

Peacebuilding through water cooperation? Institutional design and peace-relevant functions in the Indus and Nile Basins

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ANNEX

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This annex documents the indicator codebook, scoring rules, and case-specific justifications used in the thesis's comparative analysis. It is designed to maximize transparency and replicability. The framework contains four dimensions (A–D), each with three indicators (1–3). Each indicator is scored on a 0–3 scale. Scores are justified for both cases: the Permanent Indus Commission (PIC, Indus Basin) and the Nile Basin Initiative / Nile River Basin Commission (NBI/NRBC, Nile Basin). Three worked examples per basin illustrate the coding procedure and evidence trace.

Table 1. Scoring scale 0-3 (applies to all indicators)
1. táblázat. 0-3 fokú pontozási skála (minden indikátorra vonatkozik)

Score	Definition
0 – Absent	No evidence the indicator is present in practice or design.
1 – Nascent	Ad hoc or partial presence; inconsistent or one-off application; weak institutionalization.
2 – Operational	Regularized practice with clear procedures; performance evidence in multiple episodes.
3 – Institutionalized/Robust	Deeply embedded in rules and routines; consistent multi-year performance; resilient to stress/leadership changes.

Table 2. Indicator Codebook (A1-D3)

2. táblázat. Indikátor kódkönyv (A1-D3)

Indicator	Operational Definition	Coding Rules (0–3)
A. Cooperation & Coordination Capacity	(Dimension header)	—
A1. Information Exchange & Notification	Extent to which parties exchange hydrological/operational data, provide project notifications, and use standardized formats and timelines.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
A2. Operational Coordination	Existence and use of procedures for coordinated operations (e.g., reservoir releases, flood early warning, joint inspections, joint monitoring).	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
A3. Joint Technical Work & Tools	Use of joint technical bodies, models, and decision-support systems; presence of shared methodologies and joint studies.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
B. Legalization & Dispute Resolution	(Dimension header)	—
B1. Rule Clarity & Mandate	Clarity, specificity, and stability of the legal/mandate framework defining rights, obligations, and institutional roles.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures;

		3: deeply embedded and resilient (multi-year, multi-episode).
B2. Dispute Resolution Uptake	Observed use of dispute-resolution ladders (good offices, expert determination, arbitration/adjudication) and compliance with outcomes.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
B3. Enforcement & Follow-through	Mechanisms and practice for monitoring compliance, implementing remedies, and addressing non-compliance.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
C. Transparency, Knowledge & Learning	(Dimension header)	—
C1. Data Transparency & Accessibility	Public availability and timeliness of data, reports, and decisions; clarity of documentation.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
C2. Monitoring & Evaluation (M&E)	Existence and regularity of internal/external evaluations, performance indicators, and learning loops.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
C3. Scenario Planning & Risk Management	Use of scenarios, stress tests, or risk frameworks for droughts, floods, or infrastructure operations.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
D. Inclusion, Adaptation & Co-benefits	(Dimension header)	—
D1. Stakeholder Inclusion	Quality and breadth of participation (sub-national authorities, civil society, user groups, private sector) and grievance/feedback channels.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
D2. Benefit Sharing & Programme Delivery	Delivery of multi-country programmes/projects (e.g., energy trade, navigation, environmental services) that distribute benefits.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).
D3. Climate/Environmental Integration	Integration of environmental flows, adaptation, and ecosystem considerations into plans, operations, and agreements.	0: no evidence; 1: ad hoc/partial; 2: regularized practice with procedures; 3: deeply embedded and resilient (multi-year, multi-episode).

The following matrix reports the scores for each indicator and brief justifications anchored in observed practices and episodes.

Table 3. Case Scores and Justifications (A1–D3)
3. táblázat. Esettanulmányok pontszámai és indoklásai (A1–D3)

Indicator	PIC Score	PIC Justification	NBI/NRBC Score	NBI/NRBC Justification
A1. Information Exchange &	2	Regular notifications and data exchange under treaty procedures;	2	Routine hydrological data sharing via basin programmes;

Notification		standardized meeting records; occasional disputes over timeliness/format.		project notifications through programmatic channels; variability across riparian states.
A2. Operational Coordination	2	Joint inspections and project-related coordination occur; operational coordination bounded by treaty text and sovereignty constraints.	2	Operational tools (e. g., flood early warning bulletins) and coordination through programmes; not legally binding but practiced.
A3. Joint Technical Work & Tools	2	Use of joint technical committees and expert inputs in project cases; technical studies commissioned when disputes arise.	3	Robust programme portfolio with shared models and decision-support systems (e.g., NB-DSS), multiple joint studies over years.
B1. Rule Clarity & Mandate	3	Highly legalized bilateral treaty with clear rights/obligations and a standing commission with defined procedures.	1	Transitional legal framework (NBI to NRBC) historically mematic; mandate evolving with varying specificity across instruments.
B2. Dispute Resolution Uptake	3	Repeated use of good offices, neutral experts, and arbitration/adjudication; compliance with outcomes in project-specific disputes.	1	Preference for consensus-based resolution; limited formal adjudication; emphasis on dialogue and project-level mitigation.
B3. Enforcement & Follow-through	2	Monitoring of compliance and implementation steps post-decision; enforcement relies on reputational/legal pressure.	1	Implementation relies on donor conditioning and peer pressure; limited formal enforcement mechanisms.
C1. Data Transparency & Accessibility	1	Commission documentation circulates to parties; limited public data release; periodic communiqués.	2	Regular basin reports, program briefs, and some open data products; transparency varies by sub-programme.
C2. Monitoring & Evaluation (M&E)	1	Internal review practices present but not systematically published; episodic after-action notes.	2	Routine project/program M&E cycles with published summaries and external evaluations on key programmes.
C3. Scenario Planning & Risk Management	1	Scenario analysis appears mainly during disputes or special studies; not routine for basin-wide operations.	2	Use of basin planning tools (scenarios, trade-offs) for multi-sector analyses and infrastructure phasing.
D1. Stakeholder Inclusion	1	Primary engagement is state-to-state; limited formalized channels for non-state input beyond consultation in project cases.	2	Multi-country stakeholder platforms embedded in programmes; variable depth and continuity across riparian states.
D2. Benefit Sharing & Program Delivery	1	Benefits realized mainly via dispute containment and predictability; limited joint development beyond notification/coordination.	2	Portfolio includes regional projects (e.g., hydropower interconnections, environmental management) generating shared benefits.
D3. Climate/Environmental Integration	1	Environmental considerations addressed case-by-case (e. g., minimum flows) rather than as basin-wide operational norms.	2	Environmental/Climate adaptation mainstreamed in several programmes with cross-basin relevance.

WORKED EXAMPLES

Each worked example demonstrates the coding flow: (i) evidence collection; (ii) indicator scoring; (iii) mechanism expectation; (iv) observation; (v) inference; and (vi) counterfactual.

PIC (Indus): Baglihar Hydroelectric Project (Neutral Expert)

Evidence Base:

- Project notification documents; Commission meeting minutes; Neutral Expert report extracts.
- Implementation notes on design modifications; timelines of submissions.

Indicator Scoring:

- A1: 2 - Notifications exchanged with disputes over design details; records show meeting-based clarifications.
- B2: 3 - Neutral Expert process triggered and concluded with parties implementing adjustments.
- C3: 1 - Scenario/risk analysis largely confined to expert proceedings, not basin-wide routine.

Mechanism Expectation:

- Legalized dispute ladder should shorten escalation and contain conflict (supports H1).

Observation:

- Escalation diverted into technical/legal forums; limited politicized spillover.
- Adjustments implemented post-decision.

Inference:

- Strong support for H1 via B2 uptake; A1 contributes to predictability.

Counterfactual (no institution):

- Prolonged deadlock and higher diplomatic friction absent the PIC ladder.

PIC (Indus): Kishenganga/Neelum Arbitration

Evidence Base:

- Arbitral awards; technical annexes; follow-up implementation reports.
- Meeting communiqués reflecting operational adjustments.

Indicator Scoring:

- A2: 2 - Operational coordination adjusted post-award within treaty bounds.
- B2: 3 - Arbitration used; compliance with minimum environmental flow ruling and operational constraints.
- D3: 1 - Environmental integration applied as a case-specific requirement, not basin-wide policy.

Mechanism Expectation:

- Adjudication should contain the dispute and yield implementable operational guidance (H1).

Observation:

- Dispute contained to legal/technical arena; post-award compliance steps recorded.

Inference:

- H1 strongly supported; partial movement on D3 via minimum flow standard in this case.

Counterfactual (no institution):

- Higher risk of politicization and slower resolution without an adjudication channel.

PIC (Indus): Joint Inspections & Routine Coordination Episodes

Evidence Base:

- Inspection reports; annual meeting summaries; technical correspondence.

Indicator Scoring:

- A2: 2 - Joint inspections conducted; operational notes recorded; scope limited by treaty text.
- C1: 1 - Public transparency limited; documentation primarily intergovernmental.
- D1: 1 - Stakeholder participation largely state-centric, with limited formal channels.

Mechanism Expectation:

- Operational routines should support predictability and incident management (H2).

Observation:

- Incidents managed within Commission processes; few spillovers.

Inference:

- Moderate support for H2 via A2 practice; transparency and inclusion remain thin.

Counterfactual (no institution):

- More frequent misunderstandings and escalations without routine joint inspections.

NBI/NRBC (Nile): Regional Flood Forecasting & Early Warning System (FFEWS)

Evidence Base:

- FFEWS operational manuals; bulletin archives; programme evaluation summaries.

Indicator Scoring:

- A2: 2 - Operational coordination through shared flood bulletins and protocols.
- C1: 2 - Regular public-facing situation updates and technical briefs.
- C2: 2 - M&E cycles for system performance and user feedback.

Mechanism Expectation:

- Programmatic coordination improves short-term risk management and reduces damage (H2).

Observation:

- Observed uptake of warnings by member agencies; iterative improvements documented.

Inference:

- Support for H2; transparency and learning loops visible (C1–C2).

Counterfactual (no institution):

- Slower, uncoordinated response and higher damages due to absent regional warning protocols.

NBI/NRBC (Nile): Nile Basin Decision Support System (NB-DSS) & Joint Studies

Evidence Base:

- NB-DSS documentation; multisector analyses; planning reports; programme reviews.

Indicator Scoring:

- A3: 3 — Shared models and datasets used for multicountry planning across programmes.
- C3: 2 — Scenario analyses applied to infrastructure scheduling and climate stressors.
- D2: 2 — Programme outputs inform regional project pipelines and benefit-sharing discussions.

Mechanism Expectation:

- Shared tools and studies should enable cooperative planning and co-benefits (H2/H4).

Observation:

- Cross-border analyses inform investment prioritization; knowledge retained across cycles.

Inference:

- Support for H2 and partial for H4; strong A3 performance.

Counterfactual (no institution):

- Fragmented national planning with duplicated studies and coordination gaps.

NBI/NRBC (Nile): NRBC Transition & Legal Mandate Evolution

Evidence Base:

- CFA/NRBC legal documents; governance transition plans; stakeholder engagement records.

Indicator Scoring:

- B1: 1 - Mandate clarity increasing but uneven during transition; instruments still consolidating.
- B3: 1 - Enforcement relies on peer pressure and donor conditions; formal remedies limited.
- D1: 2 - Stakeholder platforms exist within programmes, with variable depth across sub-basins.

Mechanism Expectation:

- Evolving legalization should gradually improve clarity and follow-through (H3).

Observation:

- Improvements in procedures but continued variability in application across members.

Inference:

- Partial support for H3; legalization trajectory visible but not yet fully institutionalized.