Internal Ex-Post Evaluation for Grant Aid Project

conducted by Sri Lanka Office: Dec 2022

Country Name	**the Project for Rehabilitation of Kilinochchi Water Supply Scheme**
Democratic Socialist Republic of Sri Lanka	

I. Project Outline

Background	Kilinochchi District is in the Northern Province and has an urban center of approximately 20,000 populations. The only water supply system in Kilinochchi District, constructed in 1982, had been destroyed during the conflict and abandoned. The people in Kilinochchi then depended on the water tankers for their water needs. Restoring the water supply system was one of the most urgent issues for the people in Kilinochchi.						
Objectives of the Project	This project aimed to improve access to safe water by rehabilitating the existing water supply scheme (WSS) in the conflict-affected Kilinochchi District, thereby contributing to the stabilization of people's livelihood, the return of internally displaced persons (IDPs), and the improvement of public health through the reduction of waterborne diseases.[1]						
Contents of the Project	1. Project Site: Kilinochchi Water Treatment Plant (WTP) (planned water treatment capacity: 3,800m3/day), Kilinochchi (Central College) Elevated Water Tank (1,000m3), Paranthan Elevated Water Tank (450m3), Kilinochchi & Paranthan, Kilinochchi District, Northern Province 2. Japanese side 1) Civil engineering work and equipment procurement[2] New construction/installation: water intake, roughing filters, washed sand storage yard, roughing filters washing wastewater storage pond, elevated water tanks, transmission pipes (PE and DIP), distribution pipes (PVC, etc.), administration buildings. Rehabilitation: intake tank, intake pump house, receiving wells and aerators, slow sand filters, administration building (frame). The Japanese contractor left the site after the completion of 85% of the works due to security reasons caused by unexploded ordnance (UXO) found many times during construction. The remaining works at the WTP site were handed over to the Japanese consultant, and the remaining pipe laying works were taken by the National Water Supply and Drainage Board (NWSDB). Accordingly, the works for the WTP were carried out by the local contractor, mobilized by the consultant, with the remaining material provided by the Japanese contractor. Equipment: electric generator, etc. (newly installed), materials of house connection (approx. 1,500 sets), laboratory equipment, operation and maintenance (O&M) equipment 2) Consulting services/soft component Providing technical assistance for (a) O&M of water treatment plants, (b) maintenance of water distribution systems, (c) water pipe connection, (d) maintenance of mechanical and electrical equipment, (e) water quality monitoring and management, Civil works at WTP (as noted above 2.1) 3. Sri Lanka side: Miscellaneous works at the WTP and elevated water tanks sites, house connection works, wastewater treatment, laying of distribution pipes that were handed over from the Japanese contractor with the remaining materials (as noted above 2.1)						
Project Period	E/N Date	(Original) March 6, 2012 (Extension) August 14, 2015	Completion Date (ex-ante)	March 2014	Completion Date (actual)	September 30, 2016 (Completion of the civil works[3])	
	G/A Date	(Original) March 6, 2012 (Extension) August 14, 2015					
Project Cost	E/N Grant Limit / G/A Grant Limit: (original) 677 million yen (amendment) 925 million yen Actual Grant Amount: 826 million yen						
Executing Agency	National Water Supply and Drainage Board (NWSDB)						
Contracted Agencies	Main Contractor(s): Daiho Corporation Main Consultant(s): NJS Co., Ltd.						

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-Post Evaluation >

- The Ex-ante Evaluation Sheet indicated that the target year for the manifestation of the quantitative effects was 2016, two years after the completion of the project. However, since the project was completed in 2016, the comparison between the planned and actual values for the target year was made for 2018, two years after the actual project completion. In addition, we considered the performance up to the time of ex-post evaluation.
- The qualitative effects assumed in the Ex-ante Evaluation Sheet, namely, "stabilize people's livelihoods," "facilitate the return of IDPs," and "improve public health," can be regarded as consequences of the project's direct outcome, namely, "improve access to safe water." Therefore, we verified them as the qualitative effects at the level of "impact," not "effectiveness." For the direct qualitative effects of the project, we assessed the effects of the technical assistance (soft component).

[1] The text before "thereby" is the translation of the Project Objective in the Ex-ante Evaluation Sheet. In accordance with the template of project objectives, we added "thereby contributing…" as the expected impact of this project. It was taken from the qualitative effects assumed in the Ex-ante Evaluation Sheet, which reads, "A stable supply of safe water is expected to stabilize people's livelihoods, facilitate the return of IDPs, and improve the health of the population by reducing waterborne diseases."

[2] The main items described here were implemented as planned. However, the quantity of pipe laying, additional waterproofing, and concrete bedding at slow sand filters were needed due to changes in circumstances after the project's start.

[3] Completion date for the portion constructed by the local contractor undertaken after the Japanese contractor completed 85% of the work on June 30, 2015.

1 Relevance/Coherence

[Relevance]

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

The project was highly consistent with the development policy of the Government of Sri Lanka (GOSL) at the time of ex-ante evaluation. The Sri Lankan government formulated the Northern Reconstruction Plan (July 2009) to ensure a socially and economically stable life for the people affected by the conflict and was working quickly to improve the standard of living in Northern Province through the rehabilitation of water supply, roads, electricity, and irrigation facilities. The plan was also to improve the water supply rate from 0% (2008) to 30% (2011) in Kilinochchi District. Practically, this grant aid project itself constituted part of the Northern Reconstruction Plan, and the level of such direct conformity between the project and the development policy has implications for other projects.

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

The project was highly consistent with the development needs of Sri Lanka at the time of ex-ante evaluation. As mentioned in "Background" above, there was an urgent need to restore the water supply system in Kilinochchi. Moreover, the water was one of main requirements for resettlement of IDPs and assurance for them to come and resettle, start their business. JICA was he first donor who pledged and went for supplying water to people under this project. The fact that JICA took the lead in supporting urgent issues in the context of development and reconstruction shows a very high level of responsiveness to development needs, which has implications for other projects.

<Appropriateness of Project Design/Approach>

The project design/approach was partially appropriate. Kilinochchi WTP could not operate fully until 2021. One of the reasons was the high algae and turbidity of raw water during a certain period of each year. The pre-treatment process by the roughing filter (newly constructed) and the slow sand filters (rehabilitated), and the intake structure with filtration arrangement (newly constructed) could not treat algae and turbidity to the accepted level until the WTP found a solution by adding Poly Aluminum Chloride (PAC) at the intake starting from 2021[4]. At the time of the preparatory survey (outline design), turbidity records showed relatively high values. Although no algae were observed in raw water, phosphate concentration (that would cause algae breeding) was high, and the past record and interviews with the community showed the existence of the algae issue. The outline design was to cope with these issues but based on the prediction that the turbidity and algae level would not significantly increase. Some construction works were being carried out by Irrigation Department at the upstream of the water intake of Kilinochchi WTP, and that may have created some drastic increase of turbidity to the WTP only during those constructions. However, even after completion of Irrigation works, turbidity and algae were present, which has been able to manage only with the PAC solution introduced by the O&M staff. It should be noted that the PAC solution has not yet been proven for adverse turbidity and algae condition which may come in the future. The project plan could have given more considerations to the turbidity and algae issue and certain prediction could have done, so that it could be reflected in design and bidding documents.

<Evaluation Result>

In light of the above, the relevance of the project is ③ (④ : very high, ③ : high, ② : moderately low, ① : low. *To be the same afterwards.).

[Coherence]

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

The project was consistent with Japan's ODA policy to Sri Lanka at the time of ex-ante evaluation. In Japan's Country Assistance Program for Sri Lanka (2004), one of the priority areas of assistance is "assistance to support the consolidation of peace."

<Collaboration/Coordination with other JICA's interventions>

Any collaboration/coordination between the project and other JICA interventions was not clearly planned at the time of ex-ante evaluation.

<Cooperation with other institutions/ Coordination with international framework>

Any cooperation/coordination with other development partners was not clearly planned at the time of ex-ante evaluation.

<Evaluation Result>

In light of the above, the coherence of the project is ②.

[Evaluation Result of Relevance/Coherence]

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

2 Effectiveness/Impact

<Effectiveness>

The project objectives were not achieved in the target year but partially achieved in the ex-post evaluation year. All the facilities are working to supply safe drinking water. However, in a period of high turbidity and algae, the WTP could not treat water in accordance with water quality standards. Also, the water distribution network has not been expanded as expected due to the above-mentioned WTP problem during the initial period and the lack of fund allocation from the GOSL.

The WTP operation in the initial period faced problems such as a high load of algae and turbidity of raw water. One of the reasons for high turbidity was a rehabilitation project upstream of Dry Aru Tank, which hindered the achievement of 50% of the quantitative targets in the target year (2018). However, since 2021, the WTP operation has significantly improved with the introduction of PAC at the intake. The water supply population and coverage have also been gradually increasing. Consequently, the achievement rates of the targets increased to 53% on average in 2021 and 57% in 2022 (as of October). Of the indicators, water supply flow and water supplied population, which are less sensitive to external factors, were achieved at 75% and 57%, respectively. In the present scenario, the WSS has prospects with the expansion of the distribution network and achieving more coverage. (At the moment only 7,328 populated connected to WSS and the population will be increased up to 40,000 in 2030.)

The expected effects of the soft component have been realized. The O&M of the WSS and related equipment have been carried out without big challenges.

<Impact>

[4] WTP staff have tried to control the PAC injection not to harm biofilm formed on the surface of slow sand filter. They have monitored that PAC can be removed at roughing filter every hour as an emergency operation.

The project has produced the expected impacts, i.e., it has stabilized people's livelihood, contributed to the return of IDPs, and improved public health.

- Regarding people's livelihood, people in the target areas spend less cost to purchase drinking water and less time fetching safe water. Normally, private bowsers sell drinking water for LKR 0.50 per liter in other districts. Beneficiaries under Kilinochchi WSS enjoy safe drinking water at a lower price at their doorstep.
- The IDPs resettled, and their own business has benefited from NWSDB pipe-borne WSS. There are many widows and women-headed families in the project areas. After the project, a group of women runs an open food store by getting water from the WSS. According to NWSDB, this place is very famous for healthy food in Kilinochchi now with safe drinking water from the project.
- As for the health status, compared to the other districts in Northern Province, Kilinochchi has fewer cases of chronic kidney disease of unknown etiology (CKDu) patients. NWSDB commented that the 24 hours water supply supported to improve the health condition and ensure the reliability of the water supply.

No adverse impact on the natural environment was observed.[5] There was neither land acquisition nor resettlement. Positive impacts were observed on the vulnerable population. Consideration is given to the poor in terms of pricing: NWSDB has a low pricing system for poor (Samurdhi) beneficiaries. At the same time, NWSDB provided free service connections to poor people with the support of the Government Agent (Kilinochchi), as the District Secretariat pays the connection fee. The poor and women-headed families (generally high in percentage in the project areas, as mentioned above) who lacked financial capacity were positively affected by the project coupled with this measure. Also, they could save time in finding water from wells. In addition, other parties benefited from this project. For instance, the Faculty of Agriculture, the University of Jaffna receives 350 m3/day of treated water from Kilinochchi WTP through a booster pump arranged under another project as temporary measure until its WTP is constructed. In addition, Poonakary WSS constructed with ADB funding receives treated water from Kilinochchi Elevated Water Tower by gravity. Moreover, there is now industrial demand: a factory and an industrial estate are seeking pipe-borne water to commence projects, which was not expected before the project.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ②.

Quantitative Effects

Indicators	Baseline 2011 Baseline Year	Target (1) 2018 2 Years after Completion	Actual 2018 2 Years after Completion	Actual 2021 5 Years after Completion	Actual 2022 6 Years after Completion	
Indicator 1: Water Supply Flow (m3/day)	130	2,300	235 (10% of the target)	1,525 (66% of the target)	1,725 (daily average up to the end of October) (75% of the target)	source: NWSDB
Indicator 2: Water Supplied Population	2,600	12,900 (3,100 service connections)	3,488 (872 service connections) (27% of the target)	7,216 (1,804 service connections) (56% of the target)	7,328 (up to the end of March: 1,832 service connections) (2) (57% of the target)	source: NWSDB
Indicator 3: Water Supply Coverage Ratio (%) (Percentage of the population in the target 14 Grama Niladhari Divisions (GNDs) that receive water supply from this project)	14.2 (Drinking water from wells supplied by bowsers)	65.0	1.91 (3% of the target)	25 (38% of the target)	25.58 (39% of the target)	source: NWSDB

Source: Ex-ante Evaluation Report; NWSDB

Note: (1) The Ex-ante Evaluation Sheet and the Preparatory Survey Report differ in some of the target values, but the values mentioned in the former, which was published later, were used to judge the level of achievement.

(2) Kilinochchi WTP supplies water to total 3,311 houses. Because 1,479 houses, out of 3,311, are located outside the target 14 GNDs, whose pipeline network was constructed under the projects funded by World Bank, ADB and GOSL, the 1,479 service connections were excluded from the evaluation of Quantitative Effects.

3 Efficiency

The project cost slightly exceeded the plan (the ratio against the plan: 122%), and the project period considerably exceeded the plan (the ratio against the plan: 220%).

The project period was prolonged due to (i) the additional scope and design changes (unexpected conditions met at the slow sand filters and the rehabilitation of them; the change in the route arrangement for yard pipes) and (ii) the discovery of UXOs and the following foreign entry restrictions.[6] The outputs were produced as planned.

In the light above, the efficiency of the project is ②.

4 Sustainability

<Institutional/Organizational Aspect>

The Kilinochchi WSS is operated and maintained by NWSDB under the control of the Jaffna Regional Manager. Required staff are

[5] The preparation of an Environmental Impact Assessment (EIA) report for this project was not required by the national law of the country. Also, no chemical dosage is involved in the treatment process.

[6] A survey based on international mine countermeasure standards was conducted prior to the start of construction (2011), and the results indicated that UXOs had already been disposed of. However, after the start of construction, UXOs were found repeatedly, and due to restrictions on foreign entry to the northern area, waiting costs were incurred.

assigned at the time of ex-post evaluation (District Engineer, Officer-in-charge and Engineering Assistant for Water Treatment Plant, Plant operators, Fitter, Drivers, and Labours except non-technical staff are available), and they are even committed to finding a solution to the high algae and turbidity issues. Non-technical staff will be assigned in the future, as its requirement is not urgent at the time of this evaluation.

<Technical Aspect>

According to NWSDB, the O&M staff have enough technical skills. NWSDB has a well-established training system for its staff: a regular annual training program for each staff category to upgrade their knowledge under NWSDB training Division. The manual provided by the project has been utilized, but it does not address high turbidity and algae situations. The O&M staff has found a solution by adding PAC, while also referring to the results of the JICA follow-up survey conducted in 2020.[7] However, this method is yet to be verified for extreme conditions, and the manual need to be updated considering present operating conditions. Although these issues may affect the operation of the facilities in the medium to long term, the current solution will be sufficient to continue the project effects for the foreseeable future.

<Financial Aspect>

According to NWSDB, the necessary budget for O&M has been committed under its Regional Support Center Northern Province. The O&M staff was also able to do a model testing for adding the PAC and find a solution for the algae and turbidity problem. It was noted that the O&M cost of Kilinochchi WTP is very low compared to other conventional WTPs of NWSDB: other WTPs in Sri Lanka basically a rapid sand filtration system, while Kilinochchi WTP selects slow sand filters as an ecological purification system, which incurs lower cost.

<Environmental and Social Aspect>

The risks in the environmental and social aspects have been monitored. The Water Safety Plan (WSP) has already been implemented, and many risks were identified and addressed one by one. Both the internal and external audits for the WSP have been completed, and countermeasures are already taken according to it. In this way, actions are being taken.

<Current Status of Operation and Maintenance>

As already mentioned, the facilities and equipment developed under this project are in a working condition. While there is room for improvement,[8] necessary O&M works are conducted as planned. It was noted that existing staff are committed to the works and improving efficiency.

<Evaluation Result>

In light of the above, only slight problems have been observed in the technical aspect. Therefore, the sustainability of the project effects is ③.

5 Summary of the Evaluation

The project partially achieved the project objectives. The operation of Kilinochchi WTP was affected by high turbidity and algae in raw water until a solution was found and implemented in 2021 and yet to be verified for adverse conditions in the future. Nevertheless, the operation has significantly improved since then, and water supply volume and coverage started to increase, contributing to the stabilization of people's livelihood, the return of IDPs, and the improvement of public health. The sustainability of project effects is secured with the solution provided by O&M staff based on the learning from the follow up support of JICA to cope with turbidity and algae. Regarding efficiency, the project cost significantly exceeded the plan. Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

- JICA noted commendable efforts made by O&M staff in charge of Kilinochchi WSS to find a solution for high algae and turbidity by making a prototype model and then actual application. This is a good example of handling problems by themselves after learning and getting insight out of JICA follow up support. NWSDB shall encourage further development of the solution and this kind of working culture within the organization.
- It is necessary to expand the distribution system in secondary and tertiary roads where NWSDB can give more service connections.
- It is recommended to update the O&M Manual with the change of the present operating procedures of the WTP.

Lessons Learned for JICA:

- JICA initiated a rehabilitation approach to revive the scheme and supply safe water to the public promptly and efficiently. Currently, NWSDB, with other donors, is working on expanding the water supply coverage by extending the distribution pipeline network. Such a timely approach can provide a positive impact, but sufficient water quantity/quality data, even though it takes time to collect it, were expected to be gathered before selecting the treatment process.

  Pre-condition, agreed arrangement, etc., had not been properly established, documented, and monitored for proper dissemination among stakeholders. It is better to have a template for the progress report in English, which could include all the important aspects/information required for monitoring and carrying forward under grant aid projects. The project had formulated as a rehabilitation project in emergency and matched the design according to the previously existing arrangement with the limited information and financial resources. However, later, new staff who were not involved in the formulation did not understand the principles/assumption of formulation based on the urgent requirement. Such a situation can be eliminated by disseminating proper details in a progress report.

  It was evident that sufficient time had not been given for proper investigation (e.g., scope change for the slow sand filters was needed due to lack of investigation), and the design was matched according to the available budget (e.g., some pipelines had been dropped

[7] The follow-up survey team proposed and tested some options using PAC with a flocculation sedimentation unit. As no funds were available to invest in a flocculation sedimentation unit, NWSDB counterpart staff derived a different method by designing a prototype model and testing it. In that way, the follow-up survey planted the idea in the counterparts' minds that they could find a solution to the problem.

[8] NWSDB pointed out that suppliers consume more time to supply required spare parts. Also, O&M staff highlighted that the gate valve installed at the roughing filters should be changed to butterfly valve. It was also noted that the cleaning of the slow sand filters takes time and is labor intensive. The O&M staff is making effort to find more efficient methods.

due to lack of funding). Therefore, a commitment from the GOSL was demanded to maximize the project impact, which could have been established and monitored, as explained above.

- There was a long delay in reimbursement of Taxes to the contractor due to the ambiguity of the tax clause in the contract between the contractor and the employer. It is better to specify and agree on duties and taxes etc., in clear terms either in the E/N and G/A.
- It is better to prepare a Project Completion Report (PCR) in English and share it with the executing agency.[9] Some important aspects, such as O&M organization and future commitment needed from the GOSL (e.g., expansion of distribution system, conservation of catchment at intake, etc.), can be included in the PCR.

Kilinochchi Elevated Water Tower

Paranthan Elevated Water Tower

Intake and Pump house

Water Treatment Plant

[9] When this project was being implemented, PCRs were prepared in Japanese only.