AGENCE FRANCAISE DE DÉVELOPPEMENT

EX-POST EVALUATION OF THE PROJECT: EXTENSION OF THE DRINKING WATER SUPPLY SYSTEM IN NAIROBI

NORTHERN CORRIDOR PROJECT – CKE1074

FINAL EVALUATION REPORT

01/10/2025

Hydroconseil
Engineering that supports development

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Contributing Experts: Jérémie Hedoin, Marie Morel, Lola Bonilla, Lugard Ogaro

Quality Assurance: Jérémie Hedoin

Please send any comments or questions about this report to:
hydroconseil@hydroconseil.com

ACRONYMS

Acronym	DEFINITION
AFD	French Development Agency
AWWDA	Athi Water Works Development Agency
BC	Biocenter (refers to ablution block)
BWRC	Basin Water Resources Committees
DAC	Development Assistance Committee
ERG	Evaluation Reference Group
ESAP	Environmental and Social Action Plan
ESMP	Environmental and Social Management Plan
ESRM	Environmental and Social Risk Management
FGD	Focus Group Discussion
GoK	Government of Kenya
JV	Joint-Venture
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
KII	Key Informant Interview
KPLC	Kenya Power & Lighting Company Plc
MoU	Memorandum of Understanding
NCWSC	Nairobi City Water and Sewerage Company
NEMA	National Environment Management Authority
NLC	National Land Commission
NRW	Non-Revenue Water
NTP	National Treasury and Planning
OECD	The Organization for Economic Cooperation and Development
PAP	Project Affected Person
RAP	Resettlement Action Plan
VOP	Variation of Price
WASREB	Water Services Regulatory Board
WB	World Bank
WRA	Water Resources Authority
WRUA	Water Resource User Association
WSP	Water Service Providers
WTP	Water Treatment Plant

A. RESUME

A.1. Presentation of the project evaluated and its objectives.

This evaluation is an external and independent evaluation piloted and financed by AFD, in collaboration with AWWDA, as part of its project evaluation mechanism. This is an ex-post evaluation, conducted one year after the project final drawdown (January 31st, 2024).

The present Draft evaluation report is the second evaluation deliverable of the external ex-post evaluation of the project: Extension of the drinking water supply system in Nairobi - Northern corridor project – CKE1074, financed by the AFD (and partly by WB).

The CKE1074 project, financed by AFD and implemented by Athi Water Works Development Agency (AWWDA), is part of a wider project to improve Nairobi's drinking water supply, in line with the city's drinking water master plans. This program was therefore complementary to other actions led by AFD or other donors.

The expectations for this evaluation are high, given that this project was one of the major infrastructure projects in Kenya over the past 20 years, which should significantly impact on Nairobi's water supply and mark a key achievement in the country's water and sanitation sector.

The objectives of this evaluation are to identify what contributed to project success, but also, to assess the standard traps that could have been avoided with an approach better suited to the Kenyan context, and to explore how certain outcomes (positive or negative) could have been improved, with a focus on aspects such as skills development, project management, and safety.

Another expectation for this evaluation is to assess the communication and stakeholder engagement processes, which are crucial for projects in developing countries. The evaluation considers whether this aspect could have been managed differently to improve its effectiveness and facilitate the overall success of the project.

A.2. Main conclusions of the evaluation

Overall, this highly ambitious project was a success. Despite a 4-year delay in program implementation, the objectives were achieved and the relationship between AWWDA and AFD remained healthy and productive throughout.

The years of delay are linked to the many twists and turns and difficulties encountered, starting with the difficulties linked to land acquisition mechanisms, then to the rise in the price of materials due to the worldwide Covid crises in Ukraine, or to the transfer of competence linked to the introduction of the Bulk Water Act.

At present, water productivity increase targets are being met, with a capacity of the facilities of 140,000 m3/day[1] (i.e. 15% more than the capacity initially planned). Water production to date stands at 107,970 m3/day, corresponding to 77% of capacity.

[1] Kigoro WTP capacity is 140.000 m3/d but was tested with 1450.000 m3/d during commissioning

Beyond this general assessment, the analysis focused on the DAC's evaluation criteria:

Table 1. Summary of the conclusions of the evaluation

Evaluation criteria	Overall comments
Efficiency	The project finally achieved its objectives with improved production capacity. Significant delays, mainly due to the implementation of RAP, delayed the end of the project by 4 years and caused numerous additional costs. It should be noted that the activities related to Non-Revenue Water (NRW) constituted a formal commitment to the CFA, but this commitment was not respected. These activities are fragmented across four different credit agreements, making it difficult to have a coherent overview of what was actually implemented. In particular, the actions financed under CKE 10.74 were mainly focused on consultancy services, but their exact content remains unclear, which makes it difficult to assess whether the expected water savings were effectively achieved. This lack of clarity and accountability is particularly concerning in the case of project CKE 1135, where NCWSC showed reluctance to seriously engage with the NRW component.
Effectiveness	Decision-making mechanisms proved to be highly effective. However, the highly centralized nature of AWWDA has limited consultation with other stakeholders (NCWSC contractors, consultants…), which would have made it possible to anticipate certain difficulties. The main difficulty remained the implementation of the RAP, where long delays disrupted all activities.
Impact	The project has contributed to increasing water production and meeting demand. For example, the pipelines delivered in August 2025 120,300 m^3/day of water , with an estimated 521,300 people benefiting from the project (based on an average consumption of 150 liters per person per day, considering 35% of technical yield)In terms of RAP implementation, a very large number of PAPs have been compensated. The project has also enabled the regularization of a large number of land-related cases (disputes, inheritance, etc.). The project has also enabled AWWDA to build up its skills (learning by doing), in Bulk Water management and ES safeguarding.
Sustainability	The project included a number of long-term measures, such as conventional technologies that are sustainable, easy to use, and easy to maintain. However, capacity building was generally quite limited. Similarly, the sanitation facilities visited had low levels of functionality and managers had low capacity.
E&S risk management (added criteria)	Although AWWDA has strengthened its skills on ES aspects, it is noted that the monitoring indicators have proved to be generally insufficient in relation to AFD's expectations, and that measures have not always been well implemented, for example H&S measures to prevent accidents or reforestation measures.

B. EVALUATION METHODOLOGY

The methodology for this ex-post evaluation is based on OECD/DAC evaluation criteria and AFD procedures. We focused on the results achieved, with an emphasis on the effectiveness, efficiency, impact, and sustainability of the interventions.

Additionally, we assessed, based on our findings, the ex-ante "impact" analysis using the six dimensions of AFD's analytical methodology: economic, social, environmental, institutional, climate, and long-term sustainability impacts of the project.

We adopted a mixed methods approach to gathering data from multiple sources, using the following methods: 1) literature review and analysis of secondary literature; 2) semi-structured interviews; 3) focus groups/group dynamics; 4) site visits. The aim was to ensure, and maximise, the triangulation of sources for the evaluative analysis. Data triangulation is a method that involves cross-referencing multiple sources of information or points of view to analyse the same subject. It helps to strengthen the reliability of the results. The aim is to validate findings, limit bias and obtain a more comprehensive and nuanced view.

All our evaluation work was based on a key tool: the evaluation matrix. This matrix presents the evaluation questions and sub-questions, which are structured around evaluation criteria based on the OECD/DAC international model, as well as the indicators and data sources and collection methods that will be used to answer these questions. The evaluation matrix serves as a basis for the creation of our data collection tools, the data collection itself, and then the evaluative analysis. It is presented in Annex.

The evaluation is structured in three main phases, with the corresponding activities outlined below.

Table 2. Overview of the methodology

Inception phase [Marche- May 2025]	**Data collection [April - July 2025]**	**Evaluative analysis [July-September 2025]**

•Kick-off meeting
•Documentary review (preliminary)
•Preliminary interviews
•Finalization of the evaluation matrix
•Development of the Scoping Note
	• Documentary review
	• Review of all the relevant documents provided
	• **Field Visit :**
	  • **Semi-structured interviews**
	  • **Focus group with beneficiaries and O&M**
	  • **Visits to infrastructure sites**
		• Answer to evaluation questions
		• Judgement criteria (from A to F)
		• Triangulation of data sources used
		• Development of evaluation report, including recommendations

C. DETAILED PROJECT NARRATIVE

C.1. Content of the project

In line with the Vision 2030 development Agenda, the Government of Kenya put in place plans to improve water services in Nairobi City, and the surrounding satellite towns. AWWDA prepared a Water Masterplan for Nairobi City and Satellite towns that was launched in 2012. This plan outlines cost-effective development strategies for the city's water supply up to 2035.

The different phases of the project are listed below:

Table 3 - Proposed Future Sources for Water Supply to Nairobi City

Phase	Period	Horizon	Source
Phase I	2012-2015	/	Ground Water exploration
Phase II	**2012-2016**	**2021**	**Northern Water Collector Tunnel Phase I (NCT I) diverting water from Irati, Gikigie, Maragua Rivers**
Phase III	2017-2020	2026	Maragua Dam (30Mm3) with S. Mathioya River Transfer
Phase III	2021-2025	2035	Northern Water Collector Tunnel Phase II (NCT II) diverting water from Githugi, Hembe and N. Mathioya Rivers
Phase IV	2026-2029	2030	Ndarugu 1 Dam (300Mm3)

Phase II of the Master Plan, which is the subject of this evaluation, includes works planned between 2013 and 2016. These works aimed to meet the city's water demand up to 2021. The projects of Phase II of the Master Plan are generally divided as follows:

The upstream works include:

- The Northern Water Collector Tunnel (Financed by the World Bank and GoK)
- Kigoro Water Treatment Plant (Financed by AFD and GoK)
- Raw and Treated Water Pipelines (Financed by AFD, World Bank and GoK)

The downstream works include:

- Construction of the Eastern Transmission (Kiambu Embakasi) Pipeline (Financed by KfW and GoK)
- Construction of the Western Transmission (Kabete – Uthiru) Pipeline (Financed by KfW and GoK)
- Extension of Water and Sewerage Services in Peri-Urban and Informal Settlements (Financed by KfW and GoK)

C.2. Activities financed by AFD, under the scope of the evaluation

In the framework of this evaluation, we will focus on the Phase II projects, co-financed by the World Bank (USD 130 million), AFD (EUR 100 million), and KfW (EUR 30 million), which are divided into upstream and downstream works.

Specifically, AFD financed three infrastructure contracts and six consultancy missions through a Credit Facility Agreement signed with the Government of Kenya on January 17, 2014, with a disbursement deadline set for January 31, 2024 (initially set to January 17, 2020).

The AFD-funded initiatives aim to improve Nairobi's potable water supply, particularly in the North Thika area, by enhancing the transfer, treatment, and distribution capacity of the water supply system. It also provides for the restructuring and extension of the city's water distribution network, while supporting the technical and administrative capacity building of the operator in charge of the service with a focus on better management of Non-Revenue Water (NRW).

Table 4 - consultant/contractor for components

Component	Description / Works	Consultant	Contractor	Expected Results / comment
Kigoro Water Treatment Plant (WTP)	Design and construction of a Ultra-modern water treatment plant	Artelia / Cape Consult JV	Suez / Sogea Satom JV	Expected capacity: 1.6 m³/s
Raw and Treated Water Mains component	5 km of pipeline (Ø 1200 mm) from Thika Dam to Kigoro WTP 50 km of pipeline (Ø 1200 mm) from Kigoro to Kabete	Egis / Mangat IBP JV	China State Construction Engineering & Nanchang FEC JV	Expected flow: 1.6 m³/s
Ablution blocks (Informal Settlements)	Design and construction of 10 ablution blocks in Kibera, Kawangware, Mukuru	FRAME Consultants Ltd.	Umande Trust	Initial target: 15 blocks / Completed: 10 (due to land tenure issues)
Distribution Master Plan	Preparation of a detailed Nairobi City Water Distribution Network Masterplan	Seureca Veolia / East Africa Engineering Consultant JV	-	Planning of network rehabilitation, extension and restructuring up to 2035
Non-Revenue Water (NRW)	Baseline assessment, capacity building, and preparation of performance-based contract to reduce NRW (component mainly implemented in CKE 3005/1049)	Seureca Consulting Engineers / International Office of Water JV	-	Objective: Reduction of commercial and technical losses in Nairobi
Ruiru II Dam Water Supply Project	Design and implementation of the water supply system from Ruiru II Dam	TRACTEBEL Engineering / GIBB Africa Ltd JV (**contract amicably terminated**)	Vinci Construction GP / Sogea Satom / Egis Eau JV **(financed by the French Treasury and the Deutsche Bank)**	Due to delays, the project was finally abandoned after selection of consultants

D. EVALUATION FINDINGS

D.1. Efficiency

The project encountered discrepancies between initial forecasts, in terms of both budget and timetable, and its actual implementation, with most components experiencing delays of between 24 and 65 months and cost increases (see Figure 1 for the revised timetable and Table 5 for details of costs). These discrepancies are the result of a combination of exogenous factors (inflation, land issues) and endogenous factors (planning, procedures). The following section highlights the main difficulties encountered and makes recommendations for improving the design and optimising the use of available resources in terms of time, budget, and human and material resources.

D.1.1. Effectiveness of the project management

- Good level of collaboration between different project teams, departments, and external partners.

The NCT project benefited from a good level of bilateral collaboration between AFD and AWWDA, with frequent and fluid technical exchanges. The centralised management of the project by AWWDA enabled faster decision-making and adaptability. However, this centralisation was at the expense of broader coordination with the NCWSC (Nairobi Water), land authorities (NLC) and local communities, which were not sufficiently involved in the design phase, contributing to difficulties during implementation. This finding was confirmed during interviews with stakeholders, who expressed concerns about the lack of initial consultation.

Key issues such as insufficient community involvement from the outset of the project (e.g. for the bio centres), the late involvement of the NLC in land acquisition and the unclear role assigned to the NCWSC, particularly in terms of support and training for Athi Water, all contributed to delays in the project.

In order to avoid further difficulties due to a lack of communication between stakeholders, it would be necessary to strengthen multi-stakeholder consultation mechanisms from the design phase onwards.

- A suboptimal sequence of works.

- *Identification of risks underestimated during work planning*

Several crucial risks were insufficiently anticipated during the project design (consultancy), such as poor anticipation of land acquisition deadlines and constraints, as well as technical and environmental constraints. For example, for ablution blocks (bio centers), poor anticipation of usage frequency, access to water and initial design. For pipelines, poor anticipation of flooding in low-lying areas, seasonal weather conditions and the slope of the terrain.

The design/planning for the pipeline project could have included a contingency plan in case of delays due to rain and early coordination with stakeholders to avoid delays related to land acquisition.

- *Selection of consultants open to question*

The ablution block (bio centers) component, which was not initially planned, was added late in the process without any real consultation or analysis of its relevance. The selection process for Umande Trust, which was first proposed through direct selection and then validated through a call for tenders as requested by the procurement unit, illustrates a lack of transparency and planning. The proposed designs (e.g. the circular structure) were not always suited to the needs and constraints of informal settlements. Umande Trust, initially responsible for design, would have been more appropriate as a community support structure.

A more flexible and contextualised approach from the planning stage would have enabled more effective implementation. Further adapt the design of facilities to local realities, prioritising sites with clearly identified needs, secure access to water and ablution, and available land.

- *Infrastructure designs incorporating innovative elements that are difficult to maintain*

Some infrastructure has incorporated innovative technologies – flocculation by bubble injection, UV, biogas – which now raise questions about maintenance and operability. For example, biodigesters (in bio centers) suffer from low utilisation rates and insufficient gas production. The technical designs of sanitary blocks are often oversized, unsuitable and have problems connecting to networks. The UV system (in WTP) is failing due to a lack of local spare parts.

Prioritise simple, robust and proven technical designs that are better suited to operating and maintenance capabilities. For example, the Katosi wastewater treatment plant (in Kampala, Uganda) can serve as a reference model for a treatment plant.

D.1.2. Effectiveness of the disbursement flows

- Financial constraints related to currency depreciation and delays in disbursements

The project has been hampered by delays in disbursements, partly due to the multiple levels of approval (no objection notices) required involving the AWWDA, the Ministry of Water, the National Treasury and AFD ; administrative red tape – in particular the nature and quantity of documents required and their accumulation as the project progressed – ; and technical or institutional problems – staff changes, banking errors, IT failures, etc. – concerning the payment of IPCs. These delays caused cash flow problems for contractors, partially halting the project and creating a situation of discomfort and pressure.

It is recommended that the chain of responsibility between the various stakeholders (AWWDA, the Ministry, the Treasury and the AFD) be clarified. The current dilution of roles contributes to delays and a lack of transparency. It is therefore recommended that a common procedures manual be developed describing the required documents, validation steps and designated points of contact beyond those defined in the credit agreement.

- Difficulty in VAT reimbursement

Although contractors/consultants are eligible for tax exemptions, the initial design of the projects did not provide for an effective VAT refund mechanism. As a result, the companies concerned had to pre-finance the VAT themselves, which put a strain on their cash flow. Although this problem has been identified, it remains partially unresolved, with several companies still awaiting reimbursement.

For future projects, it is essential to incorporate an operational and secure VAT exemption or refund mechanism at the design stage (currently the case for the CKE1135 project).

D.1.3. Discrepancies between the final costs and the initial budget

The project has experienced significant delays and cost overruns, mainly due to difficulties in acquiring land, particularly for the installation of pipelines. For example, in 2020, construction of the main water pipeline had not yet begun, while other parts of the project were nearing completion. Land acquisition problems also affected other components: the construction of biological centres was delayed due to the difficulty of finding suitable available land, given the relatively large footprint required by their design. Similarly, for the Kigoro water treatment plant (WTP), only half of the land had been acquired initially, and construction could not begin until the acquisition of the second half was finalised, leading to further delays.

At the same time, rising material costs, particularly for steel, due to global events such as the COVID-19 pandemic and the war in Ukraine, led to sharp price increases. It was necessary to wait for prices to fall before signing a financial amendment. The Pipelines contract, signed in Kshs but settled in both Kshs and USD, provided for price adjustments on both currencies. The initial offer, which was highly competitive, had been based on historically low HRC indices prior to the sharp rise caused by the COVID-19 pandemic.At the same time, the sharp depreciation of the Kenyan shilling, which fell from 112 to 160 KES per euro between 2013 and 2023, led to significant budget adjustments, which particularly affected contracts denominated in foreign currencies.

In summary, the delays are due to a combination of difficulties in acquiring land, cost volatility and the time needed to adapt contracts in response to global economic shocks.

- Significant RAP implementation delays impacting the whole project

The implementation of the RAP took much longer than expected. This seems particularly due to the fact that the complexity of the situation was underestimated and that the PAP organized themselves to negotiate, even through the court.

The study done by IFRA in 2024 analysed the process and highlighted multiple barriers. Institutionally, poor coordination between the NLC and the Ministry of Lands, delayed access to cadastral records, and budget issues—since the NLC depends on Treasury allocations—have caused significant delays, with property reports sometimes taking over a year, during which land can be resold and procedures must restart. It mentioned also the difficulty to simultaneously implement national legislation and international donor standards. Surprisingly, in the context of this project, NLC procedures were often stricter than those recommended by IFC. Indeed, in several cases where it was impossible to compile all the official documents, the financial agency (AFD, WB) would have shown more flexibility.

- Increased material prices, particularly for steel, which affected pipeline construction costs.

The initial budget for the pipelines was underestimated, as the tender was submitted when prices were at their lowest, before the Covid-19 crisis, which subsequently led to a sharp rise in prices. This necessitated budget adjustments. For example, the final extension granted in March 2024 for the pipeline project by AWWDA includes an Addendum No. 3 approved on 3 February 2021, entitled Adjustment for Changes in Cost (VOP) for the Ferrous Component, for a total amount of KES 1,056,579,274.76 including VAT. Although the contract does not provide for fixed prices for raw materials, the budget revisions do not appear to be directly correlated with price developments in terms of timing (see Figure 2).

D.2. Effectiveness

D.2.1. Effectiveness of the project implementation

A project well monitored and adjusted even if lacking of performance indicators

Although the project achieved its main objectives in terms of increased water production, numerous adjustments were made during its implementation. In this respect, we note numerous contract amendments, mainly linked to delays in the implementation of the RAP and to cover price escalations for the steel pipes, which had repercussions on all activities.

Although the content of the program was indicative at the outset, we have noted a number of changes, such as the addition of interconnections with the Ngethu station or the Kabete reservoir, but also the absence of operational activities linked to NRW or the cessation of activities linked to the construction of the Ruiru II dam.

We note, however, the existence of a rigorous monitoring system, notably AWWDA's monthly and quarterly monitoring reports, and AFD's generally half-yearly missions. We do, however, regret the lack of common indicators for monitoring project performance, particularly with regard to financial, environmental and social aspects.

We regret that we couldn't obtain certain progress reports particularly on NRW or on ES. The financial data obtained were also uncleared and sometimes diverging.

D.2.2. Governance of the project

In the end, AWWDA played a strong role in the project's implementation, enabled by highly operational internal monitoring and decision-making mechanisms.

In terms of collaboration between AWWDA and AFD, we note that the main mechanisms for monitoring and exchange consist of weekly meetings and supervisory missions, which generally take place every six months.

Progress reports prepared by AWWDA and internal meetings organized have rarely involved AFD or other stakeholders.

Even if these monitoring and decision-making mechanisms are similar to the functioning of a steering committee and a technical committee, it is noted that these formal bodies did not exist and that AWWDA acted essentially unilaterally in implementing this project. In this respect, the WSP (included NCWSC) undoubtedly deserved to be more involved in the discussions.

D.2.3. Level of stakeholders' engagement

AWWDA has played a central and direct role in stakeholder engagement throughout the project, often acting as the main point of contact. In contrast, the involvement of the WSP (included NCWSC) has remained limited. The project initially included a capacity-building and NRW component (with Seureca), which was expected to lead to a performance-based contract. However, this was ultimately rejected by NCWSC.

It appears that the project has taken steps to involve NCWSC, such as inviting them to supervision mission meetings, or implementing distribution-related activities (NRW or distribution master pan). Despite this, the political situation has created a degree of competition with AWWDA over water production, and collaboration remains difficult to this day.

Going forward, it will be essential to ensure that the operator demonstrates genuine commitment to improving its performance, so that future infrastructure investments can deliver their full intended impact.

It is also recommended to make the project creation and decision-making process more transparent and participatory by involving all relevant stakeholders from the outset. It would be desirable, as part of the project, to strengthen the powers of the WASREB (Water Services Regulatory Board) so that it can sanction WSPs that refuse to cooperate or pay the amounts due to the AWWDA. According to WASREB's compliance and enforcement strategy, the agency follows a graduated approach: education, warnings, then legal sanctions such as fines or administrative penalties as a last resort. However, to ensure the effectiveness of contractual relations between WSPs and AWWDAs, clearer and more explicit sanctioning powers – including license suspension or the imposition of financial penalties – would be justified.

D.2.4. Effectiveness in terms of lands acquisition and resettlement

Land acquisition has been the project's biggest challenge, causing significant delays and additional costs for most components of the project. This prolonged delay, estimated at 380% of the initial timeframe, is due to several factors, including a lack of anticipation regarding the complexity of land-related issues on the ground and changes in land acquisition laws that further complicated the process. In example, construction of the water treatment plant began before the acquisition of the second land parcel was completed, or the work on the last section of the pipeline, between Ngethu and Gigiri, with discontinuous way leaves.

According to the IFRA report, land acquisition has faced multiple barriers. Institutionally, poor coordination between the NLC and the Ministry of Lands, delayed access to cadastral records, and budget issues—since the NLC depends on Treasury allocations—have caused significant delays, with property reports sometimes taking over a year, during which land can be resold and procedures must restart.

According to IFRA's analysis, although some measures exist to facilitate land acquisition, their implementation remains complex. It can be difficult to simultaneously implement national legislation and international donor standards. Compensation processes have had an impact on the formalization of land tenure regimes.

Also IFRA concluded saying that implementing both the country legislation and the financier's norms can be tricky. Surprisingly, in the context of this project, NLC procedures were often stricter than those recommended by IFC. Indeed, in several cases where it was impossible to compile all the official documents, the financial players (AFD, WB) would have shown more flexibility so as to be able to compensate these affected people all the same.

Clear procedures, but often at odds with PAP interests

The county authorities we met, particularly those in Muranga, who had been heavily impacted by the construction of the tunnel and the withdrawal of water resources, were satisfied that the project had taken social impacts into account and that solutions had been found.

Among the PAPs, reactions varied according to the groups affected:

- Many landowners on the Ngethu section were dissatisfied with the compensation amounts proposed. Legal action was even taken,
- 47 PAPs were unable to obtain compensation because they were unable to present valid official titles. They were nevertheless impacted by the project.

According to NLC, the land acquisition process was carried out successfully and delays could hardly have been avoided. On the other hand, the RAP study would have benefited from anticipating these difficulties and carrying them out during project implementation, so as not to impact other activities.

D.3. Impact

D.3.1. Impact on access to drinking water and sanitation in Kenya

The NCT project significantly improved access to drinking water and sanitation in Nairobi and surrounding areas. The new pipeline and Kigoro Water Treatment Plant (130,000 m³/day capacity) enhanced supply reliability and enabled cost-effective, gravity-fed distribution. With 110,000 m³/day delivered to NCWSC, the project largely met its targets for water production and population served.

However, the expected water savings (21 million m³/year) have not been demonstrated. Instead, over-pressurization has led to pipe bursts and high-water losses. Despite a funded NRW study, no corrective actions have yet been implemented.

Despite the clear positive impact on access to safe water and hygiene in informal neighbourhoods, the impact of the bio-centres proved limited due to low usage. Their overall contribution remains marginal compared to the large-scale infrastructure.

A study of several sites highlights significant variability in usage and income levels. In Bombolulu (Kibera), the Slum Lights centre welcomes an average of 50 to 60 users per day. In contrast, the Fort Jesus site (Woodley, Kibera) is very poorly attended, with an estimated 10 to 15 people per day.

In the Mathare North neighbourhood, the Kambi Safi centre attracts around 70 users per day for toilets, showers and laundry facilities. The Madoya Tumaini centre is more popular with households (around 100). Finally, in Kawangware (Kanuganga), attendance is higher (around 100 users per day). The initial business plan for these facilities anticipated higher usage than has been observed.

Several factors explain this limited attendance. Water supply is often irregular, sometimes reduced to two days a week, which discourages users (e.g. in Fort Jesus and Madoya Tumaini). Hygiene and acceptability issues also arise, particularly among women who fear a lack of privacy or infections (Madoya Tumaini, Kanuganga). The design and maintenance of the infrastructure are also problematic, with some technical equipment (burners, pipes) regularly breaking down. Finally, some centres cater to a limited audience, such as the one in Fort Jesus, which is mainly used by worshippers from a nearby church.

D.3.2. Social and economic impacts

Despite the significant negative social and economic impacts - most notably the displacement of over 2,200 individuals including property holders, businesses, and institutions - these effects were largely compensated. Approximately 80% of Project Affected Persons (PAPs) related to the tunnel and 90% related to the pipeline received compensation, with the remaining unresolved cases primarily due to legal or administrative constraints such as land disputes or succession processes. This demonstrates that while the project did entail substantial disruption, it was accompanied by an important effort to mitigate its adverse effects through compensation and resettlement measures.

Beyond compensation, the project generated important positive socio-economic outcomes, with 524 333 estimated people benefiting from the project (based on mean consumption per user of 150 l/d/pers).

The establishment of biocentres in informal settlements also improved access to sanitation and hygiene facilities, especially for vulnerable groups. The creation of biocentres in informal settlements has also improved access to sanitation and hygiene facilities, particularly for vulnerable groups. It was observed in the five biocentres visited that two of the centres were adjacent to a school. Children, considered a vulnerable group, have frequent and privileged access to quality sanitation facilities. These centres were designed with inclusivity in mind, offering gender-separated toilets and showers, and ensuring accessibility for people with disabilities. In addition to meeting basic hygiene needs, biocentres served as trusted community spaces that foster social cohesion and provided a sense of safety, particularly for women and children.

The project also had a positive impact on local employment. At the Muranga' Water Treatment Plant, around 40 skilled permanent jobs were created, contributing to local capacity development. In the ablution block, the involvement of community committees encouraged ownership and, in some cases, the reintegration of vulnerable individuals into the workforce.

D.3.3. Environmental impacts

On hydrological aspects, our assessment team met with the Muranga WRA to discuss water abstraction from the natural environment. They assured us that all hydrological studies had been carried out prior to the works and that monitoring of the hydrology of the three watercourses is currently underway. At the same time, these withdrawals from watercourses have been the subject of compensation projects at the level of the counties concerned. This compensation has been the subject of a specific programme funded by the World Bank. Unfortunately, we were unable to obtain documentation on these preliminary hydrological studies or on the resource monitoring network, only the WRA's assurance that everything had been carried out satisfactorily.

While no carbon footprint assessment was conducted during the design phase, the project has nonetheless contributed to a reduction in greenhouse gas emissions by eliminating the need for pumping at the Nairobi station thanks to the gravity-fed design from Kigoro. However, reliance on diesel generators at terminal sites remains a limiting factor. We have attempted to assess the carbon impact of this pumping, which is estimated, based on the assumptions presented in section 3.3.1), at 1,515tCO_2e/year[2] in reduced greenhouse gas emissions.

In terms of environmental impacts on land and ecosystems, significant disturbances were recorded, particularly soil erosion, vegetation loss, and risks of water pollution. Based on the data available at the project completion date, the mitigation measures for these impacts have been implemented. However, during our evaluation we observed that efforts in reforestation have so far shown limited results. While community-based planting initiatives were launched at the Maragua intake, survival rates were very low, and no similar actions were undertaken at the other sites. Recent partnerships with KFS and KARLO represent a positive step, but implementation, ecological appropriateness, and sustained follow-up will be critical to ensuring success.

On a more positive note, the use of advanced treatment technologies at the Kigoro WTP has demonstrably helped limit the plant's environmental footprint. The compact design of the AquaDAF units, reduced chlorine usage through UV disinfection, and internal water recycling via the Denser Deck system have minimized land take, chemical discharges, and water losses.

The reduction of water loss through the NRW components was unfortunately not implemented, while it was planned from the beginning of the project to save 21.000.000 m3/year.

D.3.4. Impact in terms of knowledge transfer

The project achieved some capacity-building results, including AWWDA's transition to bulk service provider, technical training on WTP operations, and targeted sessions on cross-cutting issues. However, efforts were

[2] Based on Considering the 30% of the water currently produced in pump to fill Kabete reservoir (32.400 m3/d), considering source of energy 45% geothermal, 25% hydroelectricity, 30% oil

limited and lacked follow-up. Planned skill-sharing activities were not implemented and joint ventures recruited for the project failed to deliver expected knowledge transfer. Overall, the absence of a sustained and coordinated approach limited the project's long-term impact on capacity development.

Recommandation:

To improve the project's impact on capacity development, it would be useful to involve all stakeholders from the outset — AWWDA, joint ventures, local institutions and users — in order to set clear and realistic objectives for skills transfer.

It would be advisable to put in place a structured capacity-building plan, combining ad hoc training, monitoring and support, with simple indicators to measure progress. Follow-up after each training course, in the form of mentoring or coaching, would help to translate the knowledge acquired into concrete practices, which is currently lacking.

In addition, the project could make better use of experience sharing with other national or regional operators, for example through station visits or twinning arrangements, in order to increase learning opportunities.

Finally, partnerships with private providers should be better supervised, with clear commitments on skills transfer and penalties for non-compliance, as some national partners have expressed disappointment at the lack of full collaboration.

D.4. Sustainability

D.4.1. Long-term effects measures

At the WTP, which has been in operation since the end of 2024, maintenance issues arose during the experts' field visit in June 2025.

In addition, the lack of a formal agreement between AWWDA and the NCWSC may contribute to a lack of clarity regarding responsibilities. With regard to the pipelines, the collaboration on the conception of the system was weak between AWWDA and NCWSC.

In terms of AWWDA capacity to operate the WTP and to manage the bulk water service, AWWDA identified in its Strategy 2023-2027 that the lack of trained staff on bulk operation constitute a weakness. Training internal staff, recruiting and subcontracting are the options proposed in the strategy and to develop by AWWDA.

The design of the ablution blocks appears ill-suited for long-term use as, for most systems. Indeed, the access to water and connection to the sewer system remain problematic for most cases. For some blocks, the quality of construction raises questions about durability. For example, gas pipes located in the middle of the room or vulnerable and easily damaged PVC pipes on the exterior threaten the durability of the equipment. Besides, we noted that the design of the ablution blocks doesn't seem adequate for hygienic use of the gas / cooking area as it is surrounded by toilets.

Although sustainability is a key objective, no clear strategies—such as capacity building plans, long-term investments, or roadmaps—were adopted during the project to actively promote it.

D.4.2. Improvement of the project sustainability

With regard to the Kigoro WTP, the business plan analysis highlights in particular the AWWDA's business continuity planning (BCP), which is more focused on immediate crisis procedures. However, it was noted that this BCP contains elements of a continuous management system, with:

- Maintenance of the plan (long-term vision): annual reviews, regular simulations, monitoring of developments, feedback. The business plan strongly emphasises that the PCA/BCP must be kept alive and updated regularly:
- Long-term operations: Beyond immediate response, the business plan introduces elements of strategic and sustainable management with integration into governance (management,

departments, board of directors), links to risk management policy, reputation management and essential services.

These are not quantified in the document. However, doubts have been raised about the operational and financial viability of the long-term strategy for operation and maintenance. Indeed, based on our interviews and review of the documents, it is conceivable that the current production rate and invoice collection rate are insufficient to guarantee both the necessary O&M operations and the repayment of the loan.

However, it appears urgent to ensure optimal operation of the facilities in order to enable the establishment of a virtuous circle through effective maintenance and a high level of functionality of the facilities.

In terms of organization, AWWDA has restructured since the Bulk Water Act and created a department of bulk water management which is currently being strengthened with the presence of head office and field teams. It should be noted that these field teams were trained rather late, and some of them joined the team after the manufacturer's 2-week training course.

Regarding the ablution block, it appears that the operation and maintenance of the ablution blocks is handled by CBO members. The capacity of the CBO to operate and maintain the system are low. Furthermore, it appears that the O&M business plan are not realistic what threaten their sustainability.

4.2.3. How could the long-term effects be improved in terms of energy supplying of the WTP?

Difficulty to ensure a stable access of energy at the WTP

WTP is currently connected to the national power grid managed by KPLC. Unfortunately, the station has not yet been able to benefit from a transformer enabling it to be connected as close as possible to the high-voltage grid. As the station is located at the end of a low-voltage line, the electrical current regularly experiences voltage drops or even interruptions, forcing the installations to use generators more often than expected and thus reducing their lifespan.

D.5. E&S risk management

D.5.1. Project's E&S risk management approach compliance with AFD's E&S procedures

Road accidents: a case of negligence in monitoring and enforcing H&S standards by the supervisor

AFD considers that the project's environmental and social (E&S) risk management framework is broadly consistent with its procedures, which are aligned with those of the World Bank (IFC standards). However, in practice, several serious accidents – particularly road accidents – occurred during the construction of the pipelines, revealing a lack of effective monitoring of health and safety (H&S) standards. The supervisor and AWWDA do not appear to have ensured sufficient control over the companies' compliance with these obligations.

D.5.2. E&S risks and impacts anticipation and identification

Poor anticipation of safety risks on the Pipeline project

Despite clear contractual obligations regarding E&S risk management, AWWDA and its supervising consultant egis/MIBP JV did not ensure rigorous monitoring of H&S compliance by the contractor CSCEC/NFEC JV. Several serious accidents occurred during the construction of the pipeline between Thika Dam and Gigiri Reservoirs, illustrating significant H&S shortcomings - 27 January 2024: traffic accident (1 dead, 4 injured); 13 March 2024: traffic accident (14 injured, including 1 paraplegic); 8 May 2024: excavator overturned (1 fatality). Each accident was followed by a thorough investigation by Bureau Veritas, which identified human and organizational causes. Immediate corrective measures (prohibitions, controls, equipment, training) and preventive measures (management plans, audits, disciplinary protocols, dedicated vehicles) were prescribed following the accidents. However, we have no evidence of their implementation. The accident led to a formal investigation by the police and the H&S committee of the project, as well as a process of compensation by the contractor in accordance with the Workmen's Compensation Act (WIBA) and insurance.

Inadequacy of these control measures in relation to E&S risks

Veritas reports reveal significant gaps in the E&S risk control system. Risk assessments were deemed too general and did not take into account the specific characteristics of the sites. No pre-work inspections were carried out, and medical monitoring of staff was outdated (last assessment in 2022), contrary to Kenyan regulations. Following the Veritas report, AWWDA strengthened the technical specifications in subsequent contracts in order to meet these requirements.

It is necessary to define clear and binding health, safety and environmental (HSE) requirements for subcontractors. These requirements should be incorporated into contracts and used as a basis for selecting and monitoring service providers throughout implementation.

D.5.3. Level of implementation of the E&S risk management approach

Low level of responsiveness to risks (number of risks, type of response and response time)

According to Veritas, the response to unexpected incidents was deemed inadequate, mainly due to inadequate emergency preparedness. A striking example is a response time of nearly 40 minutes, which is considered unacceptable for critical situations. The emergency plan in place was poorly adapted, and post-incident management procedures lacked rigour.

It is strongly recommended that emergency plans be formalised and regularly updated, with clear rapid response protocols. A rigorous investigation procedure should be incorporated, including immediate notification to the AFD and a detailed investigation report within 30 days, in accordance with HSE UK – HSG245 standards.

E. MAIN RECOMMENDATIONS FOR FUTURE PROJECTS

Based on the findings and lessons learned, a number of recommendations have been formulated, either by project stakeholders or through our analysis:

Regarding the land acquisition

- Learnt lessons: As significant delays were observed, it is assumed that the RAP was not fully anticipating the complexity of the situation on the field, and the time needed for land acquisition,
- Recommandation: As the RAP implementation delayed all the project components, we recommend ensuring land acquisition is effective before to start with construction works.

Regarding the component of ablution blocks in unformal settlements

- Learnt lessons: It seems that the design is not suited to the local context: the technology is too ambitious and the footprint too large, making it difficult to obtain authorization from the authorities and resulting in low visitor numbers.
  Recommandation: Would a more robust system, adapted in size to the local context, have guaranteed better results in terms of visitor numbers and sustainability?

- Learnt lessons: As access to water is a problem for most sites.
  Recommandation: It is recommended that these sites be connected to rainwater collection tanks and that toilets be equipped with water-saving systems,

- Learnt lessons: Permits from the authorities were an unexpected stumbling block.
  Recommandation: Based on this feedback, it is proposed to change the approach with the authorities and request permits at the outset for sites where the need has already been identified and which do not compete with other land projects,

- Learnt lessons: The quality and functionality of the facilities are unsatisfactory.
  Recommandation: Perhaps it would have been more sensible to separate the construction work from the social project management activities,

- Learnt lessons: The management of the facilities appears to be inefficient. The selection and training of CBOs has shown its limitations.
  Recommandation: Would it have been possible to strengthen these aspects and offer longer-term support?

- Learnt lessons: The agreements with NCWSC have not provided sustainable access to water or support for CBOs.

- Learnt lessons: The sites sometimes lack access to sanitation (difficulty in accessing a sewage truck, absence of an underground sanitation network).
  Recommandation: The choice of sites would have benefited from being more rigorous.

In terms of environmental and social management

- Learnt lessons: The measures in terms of reforestation, at the intakes or along the pipe, are not implemented as it was supposed to do, but long-term sustainability and site constraints limited restoration along the pipeline route.
- Learnt lessons: The ES monitoring indicators proposed in the credit agreement are not followed and communicated to AFD.

In terms of health and safety

- Recommandation: To raise awareness in terms of H&S and to avoid accidents, it is proposed to put in place a a clear, contractual system of penalty in case of health accident,

- Learnt lessons: The safety measures in the WTP are not respected at the beginning of the project (until 2023).
  Recommandation: It is recommended to raise attention on it before to have irremediable accidents,
- Recommandation: It would be useful to insist more on H&S measures in the procurement process for the selection of the consultants and enterprises,
- Recommandation: A sanctions and penalties mechanism already exists in the contractual model of AFD. However, it is necessary to plan for close monitoring of its application so that concrete measures are taken in case of non-compliance with E&S and H&S standards, which has not yet been observed until now.

In terms of capacity to operate the WTP and bulk water management

- Learnt lessons: Given that production targets are currently not being met (around 80% at the moment) and that bulk water management represents a potential long-term source of income for Athi,
  Recommandation: it seems appropriate to strengthen human capacity through training/skills transfer, bonus systems, or new recruits,
- Recommandation: It is also urgent to finalise the agreement on water sales to NCWSC and enable a better rate of bill collection,
- Recommandation: Internal or external audits of the condition and operation of the station could help to better identify areas for improvement to enable better operation, sustainability, and ES management of the facilities.

In regards with financial management

- Recommandation: In order to facilitate the advance payments, we recommend proceeding to external audit as before. The OAG doesn't consider the same indicators,
- Recommandation: As the steel price varied a lot during project implementation, it is recommended to have a monitoring tool to correlate the amendments due to VOP to the material market price.

In terms of consultation or decision-making bodies

- Learnt lessons : The project was mainly guided by AWWDA, in coordination with AFD but without formal concertation and decision taking framework.
  Recommandation: It would have been useful to mention the necessity to establish steering committee and technical committee in the credit agreement,
- Recommandation: To provide for more inclusive, participatory consultation methods, particularly on the land acquisition process,
- Learnt lessons: The lack of involvement of NCWSC is regrettable.
  Recommandation: We recommend pursuing the efforts to organize a technical collaboration with NCWSC, inviting them to greater consultation. It's essential to ensure that the operator demonstrates genuine commitment to improving its performance, so that future infrastructure investments can deliver their full intended impact.

In terms of sustainability

- Recommandation: We recommend establishing a clear sustainability strategy that includes a capacity-building plan, long-term investments, institutional monitoring, and measurable long-term objectives monitored by a third party,
- Improve infrastructure design: review the quality of materials and the layout of equipment in sanitary blocks, and incorporate sustainability and hygiene standards from the design stage onwards,
- Ensure financial viability: establish an effective billing and collection system, with a detailed, viable and validated long-term business plan,
- Strengthen human capacity by emphasising staff training, recruiting specialised personnel and providing extended follow-up. In particular, we recommend strengthening the relationship and the transfer of knowledge and skills to NCWSC.