RIVERS WITHOUT BOUNDARIES

Eyes Wide Shut

Ignoring Cumulative and Transboundary Impacts of the Rogun HPP

Review of the Transboundary Cumulative Impact Assessment for the Rogun HPP (ESIA Vol. 1, Chapter 23) and its compliance with IFC CIA Guidance and World Bank ESF

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Contents

1. Introduction and Analysis of TCIA Scenarios

This report presents an independent analysis of the Transboundary Cumulative Impact Assessment (TCIA) for the Rogun HPP Project. The analysis evaluates the document's alignment with the World Bank Environmental and Social Framework (primarily ESS1) and the IFC Good Practice Handbook on Cumulative Impact Assessment (2013). The text is complemented by a table presenting the potential consequences of different scenarios of future development.

The TCIA identifies critical "Valued Environmental Components" (VECs) and incorporates external stressors, notably the Qosh Tepa Canal. However, the assessment is fundamentally flawed by its reliance on a static "post-Nurek" baseline and the omission of critical government strategies and alternative operational scenarios.

While it is superficially compliant with the first procedural steps of CIA guidance, the document erroneously characterizes the Rogun HPP as having a "neutral" cumulative impact on downstream ecosystems. This conclusion ignores the fact that Rogun Reservoir will extend the operational life of the Vakhsh Cascade by 60–100 years, thereby perpetuating the degradation of the Tigrovaya Balka World Heritage Site for up to a century longer than the current baseline (silting of Nurek Reservoir) would allow.

In Table 1, we addressed gaps and discrepancies in the TCIA scenarios using only two VEC examples, both of global biodiversity value: Tigrovaya Balka Nature Reserve (World Heritage site) and the Ramsar wetlands of the Amu Darya Delta. For clarity and a more complete picture, we split Scenario 2 into filling (2a) and operation (2b). We also added the "Harmonious Development Scenario" (Scenario 6), which was central to the World Bank's 2014 findings and is mentioned in the 2025 ESIA.

After scenario analysis, we proceed to analyze the TCIA's compliance with the IFC CIA Guidance (Section 2) and then its compliance with the World Bank's ESF (Section 3).

Large-scale unmitigated impacts on natural and critical habitats and endangered species will result from omitting and downplaying those in the TCIA (and ESIA as a whole) unless it is brought to compliance with requirements of the World Bank Group's standards.

The review conclusions highlight six key recommendations for bringing the TCIA and respective other parts of the ESIA into compliance with the World Bank Group's safeguard standards.

TABLE 1. Analysis of the Rogun TCIA scenarios.

Scenarios considered in the TCIA	Likelihood	Impacts on Tigrovaya Balka World Heritage (TB)	Impacts on Ramsar wetlands of the Amu Darya Delta (Aral Sea)	Comments on gaps
Scenario 1 （substitutes baseline: Situation without Rogun HPP. Assumptions: -all countries continue to use water as they do now; -Tajikistan continuing to not use the full share allocated (assumed as an average 1.2.km3); Afghanistan (which is not included in BVO) assumed to use the 2.1 km^3 annually as per the standard BVO distribution -Continued electricity shortages in Tajikistan.	**Low.** During last 5-7 years Tajikistan used almost all its share/quota of 9.5 km^3. Planning documents envision gradual increase in water consumption.	Baseline study on biodiversity absent in the ESIA. Dam causing most impacts: Nurek HPP. During next 20-30 years TB will experience similar lack of periodic floods. After 2050 Nurek Reservoir active volume is progressively filled with sediment, floods and sediment inflow gradually come back to TB and improve ecosystem resilience, preventing further degradation. The TCIA also omits the fact that international water-sharing agreements do not safeguard biodiversity needs of Tigrovaya Balka.	Baseline study absent in the ESIA. The information presented contains major mistakes. Meanwhile delivery of water to remnant wetlands is enshrined in water-sharing agreements. Current trend: Amu Darya Delta getting 50% or more of its minimal water requirements, wetlands slowly shrinking. In occasional water-abundant years large inflow (in vegetation season) helps to improve long-term resilience.	The TCIA baseline is very weak founded on fragmented anecdotal and outdated evidence. The TCIA (and ESIA) lacks analysis of legal and administrative mechanisms underlying ICWC, TB World Heritage and Amu Darya Delta wetlands management. Feasibility of proper monitoring of actual water management in Tajikistan not discussed. TCIA lacks detailed description and understanding of important VECs including their eco-hydrological requirements. New baseline study is needed as a foundation for the “TCIA issues”. Environmental flow study for Lower Vakhsh is one of necessary components of this baseline development.
Scenario 2a (filling period): Tajikistan Using Full Allocation to fill the Rogun reservoir. Assumptions: -conditions as in Scenario 1 -starting in “year 9”, Tajikistan uses its full allocation (whether for filling	**Highly unlikely** that during the filling of Rogun reservoir Tajikistan will be able to stay within its 9.5 km^3 quota or current slightly greater allocations by ICWC. The reason – planned expansion of irrigated agriculture and	As the regulation functions during Rogun construction gradually switches from Nurek to Rogun reservoir, the recurring significant harm to downstream ecosystems from complete elimination of floods and sediment flow will be caused by the Rogun HPP	Any scenario results in direct reduction of water reaching the AD Delta by 25% to 50% of current already insufficient inflow. As water resources in water-abundant years are likely to be used for intensified filling of the Rogun reservoir the	Scenario as described in the TCIA neglects governmental plans and necessity to collect information on impacts in detail. Even within Tajik water allocation limits the impact on Ramsar wetlands is significant and results from Rogun reservoir filling (compared to suggested baseline). In any case the impacts of reservoir filling on Ramsar wetlands and other VECs has to

Rogun reservoir or for irrigation purposes) i.e. in addition to the water consumed as per the available data, +1.2 km^3 in a wet year, +1.0 km^3 in an average year, +0.8 km^3 in a dry year (0.2 out of it in winter). TKM and UZB keeping their share; in this simplified approach, it is assumed that the difference would represent a direct reduction of water reaching the Aral Sea.	other water uses as per National Water Management Strategy till 20240 (2024) and observed continued decline of Vakhsh river flow.	operation. Otherwise, those negative Impacts remain severe for the Tigrovaya Balka World Heritage Site - similar to Scenario 1. (see comments in Scenario 2 b).	likelihood of occasional large-scale replenishment in Delta water bodies will be reduced. Corresponding increase in chronic negative impact on aquatic fauna and waterbirds.	be assessed, and mitigation options suggested. In TCIA it was dismissed despite clear requirement to deliver water to the former Aral Sea enshrined in the water-sharing agreements/mechanisms. The fact that lack of water in wetlands will be influenced not only by filling of Rogun, but also by other cumulative factors is used as illegitimate excuse not to assess the impact in detail.
Scenario 2b. Rogun HPP operations 2038-2148. "Tajikistan Commitment" Scenario - the only one considered in the ESIA in any detail. Rogun HPP will take over the Nurek regulation function by using only 4.5 km^3 of its 10.3 km^3 active volume to continue exactly the same operation (flow management) regime. Nurek will become run-of-river reservoir using its live volume only for daily-weekly regulation and flood control.	**Less likely Scenario than #4.** The suggested regime is a bad compromise in absence of genuine cooperation. No agreement at basin level specifying its implementation has been reached so far. Tajikistan promises not to use 60-70% of live volume of the Vakhsh Cascade(15 km^3), thus making the Rogun project less economically viable. Rogun dam that was designed to provide multi-year regulation is working in annual regulation regime.	Rogun HPP becomes the main cause of recurring negative impacts for natural ecosystems downstream (e.g. flood pulse alteration, blockage of sediment transport, etc). Impacts remain severe for the Tigrovaya Balka World Heritage Site - similar to Scenario 1. The extension of impacts duration by 60-100 years, likely, makes inevitable full degradation of the TB's World Heritage site's outstanding universal values: floodplain forests will be replaced by desert vegetation.	Little significant additional impacts envisioned after filling. Rogun Reservoir evaporation of 150-200 million cubic meters, likely, is not very noticeable for Delta water balance. Reduction of flow critical for viability of the Wetlands of International importance is likely to constitute violation of the article 5 of Ramsar Convention aimed to prevent harm to Ramsar wetlands in neighbor's territory.	TCIA fails to assess impacts/aspects from the flow regulation by Rogun HPP: 1)from "year 10" Rogun HPP will cause recurring damage to the TB World Heritage site 2)Increased negative impacts duration, extending them by 60-100 years (!!) 3) ESIA proposes that Rogun will help to control the PMF and reduce frequency of floods of smaller magnitude – most likely causing direct impact on the TB World Heritage site's key ecosystem processes. 4) Additional impacts on TB may result from the change in Nurek reservoir operations (e.g. new peaking regime).

Scenario 3: Rapid Reservoir Filling. Assumptions: Same conditions as in Scenario 2, but Tajikistan filling the reservoir rapidly with the following assumptions: Filling in 3 years 15 to 17 (-3.5 km³ in year 15; -5 km³ each in years 16 and 17) Losses shared by TKM and UZB, with a slightly larger reduction for UZB.	**Highly Likely Scenario.** As the Rogun HPP displays chronic construction time overruns, it may delay start of active filling period. To improve financial viability of the project the Government of Tajikistan is highly likely to opt for rapid filling with or without ICWC consent. As Uzbekistan is planning to benefit from Rogun electricity, it is likely to avoid confrontation and prioritize peaceful resolution and quicker delivery of electricity over biodiversity conservation, environmental security, and temporary hardships in irrigated agriculture.	Additional impact on critical habitats of Tigrovaya Balka likely moderately negative. Specific effects of 25% flow reduction should be assessed in detail. Specific concern – further reduction of high water flows in water-abundant years and exacerbated competition for water with surrounding irrigated areas in normal and water-deficient years.	Serious ecosystem shock from drastic reduction of inflows. Likely major additional negative impact on aquatic fauna and waterbirds.	Impacts on biodiversity not assessed at all. Feasibility of avoiding Senario 3 in the construction time-overrun circumstances not analyzed. Mechanisms helping Tajikistan to adhere to certain "promised" modalities of water management not described and not assessed. In current form the ESIA/TCIA provides no mitigation tools for this highly likely Scenario. Absence of honest analysis of possible cost and time overruns makes it more likely to happen.
Scenario 4: Additional Shift (Operations phase). Assumptions: Same conditions as Scenario 3, but after filling the reservoir, starting in year 18 Rogun HPP is operated by shifting an additional 5 km³ of water from summer to winter. At the same time river discharge in winter would increase, i.e. during the non-vegetation period.	**Highly likely scenario.** Scenario selected is not the worst one, as 5.5 km3 of the live volume in the cascade remains unused. Similar change once happened on a smaller scale when Nurek Reservoir shifted from irrigation to energy operation regime in the 1990s. In absence of specific binding agreement no clear mechanisms available to ICWC to	Additional impacts on critical habitats of Tigrovaya Balka likely moderately worse to highly negative in all years due to already very high impacts. This will likely lead to achieving faster complete degradation of the floodplain ecosystem than in Scenario 2b. Most profound negative impacts on aquatic biota of lower Vakhsh and Amu Darya downstream of it, in	According to the TCIA (Table 9-7) this will increase by 2-3 times the frequency of extremely low inflows. In reality, such change in operational regime will, likely, completely eliminate the current legal mechanism set by Protocol 566 and other old basin-wide agreements, which prescribe delivery of certain volumes of water into the Delta wetlands. Besides, this will	Different impacts on biodiversity VECs not articulated and not analyzed. Assumption that winter flows may improve ecosystem health in the Delta is not supported by ecological research and likely not accurate as wetland ecosystems usually need most water during warm seasons. Suggested scenario does not represent full degree of threat, and must be complemented by the "worst case scenario" with greater seasonal flow redistribution with maximum use of the Vakhsh Hydropower Cascade live volume.

	prevent Tajikistan from such shift. Prioritizing economic viability of Rogun HPP and satisfying both domestic population and vast export contracts is likely to trigger such a shift.	particular, from manifold increase in winter flows.	create incentives for downstream countries to build additional large water-storage facilities. Therefore, Ramsar wetlands in Amu Darya Delta are likely to be fully eliminated under this scenario.	Feasibility of avoiding Scenario 4 in circumstances of climate stress, changing international relations, not analyzed. No mitigation measures designed.
Scenario 5: Qosh Tepa. Assumptions: Same conditions as Scenario 4, but starting in "year 20" Qosh Tepa canal operates by deviating 10 km^3 of water yearly, 8 of which in summer and 2 in winter.	**Highly likely scenario.** Development of Rogun HPP without setting new project specific agreements-mechanisms complementing the P.566 and old treaties will contribute to inability to include Afghanistan into the ICWC system (threat of which is explicitly expressed by Afghanistan's disapproval of the Rogun HPP Project). Creation of this canal outside of the existing basin-management system will make this coordination mechanism obsolete\defunct. It also contains incentives for Tajikistan to violate its promise to restrain the use of Rogun HPP against its own interest.	No immediate additional hydrology-driven impacts from the Canal on the TB as its intake is located downstream. Likely impacts on similar downstream tugay forests in Turkmenistan and Uzbekistan. Possible (but not obvious) long-term impacts on aquatic biota of Panj-Vakhsh-Amu Darya due to changes in interconnected populations of fish (e.g. sturgeons) or/and introduction of new invasive species through the new canal system.	According to the TCIA Table 9-7 this will increase by 3 times the frequency of extremely low inflows. In reality, the scenario includes elimination of the current legal mechanism set by Protocol 566 and other old basin-wide agreements, which prescribes delivery of certain volumes of water into the Delta. Besides, this will create incentives for downstream countries to build additional large inefficient water-storage facilities to compensate for water shortages in warm season. Therefore, Ramsar wetlands in Amu Darya Delta are likely to be eliminated under this scenario.	All same as in above Scenario 4. Desirability of inclusion of Afghanistan in water-sharing agreements mentioned. It's specific interrelation with Afghanistan's exclusion from Rogun project consultations despite its very negative stance not discussed. No mitigation action plan suggested.

Scenario 6. "Harmonious Development" (not considered) *This scenario, when Tajikistan and other basin countries agree on mutually beneficial way to use Rogun HPP as multi-year regulation facility to alleviate droughts and provide other benefits is mentioned many times in the ESIA (and was the focus of the World Bank's conclusions on the ESIA in 2014). IT IS ABSENT FROM THE TCIA formal analysis*	*In reality it is the only way forward that avoids major conflict. Scenario is intrinsically linked to wider reform of the belated wider reform/improvement of ICWC and underlying old agreements.*	*Multi-annual regulation may have good and bad consequences for biodiversity, depending on specific parameters. Tradeoffs with improvements in irrigation must be analyzed in detail. Specific scenario should incorporate developing environmental flow requirements for Lower Vakhsh river.*	*Likely neutral. May reduce inflow in high-water years. Tradeoffs with improvements in irrigation must be analyzed in detail. Specific scenario should incorporate developing environmental flow requirements for Amu Darya Delta wetlands should be written into new operation scheme.*	*Scenarios featuring the mutually beneficial operational regime must be added with detailed analysis of tradeoffs and synergies between improved conditions for irrigation, environmental health, biodiversity values and electricity generation and trade.*

2. COMPLIANCE ANALYSIS AGAINST IFC CIA GUIDANCE (2013)

The IFC Handbook prescribes a six-step process for CIAs. The TCIA follows this logic but exhibits critical deficiencies in data quality and scenario selection.

2.1. Step 1 & 2: Scoping, VECs, and Spatial/Temporal Boundaries

The TCIA appropriately delineates the Area of Influence (AoI) to the full Amu Darya basin, but all other aspects are flawed.

2.1.1. The temporal boundaries are manipulated to obscure long-term cumulative impacts.

The temporal scope is defined as inappropriately short: “Operational impacts (from 2032) will be assessed for the full operation and inundation of the Project expected by 2038” (Section 5.3.2), while elsewhere the TCIA acknowledges that according to the IFC CIA Guidance, "temporal boundaries of the CIA were defined by the expected life span of the Project" (Section 2.3). The temporal scope to be considered for the operations of Rogun HPP should be its minimal lifespan of 115 years, which is listed in the TCIA as a major advantage of the project and the key criterion for the selection of the tallest dam from among alternatives.

2.1.2. The TCIA identifies “Water Availability” as the primary VEC (Section 3.2.1), specifically water (quantity, accessibility, availability) for the local population. However, beyond that, the TCIA hardly contains any description or analysis of the receptor—the potentially affected local communities downstream of the dam cascade.

2.1.3. Biodiversity VECs are poorly defined.

The "Aral Sea" is treated as a lost cause rather than focusing on the Amu Darya Delta wetlands (Ramsar sites) which rely on specific inflow requirements and management system[1]. "Fish migration" is a generic notion, again ignoring receptors—the ecological requirements of endemic and endangered species like the Pike Asp and Amu Darya Shovelnose Sturgeon.

2.2. Step 3: Baseline Conditions

The baseline relies on outdated 2014 TEAS/ESIA data and fails to account for current data from the field, governance arrangements and policy documents.

Main Gaps:

2.2.1. Lack of Climate Change Data.

The TCIA has seven lines dedicated to climate change without any specific characterization of already occurring changes or references to a more detailed assessment. The overall ESIA also has

[1] https://aral.uz/wp/west-aral/

very little relevant up-to-date information on climate change and does not contain a review of recent basin-specific studies. The TCIA report ignores recent SIC ICWC data (2019–2023) showing a declining trend (-1.3 km3 or 6%) in Vakhsh River flow. Meanwhile, climate change effects are essential components for any future development scenario.

2.2.2. Absent Ecological Baseline.

There is no up-to-date baseline study for the Tigrovaya Balka World Heritage site or Amu Darya Delta wetlands, and no data on the specific eco-hydrological requirements of endangered fish, etc. The assessment relies on fragmented, anecdotal evidence. The wider ESIA also does not include baseline studies on the biodiversity of any areas downstream of Nurek HPP or its eco-hydrological requirements (environmental flow requirements).

2.2.3. Socio-Economic Baseline Lacking.

Neither the TCIA nor the wider ESIA includes baseline studies on the socio-economic conditions of local populations in any areas downstream of Nurek HPP. Thus, impacts of the Project on rural populations in those areas remain unassessed. For example, the ESIA claims that Tajikistan will not use additional water for irrigation until it fills Rogun Reservoir (Scenario 2(a)). If taken at face value, this necessitates an inquiry into the social impacts of such a decision on local communities dependent on irrigation along Lower Vaksh River and possible secondary impacts (e.g., an increased number of migrant laborers).

2.2.4. Ignoring governmental plans and governance structures.

2.2.4.1. The TCIA ignores the Tajikistan National Water Management Strategy until 2040 (approved in November 2024). This strategy envisions an increase in water consumption by 1.3 km^3, with at least two-thirds likely to be withdrawn in the Amu Darya Basin, and a 50,000 ha expansion of irrigated land. This directly contradicts the TCIA assumption that Tajikistan will stay within current quotas (Scenario 2(a)).

2.2.4.2. Discussing the “Aral Sea,” the TCIA reveals that its authors are unaware that water supply into remnant wetlands is mandated by the same water-sharing agreements and managed by a special branch of the same agency which governs the ICWC, supported by the GEF, UNDP, and several multilateral donors. The TCIA ignores multiple recent studies on the environmental flow requirements of specific wetlands in the Amu Darya Delta. Instead, it reports that an inquiry was sent to a project working on the Northern Aral in the Syr Darya Delta in Kazakhstan – completely different river basin. In other words, the TCIA failed to identify and analyze current ecological status, water management objectives, governing policy mechanisms, and institutions managing water delivered to the remnants of the Aral Sea in the Amu Darya Basin.

2.2.4.3. The most striking failure of the TCIA and Updated ESIA at large is the lack of objective analysis of current practices and problems in the complicated system managing water-sharing agreements based on Protocol 566. In 2014, at the end of the ESIA process which is now being

"updated," the ESPOE, in its final report, emphasized: "*The legal analysis contained in the ESIA (Chapter 8) shows that these water sharing instruments are agreements, declarations or practices rather than treaties, that they lack provisions for monitoring and enforcement; and provide no dispute resolution mechanisms. The E&S PoE notes that the legal and technical basis for the BWO and ICWC water quotas to countries lack clarity ... Although generally appearing acceptable by the countries involved, current annual water allocation practice thus remains vague and unenforceable and is not amenable to objective resolution in cases of dispute*." This is even more true ten years later. Since 2014, water management in the region has been complicated by accelerated climate change, significant population growth, armed conflicts between upstream basin countries, and the partial departure of some riparian countries from key water management mechanisms. Nevertheless, the TCIA and ESIA do not contain an objective, impartial assessment of the current functioning and effectiveness of the ICWC and related mechanisms. The only exception is the TCIA mentioning in passing that ICWC decisions on water allocation to the "Aral Sea" are not fully implemented (and therefore water supply to the "Aral Sea" is not worth the effort to assess and mitigate). As the TCIA Consultant points out the fact that less water is delivered to Aral wetlands than is decided by the ICWC, why does he fail to analyze which weaknesses in international mechanisms lead to this violation? Besides, neither the TCIA nor the ESIA acknowledge the important fact that Protocol 566 and related agreements have a political and economic nature and were not designed to safeguard the biodiversity of rivers and floodplains. As a result, this biodiversity is in decline and Rogun will be a major addition, cementing this degradation for a century. Adhering to Protocol 566 does not guarantee absence of negative impacts on this biodiversity.

2.3. Step 4 & 5: Assessment and Significance

The scenario modeling is biased toward justifying the project rather than assessing actual risk.

Main Gaps:

2.3.1. The report argues that because the Nurek HPP (existing downstream) acts as a barrier and sediment trap, Rogun adds no new negative impact to downstream biodiversity, specifically to the Tigrovaya Balka reserve (Section 6.2.2.3; Section 8.2). This neglects the fact that Rogun takes over the regulation function from Nurek and becomes the primary cause of recurring negative impacts (e.g., flood pulse alteration, sediment trapping). The TCIA argument relies on a "baseline" that is already degraded. IFC CIA Guidance (Section 1.1) states cumulative impacts result from "successive, incremental... effects." By constructing Rogun, the Project is effectively locking in the fragmented status of the river for an additional 60–100 years (Section 6.1.1), preventing potential future restoration that might occur if Nurek were decommissioned or managed differently.

2.3.2. In Scenario 2 (a and b), the report wrongly argues Rogun is neutral because it operates within Protocol 566 water quota limits while filling Rogun and within ICWC mechanisms when limiting seasonal flow redistribution. However, the TCIA does not assess the likelihood/feasibility of staying within such limits against possible economic, political, and climate pressures. For example, Tajikistan staying within a quota of 9.5 km3/year is highly unlikely given the recent trends of growing consumption and decreasing flow, as well as the numerical objectives of Tajikistan's Water Strategy until 2040.

2.3.3. Scenario 3 (Rapid Filling): The TCIA dismisses this as a "violation" and leaves it without in-depth assessment. Yet, this is a highly likely scenario. Given chronic construction delays and the need for financial viability, the Government of Tajikistan is likely to opt for rapid filling (3 years vs. 16 years). This would cause a serious ecosystem shock with major impacts on aquatic biota and water-using communities downstream, which are not adequately assessed.

2.3.4. Scenario 4 (Additional Shift). This scenario involves shifting an additional 5 km^3 from summer to winter to maximize electricity exports. The TCIA underestimates the impact, which would likely severely damage both the Tigrovaya Balka World Heritage site and Ramsar wetlands in the Amu Darya Delta due to altered seasonal flows. It declares this scenario impossible due to commitments by the borrower to adhere to ICWC decision-making. However, it fails to analyze under which circumstances Tajikistan may be forced to take its promise back. Meanwhile, a similar shift happened with the operations of Nurek, which in the difficult period of the 1990s changed the operational regime despite the harm caused to downstream ecosystems and water uses.

2.3.5. Missing Scenario. The TCIA omits a scenario where Rogun is used for multi-year drought alleviation benefiting downstream nations (see Scenario 6: "Harmonious Development" in Table 1). This scenario was the focus of the World Bank's 2014 conclusions on the Rogun HPP Project, and "possible benefits to downstream countries in dry years" are mentioned throughout the ESIA. However, it is excluded from scenario analysis, limiting the assessment to conflict-prone scenarios.

2.4. Step 6: Management of Cumulative Impacts

IFC CIA Handbook Step 6 (Management) states that "responsibility for [cumulative impact] management is shared" and requires "collaborative engagement" when individual project mitigation is insufficient. The TCIA has hardly a page of general words on this subject without any specific plans for collaborative engagement.

Main Gaps:

2.4.1. The primary mitigation strategy listed in the report is adherence to mechanisms established by Protocol 566 and related water-sharing agreements from 1992 and 1995 (Section 9.8). It states very vaguely: "*Protocol 566 is the relevant framework... However, under changing conditions modifications of this agreement might be required*" and then repeats several general recommendations which once were described in much greater detail in the 2014 ESIA. The World Bank, in its post-ESIA recommendations in 2014, emphasized that to be able to remain effective in water use coordination, those agreements should be complemented by agreements on seasonal and multi-year flow regulation for optimal use of the Vakhsh Hydropower Cascade with Rogun HPP. The TCIA, without any assessment of changes in the last 10 years, again recommends thinking about it in the future, while its task was to address those impacts now. The 2025 TCIA lacks any detail on the design and implementation of mitigation measures and has no references to specific mitigation plans.

2.4.2. Problems of enforceability: Under IFC Guidance, mitigation should be technically enforceable. Protocol 566 is a political agreement without technical enforcement mechanisms and dispute resolution mechanisms. Along with water-sharing agreements, it was designed in the 20th century primarily to coordinate water-sharing, irrigation, and hydropower production, without detailed consideration of biodiversity conservation, environmental flow management, etc. It does not even have clear-cut mechanisms to fix certain shifts of river flow between seasons. Tajikistan's "commitment" to suffer losses and preserve a Nurek-like water regulation regime which is not optimal for any riparian country (or biodiversity feature) is non-binding. The power purchase agreement with Uzbekistan as a "substitute" enforcement measure has not been properly assessed, while its effectiveness for water management and biodiversity conservation is highly questionable due to its narrow sectoral focus on energy. No technical enforcement mechanism is suggested or analyzed for that in the TCIA.

2.4.3. No recognition and mitigation of major impacts. For example, TCIA Section 6.4.2.1 argues that upstream cascades are a positive cumulative impact because they trap sediment, extending Rogun's life. While potentially positive economically, sediment starvation downstream is a major ecological stressor. The TCIA should assess the negative cumulative ecological impacts of sediment starvation on the Vakhsh River ecosystems, Amu Darya Delta and Aral Sea region, not just the positive economic impact on the dam's lifespan.

2.4.4. Conflict between policies unmitigated. The TCIA is very superficial and not based on detailed knowledge of regional policy-making practices; it does not reveal, assess, or suggest mitigation measures for potential conflicts between policies and projects. Tajikistan's own Water Management Strategy contradicts its "commitment" to voluntarily restrict water use to historical quotas when filling the reservoir. This should be analyzed in the TCIA.

2.4.5. The TCIA identifies Scenarios 3 to 5 as having a degree of impact on downstream Turkmenistan and Uzbekistan that "would clearly not be acceptable." But it offers no technical mitigation, only stating it would violate a "clear commitment" made by Tajikistan. Given financial and other pressures and intersectoral competition, this is insufficient and has little to do with the technically enforceable mitigation requirement of the IFC.

2.4.6. "Worst Case" Scenario 5 unmitigated. The report admits that Afghanistan (building the Qosh Tepa Canal) is not a party to ICWC/BVO agreements (Section 6.7.4). Therefore, the management mechanism for the most significant cumulative impact (water scarcity exacerbated by Qosh Tepa and Rogun) is currently non-existent. Section 9.8 (Recommendations) of the TCIA identifies the correct mechanism (diplomatic engagement). However, it lacks a concrete Adaptive Management Plan (as recommended in IFC Guidance Step 6) for the specific scenario where Afghanistan extracts maximum water (10 km3/y) while Rogun Reservoir shifts 9.5 km3 from

summer to winter. IFC Guidance requires defining "triggers for specific adaptive management decisions."

2.4.7. Scenario 2b impacts are not mitigated. As discussed in sections 2.3.1–2.3.2, the TCIA (and ESIA) as a whole, based on political assumptions (irrelevant for the biodiversity management), refuses to recognize and analyze the obvious cumulative impacts of the Vakhsh Cascade. Consequently, those most severe impacts on the most endangered biodiversity and the World Heritage site are intentionally denied mitigation actions. This is the most important flaw in the whole TCIA/ESIA related to biodiversity.

2.4.8. Mitigation measures denied for river habitat fragmentation on absurd grounds. Section 6.4.2 of the TCIA recognizes that Rogun HPP adds to river fragmentation by creating an additional barrier and by fundamentally changing habitat conditions on the entire length of its reservoir. It describes nine more planned dams destroying Surkhob and Obihingou natural river habitats and admits that those will also add to natural habitat fragmentation and alteration. And after that, the TCIA concludes: "*Since these additional HPPs will be located upstream of Rogun reservoir, there will be no impacts on them stemming from Rogun*" and removes the issue from further analysis and mitigation planning. Similar "logic" may exempt from assessment of cumulative impacts any next dam if it is being built upstream of other dams. In reality, habitat fragmentation and modification have basin-wide cumulative effects for aquatic biota and ecosystem processes whether they happen upstream or downstream. The TCIA's argument clearly contradicts the IFC CIA Guidance and World Bank's ESF, as it fails to recognize and mitigate cumulative impact at the basin scale as necessary.

3. TCIA COMPLIANCE WITH THE WORLD BANK'S ESF

3.1. Very limited analysis of impacts and failure to identify some impacts.

ESS1 Para 32 (Cumulative Impacts): The assessment will consider cumulative impacts... from other **relevant past, present and reasonably foreseeable developments**.

The TCIA (Section 4.3, Table 4-1) provides a long list of cumulative stressors, including the Vakhsh Cascade, the proposed Shurob HPP, upstream cascades (Obihingou/Surkhob), and significantly, the Qosh Tepa Canal in Afghanistan. However, it fails to consider cumulative impacts from most of these stressors in any detail and does not provide any actionable mitigation recommendations.

Main Gaps:

3.1.1. Biodiversity values, natural ecosystem processes, and services modified due to the development of the Vakhsh Hydropower Cascade are largely unaddressed, which makes it impossible to correctly identify cumulative impacts and the eco-hydrological requirements of impacted biodiversity VECs. The same relates to information on changes in environmental conditions for local communities, especially in Karakalpakstan. The TCIA (and ESIA) contains only general, partly inaccurate information on the initial pre-cascade baseline, changes due to water infrastructure development, and related impacts. It simply denies any impact from the Rogun

HPP without any proper analysis of the past developments and their specific impacts on globally important biodiversity.

3.1.2. Currently experienced and foreseeable climate change impacts are not considered in any detail, nor are they reflected in the scenario analysis as a factor of its own. Any clear arguments relate only to the Rogun HPP "climate adaptation value" for infrastructure without analysis of the environmental and social consequences of such an "adaptation strategy."

3.1.3. Scenario 4 with a seasonal water shift is not using the maximum volume of the Vakhsh Hydropower Cascade; such a possibility is only mentioned in passing but not assessed or mitigated.

3.1.4. The omission of the up to 1.3 km^3 additional water withdrawal for 50,000 ha irrigation expansion in Tajikistan's "National Water Management Strategy 2040" constitutes a failure to assess reasonably foreseeable developments.

3.2. Failure to Assess Impacts

Main Gaps:

3.2.1. As mentioned in Part 2, the temporal dimensions of Rogun HPP impact on downstream ecosystems are not considered, despite its obvious role in the proliferation of the worst impacts on biodiversity for the next 100+ years, far beyond the service time of the currently existing hydropower cascade in a baseline scenario. For example, the TCIA frames the trapping of sediment by Rogun as a positive benefit (extending Nurek's life). However, under ESS1, this must be assessed as a cumulative impact. Without Rogun, Nurek would significantly silt up by 2050, potentially gradually restoring natural sediment flows and flood regimes. Then Nurek Dam will have to be decommissioned as it cannot withstand extreme flows. Rogun extends the duration of factors leading to ecosystem degradation by 60–100 years. This temporal cumulative impact—a century of delayed restoration—is unassessed.

3.2.2. The TCIA fails to assess cumulative impacts from fragmentation and transformation of the Upper Vakhsh basin main watercourse caused by Rogun and the planned cascade with nine new dams upstream of it. It fails to address those impacts in a context of successive Vakhsh Cascade development. Similarly, the consultant fails to address the same changes that could be caused by a cascade on the Panj River planned in the more distant future. Meanwhile, fragmentation/habitat conversion will be caused by the cumulative impact of already existing dams, the Rogun HPP project, and planned dams, and should be assessed at the Upper Amu Darya basin scale to design and recommend early measures to preserve exemplary free-flowing river ecosystems. In particular, the Panj River, which retains a free-flowing character over more than

1000 kilometers, is the most important aquatic biodiversity VEC, requiring mitigation measures. Instead, the TCIA refutes any necessity to consider the fragmentation issue based on a vague and scientifically invalid excuse.

3.3. ESS1 Mitigation Hierarchy (Avoid, Minimize, Restore, Offset)

The report argues that "avoiding" additional summer-to-winter water shifts (Section 6.2.2.3) satisfies the hierarchy. The reliance on Nurek's current operational regime (which already causes significant harm to downstream ecosystems) as a justification for Rogun's "neutrality" minimizes the Project's responsibility to contribute to cumulative solutions, rather than just avoiding cumulative additions. The TCIA/NNLP explicitly reject using Rogun's storage (10.5 km^3) to simulate flood pulses for Tigrovaya Balka restoration, despite the physical capacity to do so. This is a failure to apply the Mitigation Hierarchy (Restore). This clearly contradicts the intention of the whole ESF and many specific clauses (e.g., ESS6 requirement to identify opportunities to "enhance the conservation aims" (ESS6 Para 27(c)).

3.4. Mitigation Gaps

ESF (ESS1) requires the Borrower to manage risks and develop robust adaptive management plans for high-risk scenarios. ESS1 Para 36 requires the inclusion of major mitigation measures into the Environmental and Social Commitment Plan (ESCP). These requirements are not fulfilled in the TCIA.

3.4.1. Relying primarily on a treaty that a proponent of the major cumulative stressor (Afghanistan) has not signed and parties who signed do not fully implement (TCIA 8.1 Aral Sea) constitutes a gap in the management hierarchy defined in ESS1 Para 27. TCIA Section 9.7.4 suggests that Scenario 5 ("Worst Case") combines Rogun filling with the operation of the Qosh Tepa Canal. In the assessment, the report admits this would result in "permanently extremely dry summers like never experienced before" (Section 9.7.4; Executive Summary p. vii). The same is fully applicable to Scenario 4 when use of the maximum practicable live volume of the Vakhsh Cascade is considered. However, the mitigation strategy relies entirely on adherence to Protocol 566 (Section 6.6.2.3), while the report acknowledges that Afghanistan (Qosh Tepa) is not a party to Protocol 566 (Section 5.2.1). No real mitigation action plan beyond a vague call to include everyone in the basin-wide agreements has been developed for what the authors of the TCIA consider the worst case. This is clearly unacceptable as mitigation of the "worst case" and should be replaced by mitigation action planning.

3.4.2. Scenarios 3, 4, and 5 predict a 25%–50% reduction in water reaching the delta or a total shift to winter flows. This would affect Amu Darya Delta Ramsar Wetlands. The TCIA erroneously suggests winter flows might improve ecosystem health, a claim, likely, unsupported by ecological science regarding wetland vegetation cycles. Then the assessment accepts the degradation of these wetlands as inevitable under future scenarios rather than proposing environmental flows (E-flows) to protect them.

3.4.3. Scenario 3 (Rapid Filling) in Section 9.7.3 identifies a high risk of significant downstream impact if the reservoir is filled in 3 years rather than 16. The mitigation for Scenario 3 is simply a statement that it would be a "violation of agreements" (Section 9.7.5). ESS1 requires robust adaptive management plans for such high-risk scenarios, not just a dismissal of them as unacceptable.

3.4.5. Lack of Mitigation for the “worst case”.

TCIA Section 9.7.4 describes Scenario 5 (Qosh Tepa + Rogun Filling) as the "worst case" resulting in extremely dry summers. TCIA offers no technical mitigation for this scenario, only political commentary. The Project must develop a Drought Contingency Plan as part of the Operational Manual. This plan must define specific reservoir release thresholds (Adaptive Management) if the Qosh Tepa extraction exceeds estimates, prioritizing downstream environmental flows over power generation during the filling phase.

3.4.6. Major cumulative impacts of Scenario 2b (intended “unchanged” operation regime of Vakhsh Cascade) are not addressed and mitigated at all despite causing degradation of a critical habitat. This contradicts the ESF (ESS6) which requires a "net gain" for Critical Habitats.

TCIA Section 8.3 states that Rogun will not change the flow regime downstream of Nurek, thus having "no additional negative effect" on the Tigrovaya Balka Nature Reserve (a UNESCO site). While hydrological modeling suggests flow stability (Section 6.2.3.5), ESS6 Para 24 requires a "net gain" for Critical Habitats. As Tigrovaya Balka is Critical Habitat (implied by UNESCO World Heritage status and presence of IUCN critically endangered species), **simply "not making it worse" may not satisfy the Net Gain requirement when viewed cumulatively**. The TCIA mentions artificial floods as a potential “offset” (Section 6.4.3) but notes it was eliminated from the Biodiversity Management Plan (BMP) even without a detailed feasibility assessment. The rejection of Tigrovaya Balka from mitigation (No Net Loss) planning (Section 6.4.3) also represents a missed opportunity for cumulative impact management required under IFC CIA guidelines regarding "collaborative engagement" (IFC CIA Handbook, Step 6).

3.5. Stakeholder Engagement

The major failure of the TCIA is largely a result of the fact that the consultant used limited and biased information sources, contacted a very limited number of interested stakeholders and experts from riparian countries (if any), and intentionally avoided meeting concerned civil society representatives. This is a major violation of the ESF and its ESS10. Two key pieces of evidence:

3.5.1. Biased selection of contacts to be consulted.

TCIA Annex 1. “Meetings Held”. Out of 15 meetings, presumably focused on TCIA questions, the Consultant met 2–3 times with representatives of international financiers, 3–4 times with Tajik energy and hydropower officials not directly involved in the project, 2–3 times with Rogun HPP Project consultants focusing on environmental and social issues, and 6–7 times with Rogun HPP

Project management officials. According to the TCIA report, he has not met with any independent environmental and social experts, CSOs, or (non-energy) state agencies inside or outside Tajikistan. He has not met any other stakeholders from riparian countries either. This supports our understanding that the consultant had a biased, narrow view of the TCIA task (to justify the Rogun HPP Project) and fully avoided contacts with experts and stakeholders who possess up-to-date information and different perspectives/concerns.

3.5.2. Improper "consultations" in Tashkent.

On October 28, 2024, in Tashkent at "riparian consultations" organized by the project, the TCIA consultant made a brief presentation in the absence of any draft TCIA documents available to participants. The inaccuracy and superficial approach displayed by this presentation was criticized by meeting participants. Subsequently, participating CSOs informed the World Bank about multiple violations of ESF ESS10 and other international norms and the inadequacy of such "consultations" in the absence of documents or a proper process (see Letter to the World Bank on improper consultations. 8 November 2024)[2]. The World Bank did not address specific CSO concerns on the obvious bias of the Consultant but promised, "The CIA being prepared is sound and well supported, and will undergo a review process, including disclosure for public comment…" (December 13, 2024, World Bank response to Rogun Alert Coalition)[3]. As a result, the Rogun HPP Project was approved immediately after that response before disclosure and appraisal of the crucial component of environmental safeguards: the TCIA.

3.5.3. Absence of consultations with potentially affected local stakeholders.

None of the consultations took place in riparian regions potentially affected by the cumulative impacts of Rogun HPP. In Uzbekistan, those are the Republic of Karakalpakstan and Khorezm Province, very far from Tashkent; in Turkmenistan and Afghanistan, no consultations happened whatsoever.

4. Conclusions and Recommendations

Volume 1, Chapter 23 of the TCIA is procedurally compliant with the scoping and assessment phases of ESS1 and IFC CIA Guidance. It demonstrates, albeit in a very general manner, the dire potential of cumulative water abstraction in the region (specifically Section 9.7).

However, the document lacks baseline information on globally important biodiversity and is extremely weak on Management and Mitigation (Step 6 of IFC Guidance). It relies heavily on the assumption that existing international treaties (Protocol 566) and non-binding promises of the borrower are sufficient to mitigate potential negative impacts.

[2] Available at the dedicated Rogun Alert web-site: https://rogun.exposed/letters
https://docs.google.com/document/d/1lQgRfTM6bsluiz9oUjPP2WX66VNZAhkeQQsas0I0xm8/edit?tab=t.0

[3] https://thedocs.worldbank.org/en/doc/e4536d867e713be1288ae0532a2760f0-0080012024/original/World-Bank-November-8-2024-Response-Letter-Rogun.pdf

To achieve full compliance, the Project must move from identifying these risks to establishing concrete, project-level adaptive management mechanisms to handle water shortages and satisfying eco-hydrological requirements, rather than deferring entirely to inter-governmental diplomacy.

The Rogun TCIA contains the most significant non-compliance with the World Bank's ESF: by framing the project as "neutral" relative to the downstream ecosystems, including the Tigrovaya Balka World Heritage site, it ignores the reality that Rogun locks in and extends the duration of catastrophic ecosystem impacts for over a century. It also fails to identify the World Heritage site as Critical Habitat and demonstrate "net gain." The document also relies on optimistic scenarios regarding water consumption that contradict official government strategies and observed trends.

To bring the ESIA into compliance with financiers' requirements and ensure that the Rogun HPP development does not cause irreparable harm at a basin-wide level and does not lead to the extirpation of global biodiversity values, the following key measures should be undertaken:

4.1. **Mandate environmental flows (artificial floods) to restore Tigrovaya Balka**. Formally assess the cumulative impact of extending the Vakhsh Cascade's lifespan by 100 years and its reoperation with Rogun becoming the lead flow regulator. The Project should reconsider the decision to exclude measures to achieve "net gain" for Tigrovaya Balka from the Biodiversity Management Plan (BMP). The Project should evaluate the feasibility of coordinated environmental releases (artificial floods) in conjunction with Nurek Reservoir to support the regeneration of the tugai forests and other World Heritage values, rather than accepting their degradation as a static baseline. A collaborative offset program should be established to meet the "Net Gain" requirement for the river system's cumulative impact.

4.2. **Mitigate river fragmentation and habitat loss**. Assess the cumulative river fragmentation and habitat conversion by existing and planned reservoirs at the basin level (at least in the Upper Amu Darya basin) and design mitigation measures, including permanent protection of the most valuable free-flowing rivers as mitigation/offset for Rogun reservoir impacts (in the context of the continued fragmentation risks explicitly incorporated into Tajikistan's development strategy).

4.3. **Address improvement in cooperation mechanisms and the "Harmonious Development Scenario".** Reassess the effectiveness of legal and regulatory mechanisms under Protocol 566 and other agreements. Assess the feasibility of using existing mechanisms to coordinate basin-wide solutions in the face of climatic, political, and economic changes and new infrastructure development (e.g., Rogun HPP, Qosh Tepa Canal). Develop an action plan for possible adjustments to complement existing coordination mechanisms with elements necessary to effectively manage water resources under cumulative impacts and new challenges. Analyze the additional "Harmonious Development Scenario" (Scenario 6) to optimize the management of Rogun HPP in the interest of all riparian countries, while sustaining globally important biodiversity.

4.4. **Develop action plans to address the drought risks under all scenarios**. Develop technical drought-response mechanisms that account for the worst climate change scenarios, the Qosh

Tepa Canal, the Tajikistan National Water Strategy 2040, etc. The TCIA must analyze Scenario 6 to evaluate trade-offs between electricity generation and basin-wide environmental health/drought resilience. The TCIA concludes that Afghanistan must be integrated into water agreements. However, the Rogun HPP Project needs a technical adaptive management plan. If Qosh Tepa withdraws 10 km3/year, how will Rogun alter its filling schedule or operational discharges to maintain environmental flows? The current text says Rogun Reservoir could help in dry years (Section 9.6), but this must be formalized into a binding Environmental Flow Management Plan. To this end, the Project may also consider developing a Drought Contingency Plan as part of the Operational Manual. This plan must define specific reservoir release thresholds (Adaptive Management) in reaction to cumulative factors exacerbating droughts (e.g., if the Qosh Tepa extraction exceeds estimates, prioritizing downstream environmental flows over power generation during critical periods).

4.5. **Reassess Rogun Reservoir filling scenarios** to reflect the current situation and policies. Develop robust mitigation measures ensuring environmental flows into Ramsar Wetlands in the Amu Darya Delta and other relevant VECs. The Environmental and Social Management Plan (ESMP) must include binding, technically enforced constraints on filling rates (e.g., automated release valves linked to downstream flow gauges) to physically prevent Scenario 3, rather than relying on political promises. The ESMP must include binding technical constraints on reservoir filling rates that are automatically triggered by downstream hydrological indicators, ensuring that political will is backed by operational automaticity.

4.6. **Develop concept/proposal for basin-wide SEA**. Given the obvious limitations of the CIA methodology demonstrated in the TCIA report on Rogun HPP Project, develop a concept/term of reference for a basin-wide Strategic Environmental Assessment for Water Management and Water Infrastructure Development. This SEA plan should be designed in cooperation with all riparian countries and subjected to public consultation. The absence of such an SEA in the current scope of the Rogun HPP Project's E&S instruments is a large gap, which may prevent the improvement of further basin-wide cooperation essential for the future completion and management of the Rogun HPP.