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The role of benefit-cost analysis in water supply and sanitation project decisions: A qualitative study of three multilateral development banks

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Abstract

Benefit-cost analysis commonly guides resource allocation in multilateral development banks (MDBs), but there has been limited qualitative evidence exploring its role in decision-making processes. This study examines how benefit-cost analysis is deployed in water supply and sanitation projects financed by three major MDBs: the World Bank, the Asian Development Bank, and the African Development Bank. We employed an applied qualitative approach, utilising interviews and focus group discussions with MDB staff. Topic guides focused on experiences from 13 recent projects, and on processes through which benefit-cost analyses were developed and how results informed decision-making. We analysed data using an interpretivist approach, applying both inductive and deductive coding in framework analysis. In doing so, we develop a conceptual framework for benefit-cost analysis development in MDBs, and its use in their decision-making. We find that benefit-cost analysis is generally performed before project approval and regarded as a critical element of project appraisal. However, we identified several barriers, including data quality limitations, difficulty in identifying and measuring health and non-health impacts, and inadequate planning for the monitoring of benefits during project implementation. Furthermore, while stakeholders beyond MDBs (e.g. partner governments) are often consulted during model development, their role in the process was typically limited to provision of input data and contextual information rather than in-depth contributions. Recommendations emerging from the analysis include: updating guidelines (particularly with respect to identifying benefit types); linking benefits to external data sources; training MDB staff on guideline implementation; and establishing a database of benefit-cost models to support cross-learning across projects and contexts.

1. Introduction

Investment in water supply and sanitation services supports human capital development (Hammer & Spears, 2013; OECD, 2013). It reduces the burden of disease (Ross et al., 2023; Wolf et al., 2023) and lowers the risk of child mortality (Masset & Sharma Waddington, 2025; Sharma Waddington et al., 2023). It also saves time (Sharma Waddington et al., 2025) and improves people's quality of life (Ross et al., 2021), and educational attainment (Jasper et al., 2012). Sustainable Development Goal 6 calls for universal access to water supply and sanitation services by 2030 (Assembly, 2015), but billions of people still lack access (UNICEF & WHO, 2025). Despite this, public investment in the water sector falls short of meeting targets (Koncagül & Connor, 2023; OECD, 2022). Multilateral organisations are among the main external donor sources of funding for the water sector (McDonald et al., 2021; OECD, 2023a). Multilateral development banks (MDBs) invested over US$18 billion in the water sector over the past 10 years, with the World Bank, the African Development Bank, and the Asian Development Bank accounting for more than 90%. However, MDB resources are scarce, and they allocate budgets among competing investment options across and within sectors (OECD, 2026). Guided by welfarist economic theory (Brouwer et al., 2008), an economic evaluation framework is often utilised to ensure efficient resource allocation (ADB, 2013, 2017; Tan, 2002; WB, 2025). Benefit-cost analysis, commonly labelled as "economic analysis" in most MDB documentation, is typically used to assess the economic viability of prospective projects at the appraisal stage (called preparation in the African and Asian Development

Banks) and often at the completion stage as well. Evidence suggests a high utilisation of benefit-cost analysis in MDB water projects (AfDB, 2020a, 2020b; Musa et al., 2026).

Benefit-cost analysis is widely regarded as critical at the appraisal stage (Calkins, 1996), and is thought to strengthen project design and aid effective decision-making (ADB, 2006). Qualitative studies examining how BCA is conducted and used remain uncommon, though there are examples beyond MDBs in transport (Beukers et al., 2012; Eliasson & Lundberg, 2012; Mouter et al., 2015), multi-sectoral Norwegian-financed projects (Volden, 2019), and healthcare policy and financing decision-making (Ahonen et al., 2026; Kumar et al., 2020; Murphy et al., 2021). Concerns about low transparency and consistency in both process and reporting have been raised in transport (Beukers et al., 2012; Mouter, 2017; Nicolaisen & Driscoll, 2014) and other large-scale infrastructure investments (Annema, 2013; Atkins et al., 2017b; Volden & Samset, 2017). Within MDBs, evidence comes from the education sector (Roth, 2016) and cross-sectoral reviews (IEG, 2010).

This evidence base also highlights similar transparency problems and indicates several issues with how BCA is used as a decision-making support in MDBs. For example, BCA often plays a limited role in investment decisions: key decisions are sometimes made before BCA is completed, and it is mostly used for administrative clearances at project appraisal (IEG, 2010). Some projects with unfavourable BCA outcomes sometimes get approved, although they are frequently questioned during the project quality review, which precedes approval (IEG, 2010). This suggests that decision-makers may occasionally override benefit-cost results, reflecting the influence of factors beyond economic justification, such as political or strategic priorities, in decision-making. Moreover, methodological concerns have been raised about the validity of assumptions and the contextual relevance of quantified benefits (Roth, 2016).

In addition, stakeholders such as partners and counterpart governments are integral to benefit-cost planning (Nguyen, 2019). They often take an active role, particularly during field visits, and this participatory approach is expected to strengthen the use of benefit-cost evidence in decision-making (Dehnhardt et al., 2022). Nonetheless, stakeholders' participation in BCA development is perceived as unstructured (Beukers et al., 2012). Their precise roles and the extent of involvement in appraising benefit-cost models remain unclear (Atkins et al., 2017a). Given the limited evidence, the only cross-sectoral benefit-cost assessment comes from internal World Bank review and evaluation exercises, underscoring the scarcity of independent qualitative research on BCA practice in MDBs (IEG, 2010). Therefore, we aimed to examine how benefit-cost analysis is developed and utilised in water supply and sanitation projects supported by MDBs. In particular, we aim to explore the following research questions:

1. What formal and informal processes do MDBs follow when developing benefit-cost analysis at the project appraisal?
2. What factors influence the inclusion or exclusion of benefit-cost analysis in water supply and sanitation projects at the appraisal stage?

3. How are key stakeholders involved in the benefit-cost analysis process, and what are their roles?
4. How do benefit-cost analysis outcomes influence the decision-making for water supply and sanitation projects at the appraisal stage?

2. Materials and Methods

2.1 Study design

We adopted an applied qualitative approach with semi-structured Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) conducted between April and November 2025 (Thorogood & Green, 2018). The study was reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007). The reporting checklist was listed in Supplement A.

2.2 Setting and participants

We interviewed staff from the World Bank, the African Development Bank, and the Asian Development Bank involved in preparing the economic analysis of selected water supply and sanitation projects. These included project managers and team members, such as consultants.

2.3 Sampling strategy

We used a purposive sample of water supply and sanitation projects from databases of the Asian Development Bank (Projects and Tenders), the World Bank (Projects and Operations) and the African Development Bank (Data Portal) (ADB, 2024; AfDB, 2024; WB, 2024). We searched bank databases for projects approved between 1 January 2020 and 5 June 2025 (Supplement B). The search timeframe was capped at 5 years, as participants would be more likely to remember the details of the benefit-cost analysis. We included projects if they targeted a domestic water or sanitation service, met the Organisation for Economic Co-operation and Development's scope definition of water supply and sanitation (OECD, 2023b) and had an approved or active status, and had project appraisal documents available (Supplement C). We excluded projects with closed status and those primarily designed for water-sector policy and management, technical assistance, and solid waste management. Other exclusion criteria are listed in Supplement C.

For the 94 projects meeting inclusion criteria, project managers were invited to participate and provided with a study information sheet via their professional email (Supplement D), between March and June 2025. For those who did not respond, we sent up to three rounds of follow-up emails. For the Asian Development Bank, we invited project managers through a web-based form, and also contacted two senior economists to facilitate engagement. Of the 94 projects, 14% accepted the invitation, 11% declined, 72% did not respond, and 3% did not participate for other reasons (Supplement D). For those who agreed, their projects were implemented in Africa, Asia or Europe. In Africa, projects were

particularly from Egypt (n = 1), South Sudan (n = 1), Somalia (n = 2), Rwanda (n = 1), Kenya (n = 1), Malawi (n = 2) and Mozambique (n = 2). In Asia, projects were from Pakistan (n = 1) and Cambodia (n = 1). In Europe, the project originated from Bosnia and Herzegovina (1) (Fig. 1).

As part of the consent process, participants were told that they would be anonymous and that any quotes used would not identify the participant directly or indirectly. However, it remains possible that some participants were reticent to give their true views, for example, if they felt they could be indirectly identified from views they had previously expressed internally.

2.4 Data collection methods

We collected data from participants, utilising two main data collection methods. First, we conducted KIIs facilitated by a topic guide (Supplement F), to explore in-depth accounts of benefit-cost development and its application in decision-making, and obtained participants' characteristics (Supplement E). Second, we invited previously-interviewed participants for a follow-up FGD around 3–6 months later, with a topic guide informed by findings from initial interviews (Supplement G). This sought to elicit their feedback on emerging findings, e.g. data challenges, and to triangulate different views about the use of benefit-cost results. Additionally, we undertook a KII with a senior water economist (World Bank) to discuss preliminary results and to obtain their views on the economic analysis practice. We attempted to do the same with the chief water and sanitation officer at the African Development Bank, but were unsuccessful.

Our research team comprised two health economists, a development economist and an environmental health epidemiologist, with demonstrated experience in qualitative research (Ross et al., 2021; Watson et al., 2020). The first author (O. M.) conducted interviews and FGDs with participants online using Zoom Workplace or Microsoft Teams, at the interviewee’s convenience. We utilised the live-transcription feature of these platforms to transcribe the discussion. The median call duration was 44 minutes (IQR: 41–52) for the interview and 58 (IQR: 55–60) for the FGD.

2.5 Data analysis and reporting

We analysed the data using efficient allocation of development bank resources as an economic lens (Coast, 1999; Coast & De Allegri, 2018; Coast & Jackson, 2017). We followed an interpretivist approach, which assumes the existence of multiple context-dependent realities, as staff experiences may vary between settings and between individuals working on the same project. This analysis aimed to generate a conceptual framework for the practice of benefit-cost analysis in MDBs, particularly considering how it is developed and used in decision-making.

We systematically analysed interview and FGD data using framework analysis, which incorporates elements of content analysis (Ritchie & Spencer, 2002). We followed the five stages of framework

analysis in examining the data: (A) familiarisation with the data; (B) identifying a thematic framework; (C) data indexing; (D) data charting, and (E) mapping and interpretation. This framework is not linked to a particular epistemological position and, hence, allows for a flexible approach to both inductive and deductive coding (Thorogood & Green, 2018). We applied these coding methods in stages B and C. In particular, we deductively derived themes and codes from the topic guide and a recent review (Musa et al., 2026), and inductively identified additional codes emerging from the data.

OM read every transcript and listened to its respective recording for verification if required. Transcripts were then uploaded to NVivo 15 (Q. S. R. International, 2025; Wong, 2008). OM then open-coded two rounds of transcripts, with each comprising three transcripts. After each round, the emerged codebook was discussed with another co-author (IR), after which similar codes were merged, and suggested new themes were incorporated. Subsequently, the refined codebook was applied to the next three transcripts, and the discussion process was repeated. After three rounds of iteration, the codebook remained mostly unchanged, and thus, a final framework was identified. This framework was then applied to the remaining transcripts. After completing eight interviews, data saturation, i.e., 'diminishing returns' of further data collection, appeared to have been achieved (Saunders et al., 2018). However, we continued with the remaining scheduled interviews to ensure this and to avoid offending participants by cancelling scheduled interviews. OM also wrote analytical memos for highly prevalent codes and then charted, mapped and interpreted the data. Participants' characteristics data were managed and analysed using Microsoft Excel.

2.6 Ethical issues

The Observational Research Ethics Committee of the London School of Hygiene and Tropical Medicine granted ethical approval for this study (Ref No: 31470). Written consent was obtained from participants prior to commencing data collection. They were also informed that they retain the full right to withdraw from the study at any point.

3. Results

In total, we interviewed 15 participants, of whom 87% were male, and 60% were project team leaders. Most were from the World Bank (47%) and the African Development Bank (40%). Participants were interviewed primarily about the 13 water supply and sanitation projects derived from sampling, but also drew on their experiences from other projects they had worked on. Additionally, the majority (73%) of participants were engineers. Over three-fifths of participants had received training in benefit-cost analysis, but only a fifth conducted the project's benefit-cost modelling themselves. Four interviewees subsequently participated in 2 FGDs, with each comprising 2 participants, all from the World Bank (100%).

Table 1
Characteristics of participants of included projects

Gender	**Interviews** **N = 15**	**Focus group** **N = 4**
Male	13 (87%)	3 (75%)
Female	2 (13%)	1 (25%)
MDB		
World Bank	7 (47%)	4 (100%)
African Development Bank	6 (40%)	0 (0%)
Asian Development Bank	2 (13%)	0 (0%)
Economist by background		
Yes	4 (27%)	2 (50%)
No	11 (73%)	2 (50%)
Years of experience		
1-4yr	2 (13%)	1 (25%)
5-8yr	2 (13%)	0 (0%)
> 9yr	11 (73%)	3 (75%)
Role in the project		
Task team leader	9 (60%)	1 (25%)
Team member	6 (30%)	3 (75%)
Employment		
Bank staff member	9 (60%)	1 (25%)
Consultant	4 (27%)	0 (0%)
Bank consultant staff member	2 (13%)	3 (75%)
Conducted the benefit-cost analysis for the project		
Yes	3 (20%)	3 (75%)
No	12 (80%)	0 (25%)
* Numbers were reported as n (%)		

Gender	Interviews N = 15	Focus group N = 4
Trained in benefit-cost analysis		
Yes	10 (67%)	3 (75%)
No	5 (33%)	1 (25%)
* Numbers were reported as n (%)		

We identified three broad themes related to the benefit-cost analysis, which we capture in a conceptual framework (Fig. 2). These comprise the development of the analysis, the use of the results in decision-making at the appraisal stage and recommendations for future practice.

3.1 Development of benefit-cost analysis at appraisal

3.1.1 Positionality of benefit-cost analysis in feasibility assessment

The three MDBs follow very similar procedures during the project appraisal process, with benefit-cost analysis as an integral requirement. All participants noted that benefit-cost analysis is mandatory and considered one of the key appraisal elements at project preparation to justify economic viability (12/12).

“Obviously, we have limited resources within the Bank and competing needs. We do not want to put resources where we would not realise the maximum impact or benefit relative to the costs incurred. Thus, economic feasibility is one of the mandatory requirements of the key feasibility aspects during the project preparation,” [Interview, 025]

“The Bank has pretty standard requirements for project preparation … We need to provide an economic assessment of the project to demonstrate what will happen if the project is not implemented,” [Interview, 027]

3.1.2 Timing for benefit-cost analysis

Benefit-cost analysis is usually conducted in advance of funding approval, often at an early stage of project development.

“Right, benefit-cost analysis starts before funding approval, as it is a part of the appraisal documents that go to the Bank’s board. So, it is developed much in advance of the project preparation,” [Interview, 027]

Benefit-cost analysis is sometimes conducted in two distinct stages during the project preparation process. Some participants indicated that while a preliminary benefit-cost analysis is often conducted during the early concept note phase, a detailed analysis is extended during the appraisal report. The former is used to obtain approval for initial project scoping, and the latter is prepared for the Bank's board of directors' approval of the detailed proposal.

"Benefit-cost analysis is conducted much before the preparation of the mission *[a series of meetings in the project location]*, where we prepare a project concept note. Here, the economic analyst is involved in conducting a preliminary analysis of the economic analysis. This analysis has to be approved by different levels (not the board), which is before the approval of the fund," [Interview, 034]

"The government, through the Ministry of Finance, write to the Bank to request support for an identified project. Once the request letter is considered, a team, including an economist, is assembled to prepare a concept note, which includes an initial analysis for management for approval. Once approved, the benefit-cost is finalised at the appraisal stage," [Interview, 023]

3.1.3 Time allocated for developing benefit-cost analysis

Numerous factors determine the timing for developing a benefit-cost analysis, most commonly the complexity of the project, the data quality and the availability of economic expertise. In general, the average time for benefit-cost preparation may extend from 1 to 24 weeks, depending on how much good-quality data was already available. Almost half of the interview participants (5/12) reported that the model-building component takes between 1 and 3 weeks, when solid data and expertise were available. However, when the benefit-cost analysis is incorporated in the overall project package, including data collection, coordination and approval phases, participants (5/12) suggested a period of 8 to 24 weeks or longer.

"In principle, the preparation of the benefit-cost analysis model would depend on the expertise of the economist and the project scope, which, for our project, was straightforward. So, we had solid data, like the number of beneficiaries, and it was developed rather quickly, in around 10 days. Maybe for some other projects, like complex projects, it takes more time," [Interview, 029]

"Benefit-cost analysis takes, on average, maybe 4 weeks during the project preparation or appraisal. Two weeks for the data collection when we are on mission and 2–3 weeks for the analysis when we come back in the office…," [Interview, 023]

"Development of a benefit-cost model goes together with the full appraisal package of a project. Hence, the overall timing often takes between 3 and 6 months," [interview, 027]

3.1.4 Use of guidelines in benefit-cost analysis

Most interviewees (11/12) reported that an internal guideline document or international guidance was used in data collection, discussion and preparation of the benefit-cost analysis.

“There is a strict set of processes and procedures within the Bank that need to be followed. So, we have to align our work with the most updated guidance and the best practice in the water sector,” [Interview, 031]

“[Analysis] must be appropriately conducted according to international standards,” [Interview, 022]

Some participants (2/12) cited the absence of a water and sanitation-specific guideline and the use of external sources to construct the analysis.

“There is a benefit-cost analysis guideline, [but] I do not recall whether there is a specific guideline for water supply and sanitation projects. … Additionally, there are some guidelines for the benefits that we need to investigate for a project,” [Interview, 028]

“There are no specific guidelines [for water supply and sanitation]; however, there was a referral to a World Health Organisation document for water and sanitation-related benefits,” [Interview, 025]

One participant noted that the World Bank has recently published a new guideline that covers the water sector more broadly (WB, 2025).

“We recently published an economic analysis guideline for water projects at the Bank. Although it includes some parts of water and sanitation, it is mostly on water resources, water risks, and climate issues that are modelled into water projects [for example] how to incorporate [these] into the project design. The guideline not only covers water supply and sanitation services but also irrigation, resilient urban sanitation, flood and drought risk management and hydropower,” [Interview, 035]

On the other hand, another participant (1/12) mentioned that guidelines are not frequently followed in their water practice.

“To be frank, we do not follow the guidelines very much because at least all the projects that we have done in the water sector were very closely linked in terms of benefit-cost results and development. Thereby, we were almost confident that the project that we were presenting would have a positive development impact. So, maybe this is the reason why we do not follow them,” [Interview, 034]

3.1.5 Quality assurance review of benefit-cost analyses

Benefit-cost analysis is subjected to quality assurance review processes during the appraisal stage at MDBs. The review of the benefit-cost analysis is often conducted internally as part of the entire review of the project appraisal documents. Around two-fifths of participants (7/12) indicated that the economic analysis usually undergoes numerous quality enhancement reviews. These reviews are performed by peer reviewers from different administrative sections/departments within the same MDB, including economists.

“At the design of the concept note, there will be a discussion about quality enhancement review [*review process by expert peer reviewers*] in the Bank to provide feedback on different sections of the document,

including the economic analysis. Also, in the decision meeting for approving the project, the team has to share the model calculations with the review committee to … check if we have counted well for all that should be counted for," [Interview, 030]

"Our work evolves and takes a lot of processes, which are part of the quality assurance. This includes a team of expert peer reviewers who review the whole document, including the economic analysis. After the peer reviewers, it is then subjected to the country team, and after that, it is sent to the front office of the director general, who reviews it before approval," [Interview, 023]

When consultants are recruited to conduct a benefit-cost analysis, MDBs normally audit and validate assumptions and calculations (2/12).

"We review the economic analysis model, which is produced by a consultant, to validate the assumptions and make sure everything is aligned with what is happening on the ground," [Interview, 022]

Moreover, some interview participants (2/12) indicated that stakeholders, such as governments or water utility counterparts ("the client"), are sometimes involved in reviewing benefit-cost analysis.

"After we prepared the economic analysis, we submitted it to the economist of the group who reviewed it, and then we submitted it to the chief economist of the region. After this, we sent it to the client for review and again, we went over the entire process for the project appraisal document submission," [Interview, 026]

"We convened with stakeholders during the validation workshop [*a project review meeting*] when the consultant presented all the project information. Then, we discussed them, and if someone was not clear about something or had a comment, they found enough clarification," [Interview, 024]

3.1.6 Stakeholders' engagement in benefit-cost analysis

Consultation of non-MDB stakeholders is seen as indispensable to the development of benefit-cost analysis at the appraisal stage in the water sector (12/12). In general, several groups of stakeholders are engaged in preparation: government counterparts [Interview 022, 025, 26, 023, 028, 027, 029, 030, 031, 032, 033, and 34], grassroots beneficiaries [Interview 30, 31, and 32,], utilities [Interview 026, 027, 028, and 032], occasionally the private sector [Interview 033], relevant United Nations agencies [Interview 024, 034 and 035] and non-governmental development partners [Interview 024, 034, and 035]. Stakeholders primarily contribute to the input data and contextual information required for the benefit-cost analysis. Additionally, governments and utilities sometimes participate in the discussion of the benefit-cost analysis results, but this depends on the country's maturity. However, the extent to which stakeholders are consulted in benefit-cost preparation can often depend on the openness and institutional structure of a client's government [Interview, 035]

3.1.7 Data challenges in benefit-cost analysis

Common problems related to the development of benefit-cost analysis in the water sector were identified. First, the scarcity and difficulty of obtaining relevant data. Second, the complexity of identifying and quantifying related economic benefits. Third, inadequate planning for the monitoring of benefits during project implementation, which is critical for the re-estimation of the benefit-cost model at completion. However, staff often believe that once the project is funded, its implementation turns into a disbursement business. Hence, planning for the monitoring of economic benefits becomes a lower priority.

“The issue is sometimes obtaining quality information for the benefit-cost analysis. Although we work with public institutions, such as utilities, they typically do not have audited financial statements. Thus, we need to collect data, which sometimes is characterised by low quality,” [Interview, 028]

“I have seen some projects where we faced some difficulties in quantifying their economic benefits. For example, we have just finalised an urban sanitation project in which we were able to quantify its public health impact; however, it was difficult to quantify how improved sanitation could be reflected in terms of economic benefits. I think this was due to the lack of information and baseline data in the country where the project will be implemented,” [FGD02]

“When the economic analysis is conducted, information is provided, and the project is approved … [*then*] our business turns into disbursement – we need to spend money. However, all the parameters that we used for the economic analysis are not being utilised and monitored, and this is very important,” [FGD01]

“We construct a couple of indicators to monitor performance, specifically financial performance. However, we do not often monitor economic benefits as long as they are justified during the project preparation and disclosed and confirmed with the Bank clients,” [Interview, 033]

Nevertheless, some MDB staff believed it was relatively easy to identify and quantify the right economic benefits in the water sector as compared to other sectors.

“The identification and quantification of the right economic benefits are relatively easy in the water sector because there are many desk reviews and studies conducted on related benefits, such as health and human capital benefits, and so forth…” [FGD01]

Data limitations sometimes impede the valuation of some benefits, such as social and environmental benefits, in the benefit-cost analysis model.

“Environmental and social benefits are sometimes overlooked in countries characterised by data scarcity because they are difficult to quantify or justify,” [FGD01]

3.1.8 Emerging benefits in the water sector

Benefits beyond those traditionally measured in water and sanitation benefit-cost analyses are increasingly being accounted for. In particular, interview participants (8/12) highlighted the growing importance of climate change-related benefits, e.g. changes in greenhouse gas emissions.

“One of the most important benefits for the Bank is climate benefits. For example, open defecation does not produce greenhouse gas emissions, but [*improved*] sanitation generates methane emissions,” [Interview, 026]

“When it comes to the benefit aspects, we engage multiple sectors, especially the climate team. This is because [*changes in*] greenhouse gas emissions and carbon pricing need to be counted as part of the benefits in the benefit-cost analysis,” [Interview, 028]

In addition, labour market outcomes have recently received more attention, such as the impact of projects on job creation

“If you invest in a water service, people will get lower disease incidence, be more productive and can find better jobs. We now use a very simple formula that estimates the income gains from investment through simple elasticities, and then multiply that by the beneficiaries at baseline to assess job creation,” [Interview, 035]

3.2 Use of benefit-cost analysis results in decision-making

3.2.1 Role of benefit-cost analysis in decision-making

Benefit-cost analysis is one of the key decision-support tools. Its output plays an important role in guiding projects and is often considered in decisions by the MDB board of directors. All interview participants (12/12) indicated that the benefit-cost analysis result influenced the project's approval. In some instances, it led to securing additional financing, specifically when the project is driving substantial impact (1/12).

“I am not surprised that the economic analysis led to the approval of the project. When the project was being implemented, it brought a huge positive impact, which led to granting additional financing,” [Interview, 033]

Some participants reported that projects with an unfavourable benefit-cost result would neither be taken to the board nor be approved. This is because such a project will not even pass the quality review (5/12).

“A project cannot move forward with a negative benefit-cost result, as we cannot present an unviable project to the Bank board of directors,” [Interview, 023]

Others, however, suggested that projects without economic viability may sometimes get approved regardless, if they have a strong social impact (1/12). Moreover, it was argued that if environmental and social impacts are appropriately quantified into the benefit-cost model, a project will yield a favourable result.

“If the project is not justified from economic, social, and environmental perspectives, it would not be worth taking it through the approval process with the Bank. Moreover, if the project is not economically viable, the project cannot be approved unless it has a very strong social impact,” [Interview, 030]

It seemed that a common consequence of an initially unfavourable finding in the benefit-cost analysis was either to modify the programme (presumably to reduce costs) or to identify new benefits to be incorporated in the analysis, until the result was favourable.

“If a project does not show a favourable benefit-cost analysis outcome, its expected benefits, including social and environmental impacts, could be restructured in an innovative approach. For instance, climate benefits could be included in a certain manner to boost the environmental and climate aspects of the projects that may alter the outcome,” [FGD02]

“If the project does not pass the economic analysis criterion, it will be redesigned,” [Interview, 026]

3.2.2 Factors considered in decision-making

Beyond benefit-cost analysis, decision-making also considers other factors. The most often reported by participants were environmental and social impact assessments (6/12), financial analysis (3/12), climate change (2/12) and gender compliance (2/12). Moreover, while political fragility, sustainability and geographical factors were less frequently mentioned, they were considered in project appraisal to aid decision-making.

“You know, we consider everything from technical factors to political factors, including geographical and sectoral factors in the project appraisal...,” [Interview, 031]

“Apart from the economic analysis, several factors influenced project decision-making. These include technical feasibility, as well as sustainability, environmental, and social factors. In addition to political fragility and gender compliance...,” [Interview, 023]

3.2.3 Weight of factors considered in decision-making

We identified mixed accounts in terms of the weight/importance of factors in decision-making. In general, decision-makers consider the entire technical package of project appraisals. However, environmental, climate change, and social factors appear to receive more attention than economic analysis (3/12). Social and environmental risks can be addressed through mitigation measures (1/12).

“…Broadly, the Bank considers the whole project package; however, these days, there is a huge focus on environmental protection, climate resilience, social issues, health and safety. For instance, a project may not be approved if it entails significant environmental and social risks,” [Interview, 027]

“We have not ranked factors in terms of importance, but I consider the economic analysis to be very critical. This is because you cannot proceed with a project unless it is viable. On the other hand, environmental, social and gender risks can be mitigated via mitigation measures. However, these measures may increase the overall cost of the project,” [Interview, 023]

The extent of importance among factors can depend on the country context in which a project is proposed, as well as institutional priorities (2/12), which can change over time. For instance, the lack of

data in low-resource settings can affect the rigour of benefit-cost analysis and, hence, its influence.

“Benefit-cost analysis is receiving less attention [than other factors], as we mainly work in impoverished countries where data simply does not exist, and many things are based on benchmarks or assumptions. For example, in some countries, such as Congo and Brazil, data is rarely available, and the project needs to be pushed through. Therefore, we sometimes outsource data from neighbouring countries,” [FGD01]

“Frankly, the level of importance depends on the institutional objectives. At some point, climate change was given huge importance to mobilise the climate agenda forward. Therefore, a project must satisfy climate mitigation and adaptation requirements. For example, if the project is economically viable and has a climate component that is not justified, its approval may be hindered,” [Interview, 033]

3.3 Recommendations for improving benefit-cost analysis practice

Several areas for enhancing the practice of benefit-cost analysis in the water sector were highlighted. First, MDB staff requested simpler guidelines, for example, to help identify and quantify relevant economic benefits and link them to external data sources. It was suggested that data collection methods should be standardised to increase accessibility of information. Participants also flagged the need for additional capacity-building training on benefit-cost analysis, and for the establishment of economic analysis databases to support cross-learning across projects and contexts (Overall, 6/12).

“We need harmonised methodological guidelines that could accelerate the discussion on the quantification of benefits. Every project manager is struggling with the same quantification issue, and they will have to search the literature and talk to different people to figure it out. Better guidance could be in the sense of measurement and linking secondary data with country-specific data. For example, improved sanitation reduces diarrhoeal disease, but to what extent, we do not know. Therefore, the provision of guidance eases the process and improves the reporting quality of benefit-cost analysis,” [Interview, 028]

“The benefit-cost analysis development process could be made simpler by having a harmonised and standardised process of indicators, with a guideline reference on their type and data that could be used. Nevertheless, these are context and location-specific; they often consume loads of time, in terms of selection of benefits, identifying their sources and quantifying them,” [FGD02]

“Although public utilities should publish their information as they are supposed to work transparently, they are withholding information, which in turn affects access to this information, which may impact the development of the benefit-cost analysis,” [FGD01]

“In terms of the need for an economic analysis database, we are not being diligent about compiling and making templates of economic analysis available in a single repository of information. That our project managers and members, including economists working on projects, can revert to them to learn and get

ideas on how to do an analysis applied to their project or their country where they are making these projects," [interview, 035]

However, some participants (4/12) had not recommended any improvement to the benefit-cost analysis practice in their respective MDB. Because they either believed that benefit-cost is often properly performed, or the question was technical for them.

"Apparently, benefit-cost analyses are properly conducted according to international standards. Thus, I am not suggesting any areas for its improvement," [Interview, 022]

"I do not really have a clear suggestion because this is not my area…," [Interview, 029]

4. Discussion

Our study has elicited experiences and knowledge of MDB staff and consultants on the practice of benefit-cost analysis in project appraisal. We identified three core themes in the data (Fig. 2) and highlighted four key findings. First, data challenges arise during project appraisal, including data quality limitations and difficulty in quantifying benefits, as well as inadequate monitoring of benefits during project implementation, which would hinder completion-stage BCA. Second, when projects initially have unfavourable economic analysis results, this often results in models being tweaked or programmes being redesigned until the results become favourable. Third, the economic analysis model is reviewed internally, and while counterparts and utilities sometimes participate in this, their role is predominantly seen as being input data provision. Finally, several areas were highlighted for improving benefit-cost practice, in relation to updated guidelines, linking benefits to external data sources, strengthening staff skills, and building knowledge databases. The paper contributes to knowledge by developing a conceptual framework for benefit-cost analysis development in MDBs and its use in their decision-making, and by offering recommendations to improve practices.

Our findings suggest that benefit-cost analysis is typically conducted before project approval and is usually a key criterion to support investment decisions. These findings align with the current MDB mandates for approving project investment (ADB, 2013, 2017; WB, 2025). However, they are inconsistent with previous studies (IEG, 2010) that showed that investment decisions often precede the development of benefit-cost analysis, and that BCA did not play a primary role in funding approval. It is possible that social desirability bias or fear of identification-coloured participants' responses, even though they had the expectation of anonymity.

Economic analysis guidelines often shape the benefit-cost analysis process in project appraisal. However, some participants reported that economic analyses were sometimes adapted from previous projects when they are sufficiently similar. This could be reasonable in some cases, but clear guidance is warranted on how to translate or adapt models. Moreover, while models are periodically reviewed as part of "quality enhancement review" and appraisal, the fact that this is done internally by other MDB staff may reinforce certain ways of doing things. This might partially explain the gap in transparency in

reporting (Musa et al., 2026) and/or a gap in best practice guidelines in academia versus MDBs (Robinson et al., 2019). If the transparency gap is masking a gap in methodological quality, then decision-making could be suboptimal. For example, probabilistic sensitivity analysis became the norm in academic practice 10–20 years ago, but most MDB project appraisals still solely use deterministic sensitivity analysis, often assigning arbitrarily parameter ranges (e.g. ±20%) (Musa et al., 2026). These findings might warrant the adoption of reference case guidelines in economic analysis practice (Robinson et al., 2019).

Several data challenges are associated with preparing a benefit-cost analysis, for example, data quality limitations and complexity in quantifying benefits. Beyond MDBs, similar issues were found in the use of benefit-cost analysis in food-related interventions (Osifowora et al., 2025), and in transport (Beukers et al., 2012). Insufficient planning for monitoring benefits during MDB project implementation hampers the update of benefit-cost outcomes at the completion stage. This does not seem to be an issue limited to benefit-cost analysis. For example, in a study across 1,300 World Bank projects, the quality of monitoring and evaluation was found to be positively associated with project outcomes (Raimondo, 2016). In addition, the fact that some projects with initially unfavourable economic analysis are revised until it becomes favourable could be interpreted in two ways. On the one hand, it could be interpreted as the benefit-cost analysis having high influence and “doing its job”, by highlighting measurement issues in the original analysis or deficiency in the original design, which would not otherwise have been uncovered. On the other hand, it could be interpreted as economic analyses having low influence, if they are being overridden by political factors (IEG, 2010), and recalibrated until the desired answer is reached, with additional time costs incurred in the process.

The main strengths of our study are threefold. First, this is the first qualitative study to elicit accounts from MDB staff on benefit-cost analysis practices in the water sector, and we were able to find only limited examples for other sectors (Roth, 2016). Second, it explored the staff’s accounts from the largest MDBs that account for over 90% of MDB financing to the water sector in the last decade (2014–2023). We interviewed a mix of staff, including task team leaders, economists and consultants, which brought diverse perspectives. Third, we designed our study on the strong foundation of a review of benefit-cost analysis documentation in the same MDBs (Musa et al., 2026), which ensured it was well-targeted at prevalent issues. On the other hand, there are also several limitations to our study. The study was characterised by a low representation of the Asian Development Bank, due to the low response rate to the interview invitation. Even though we invited project managers from 94 projects, the majority did not respond (n = 68), perhaps due to being too busy or uninterested; or declined (n = 10); or had other reasons (n = 3). Our design focused on the project appraisal stage, as MDB staff are more likely to recall benefit-cost analysis-related details at that time. It would have been interesting to include completion stage benefit-cost analyses as well, but this was not possible because all projects are still being implemented, which was the trade-off with having good recall. We only included projects from three MDBs; however, we do believe that the findings are likely to be relevant across other similar and smaller institutions, as they tend to model their practice on the larger institutions (Prizzon et al., 2022). Our research focused on MDB staff involved in the analyses, as we aimed to get a wide breadth of projects,

but future research could focus in-depth on a small number of projects by including stakeholders beyond MDBs, such as in government and implementers (e.g. utilities).

In conclusion, our findings offer multiple policy and research implications. While benefit-cost analysis is perceived to be integral to project appraisal across several large MDBs, remaining issues could be resolved so that analyses can best inform decision-making. MDBs could improve benefit-cost analysis practice in many ways: by updating guidelines with respect to identifying and measuring benefits, linking benefits to external data sources, strengthening staff skills in benefit-cost analysis and establishing economic analysis databases to support cross-learning across projects and contexts. Harmonisation of benefit-cost analysis for the sanitation sector was proposed by the World Bank, through the promotion of a web-based modelling toolkit (WB, 2015). This was not embraced, however, internally or externally, most likely due to resistance from analysts and project managers to using a standardised template. Lessons from this experience should be applied in future efforts. MDBs should also adopt a stakeholder-centric approach in benefit-cost planning to prompt discussion beyond data provision (Nguyen, 2019).

Declarations

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Author contribution statement

We indicate authors' contribution using the Contributor Roles Taxanomy (CRediT)**. Omran A. H. Musa**: Conceptualisation, data curation, formal analysis, investigation, methodology, project administration, software, validation, visualisation, validation, writing – original draft, and writing – review & editing. **Oliver Cumming**: Conceptualisation, methodology, funding acquisition, validation, writing – review & editing and supervision. **Elisa Van Waeyenberge**: Conceptualisation, methodology, funding acquisition, validation, writing – review & editing and supervision. **Ian Ross**: Conceptualisation, methodology, project administration, resources, funding acquisition, validation, writing – review & editing and supervision.

Conflict of interest

The authors declare no competing interests.

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Figures



Figure 1

Geographic location of water supply and sanitation projects included in the study

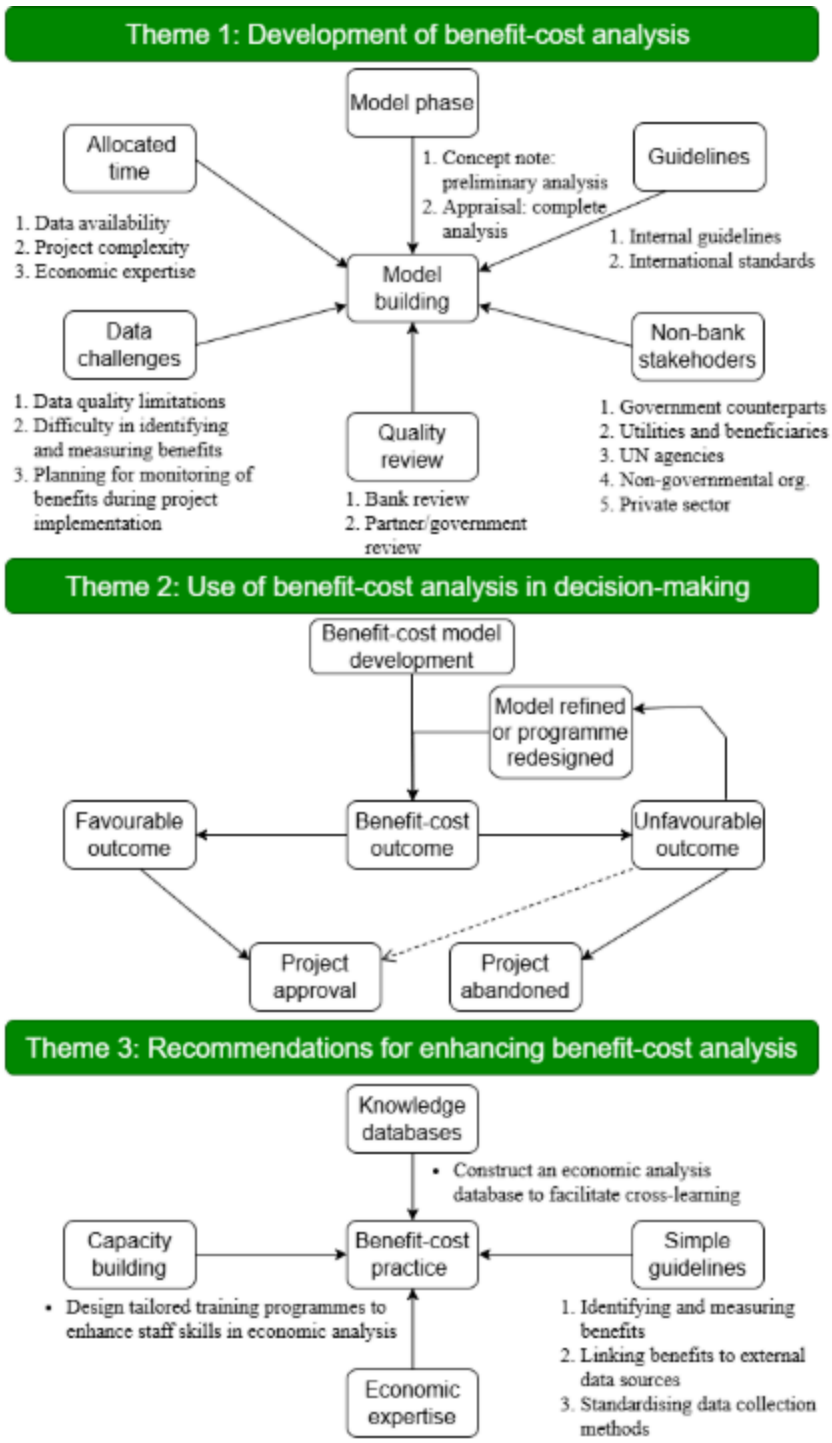


Figure 2

Conceptual framework of benefit-cost analysis practice in water supply and sanitation projects at the appraisal stage

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