their paddy fields. There has been no major conflict among the water users. | PCR, TSC, Kandieng Station & Boeung Kansaeng FWUCs, PDWRAMs. |
| (Overall Goal) Management and coordination mechanism for water resource utilization is operated on a trial basis toward effective, equitable and sustainable water resource management. | 2. The river basin water resources utilization coordination mechanism is applied into all river basin in the target provinces based on the project's outcomes and experiences. | Status of the Achievement: Achieved as planned. (Ex-Post Evaluation) <ul style="list-style-type: none"> The coordination mechanism has been implemented for distributing river basin water resources to all users in all target Provinces. | DWRMC, PDWRAMs. |
| | 3. Almost all farmland expands into irrigated areas in the respective target river basin and the safely level of water. | Status of the Achievement: Almost achieved as planned. (Ex-Post Evaluation) <ul style="list-style-type: none"> Almost 100% of farmland in Pursat and Boribo-Bomnak river basins has become irrigated farmland during the rainy season, although the percentage has dropped during the dry season due to the limitation of water availability. | Kandieng Station & Boeung Kansaeng FWUCs, PDWRAMs. |

3 Efficiency

Both the project cost and the project period were within the plan (the ratio against the plan: 89% and 100%, respectively). Part of the project cost was saved, because highly-skilled Cambodian consultants were deployed for survey and training activities, instead of Japanese short-term experts.

For Outputs were produced as planned.

| | Project Cost (Japanese side only, yen) | Project Period (months) |
|----------------|--|-------------------------|
| Plan (ex-ante) | 603 million yen | 60 months |
| Actual | 538 million yen | 60 months |
| Ratio (%) | 89% | 100% |

In the light above, the efficiency of the project is ④.

4 Sustainability

<Policy Aspect>

In the "Five Years Strategic Development Plan on Water Resources Management and Development" (2024-2028) which was the draft at the time of ex-post evaluation, two of the strategies focus on improving the effectiveness of water resources management and development including the implementation of irrigation systems as well as increasing the effectiveness in the protection and conservation in water resources sector. In addition, MOWRAM established the National River Basin Management Committee (RBMC) in 2023 to manage, conserve, and develop all the river basins effectively and sustainably at the country level.

<Institutional/Organizational Aspect>

The National RBMC prepares guidelines and monitors RBMCs at the provincial and municipal levels in the preparation and implementation of the related strategic development plan and action plan for the effective management, conservation, and development of the river basin. Provincial and municipal RBMCs report the implemented activities to the National RBMC.

The organizational structure of MOWRAM and PDWRAMs has been functioning, although some staff members have been changed because of the structural change, rotation of working places, retirement, etc. Although new staff have been assigned to ensure the continuity of the water resource management and coordination activities, the number of staff has not been sufficient at MOWRAM and PDWRAMs. To promote the mechanism strengthened by the project, MOWRAM has assigned 35 members in the relevant two Departments and 13 in TSC, while the number of members of the six target PDWRAMs has varied from nine to 32. PDWRAMs have tried to ensure their responsibilities by contracting retired members as trainers or advisors and leveraging rotated members to technically support colleagues.

<Technical Aspect>

The staff of MOWRAM and PDWRAMs have sustained their knowledge and expertise in the field of river basin planning, coordination, and management, as explained in the <Continuation Status of Project Effects at the Time of Ex-Post Evaluation> section. TSC has delivered six to seven training sessions per year to maintain their technical skills. In addition, some of them have participated in JICA training in Japan on river basin water resources utilization. Most of the manuals and guidelines developed by the project have been utilized, including the "Guideline for Establishing and Operating RBMC."

<Financial Aspect>

MOWRAM and PDWRAMs have tried to allocate the annual government budget for maintaining and strengthening the river basin water resources management. However, due to limited budget resources of the central government, the final allocation of the budget depends on the national development priorities, which was prioritizing the facility maintenance at the time of ex-post evaluation. MOWRAM and PDWRAMs have strived to optimize the allocated budget to maximize the impact of their efforts, especially for the capacity building of their staff. MOWRAM and PDWRAMs have kept requesting a budget through the annual budget plan and the three-year development plan.

<Environmental and Social Aspect>

No issue on environmental and social aspects has been observed, and it has not been necessary to take any countermeasures.

Climate change has been a growing risk factor for the fluctuating water levels in the river basin. As for the countermeasure, PDWRAMs have conducted the daily monitoring of water levels. In case of high-water levels triggering notification alerts, PDWRAMs immediately inform the Natural Disaster Department, which then disseminates the information to farmers and residents for flood prevention. During the dry season, PDWRAMs follow MOWRAM's water allocation directives and notify farmers about safe irrigation quantities.

<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 project effects is ③.

5 Summary of the Evaluation

The project achieved the Project Purpose almost as planned which was to develop the management and coordination mechanism for water resource utilization. The mechanism has been sustained and implemented, and the irrigated farmland has been expanded mostly as planned (Overall Goal). Regarding sustainability, there have been partial personnel and budget shortages, but efforts to maximize the effects with the allocated resources have been conducted.

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

III. Non-Score Items

Adaption and Contribution:

- Regarding JICA's communications and collaboration with MOWRAM, it is noteworthy that JICA experts' desks were arranged next to the counterparts of MOWRAM, and this contributed to close communication and relationship between the project members. This friendship has continued even after the time of project completion, which has enabled the office in charge at HQs and the Cambodia Office to sustain favorable communication with MOWRAM for the implementation and coordination of the country training in Japan.

Additionality and Creative Values:

- As an example of knowledge co-creation, the project conducted technical exchanges with JICA's other projects for irrigation and river basin management in neighboring countries (Vietnam, Thailand, Philippines, and Indonesia). The knowledge and experiences gained through technical exchanges were utilized effectively for developing the River Basin Water Resources Use Plan and organizing RBMC meetings.

IV. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- The National RBMC and its secretariat have been just established. To ensure their activities are effective and sustainable nationwide, MOWRAM, in cooperation with PDWRAMs and other relevant stakeholders, should make a clear plan to conduct regular meetings and promote awareness raising on river basin management among relevant stakeholders including water users, so that water resources of all river basins be effectively and sustainably managed. The target water users should not be limited to farmers but also water users for multipurpose water supply, such as the private sector stakeholders, public populations, etc. whose understanding is necessary for efficient water allocation.

Lessons Learned for JICA:

In the project, a working team was formulated for each Output, and the team members were appointed from eight departments of

MOWRAM. As stated earlier, basic technical training was conducted at the early stage of the project period for their capacity building. Some members, who had less experience in certain areas such as the formulation of the River Basin Water Resources Use Plan, could understand the concept but had difficulty in embodying it in the activities. When assigning the counterpart personnel, it is necessary to carefully discuss their background and experience with the implementing agency so that they can match with the project outputs. If it is difficult to assign such personnel, it is effective to conduct technical training at the early stage and continue the on-the job training during the project period. This will be the key to the successful implementation and the continuity of the project effects.



Secretariat Meeting of Boribo-Bomnak RMBC in 2023
(Kampong Chhnang Province)



Exchange Activities between Kandieng Station FWUC (Pursat River Basin) and Lum Hach FWUC (Boribo-Bomnak River Basin) in 2023
(Pursat Province)