



# Conditional visibility: Intersectional inequities marginalize local scholarship in conservation science

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## ABSTRACT

Structural inequities in conservation science, rooted in center-periphery dynamics, funding asymmetries, and systemic gender disparities, marginalize Global South scholarship. This marginalization impedes the integration of Indigenous and Local Knowledge (ILK), effectively decoupling local scholarship from global conservation discourse. We analyzed 132 peer-reviewed articles on Philippine aquatic ILK and environmental stewardship. We modeled how author affiliation (International/Local), gender (Male/Female), and funding status (Funded/Unfunded) shaped scholarly visibility using scientometric mapping and factorial analysis. Our findings revealed a clear thematic segregation: international scholars focused on the highly visible Applied Conservation cluster (median Citations Per Year [CPY] = 2.06), but Philippine scholars concentrated on the less visible Ethnoecology and Governance cluster (median CPY = 0.80). Globally, our modeling reveals a significant three-way interaction (Analysis of Variance [ANOVA],  $F(1124) = 12.06$ ,  $p < 0.001$ ). Pairwise comparison confirmed an intersectional pattern: funded Philippine male scholars achieved statistical parity with international peers, yet funded Philippine female scholars remained significantly marginalized. This demographic hierarchy was absent in the Philippines-only subset ( $F(3,72) = 0.92$ ,  $p > 0.05$ ). These findings highlight *conditional visibility*: the impact of local scholarship is shaped not by merit alone but by intersectional hierarchies of affiliation, funding, and gender. Achieving global knowledge equity demands dismantling these hierarchies to end the erasure of local, and particularly female, scholarship in conservation science.

## 1. Introduction

Urgent global threats such as climate change demand robust international collaboration (Choquez-Millan et al., 2024). This need is most acute in aquatic ecosystems, which currently experience the highest rates of biodiversity loss worldwide (WWF, 2022; IPBES, 2024). While partnerships bridging the developed Global North and the developing Global South are often advocated as a solution (Bradley, 2008; Choquez-Millan et al., 2024), their success depends on institutional readiness. Martins (2020) defines this as a state of comparable research capacity and commitment. This shared capacity is required to translate Indigenous and Local Knowledge (ILK) into actionable conservation policy. However, institutions rarely achieve parity, leaving global knowledge production deeply asymmetrical.

This disparity, rooted in colonial history, sustains a neocolonial

hierarchy that establishes enduring center-periphery dynamics. This system privileges Western scientific norms and fosters academic dependency, positioning the Global South as a periphery to the Global North center (Martins, 2020; Schöpf, 2020; Castro Torres and Albrez-Gutierrez, 2022; Johnson et al., 2022; Oztig, 2022). Understanding these dynamics requires an intersectional lens (Crenshaw, 1989) to recognize how hierarchical power systems, including geography, funding, and gender, compound marginalization. Consequently, effective collaboration transcends equality, the principle of treating everyone identically. It requires equity, which mandates a deliberate redress of historical power imbalances based on need.

These center-periphery dynamics manifest as parachute science, helicopter science, or the recently termed remote-control science (Dáttilo and Rivera-Núñez, 2025). In this model, researchers from the developed Global North lead agendas and disproportionately benefit

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from Global South research, often with minimal local engagement (Stefanoudis et al., 2021; de Vos and Schwartz, 2022; Miller et al., 2023; Dawson et al., 2024; Smit et al., 2025). These practices contradict equitable partnership ideals and directly undermine global sustainability by marginalizing vital local perspectives. This creates a scientific labor division where the Global North monopolizes theory production while the Global South provides only data. This dynamic systematically devalues local scholarship (Bradley, 2008; Nakamura et al., 2023), driving the disparities in scholarly visibility observed within the global citation system (Castro Torres and Alburez-Gutierrez, 2022; Smit et al., 2025; Dáttilo and Rivera-Núñez, 2025). In this study, we conceptualize this inequality as a system of *conditional visibility*. In this mechanism, the value of Global South research is judged not on its own merits but by its alignment with Global North hierarchies.

The consequences of *conditional visibility* are most acute for Indigenous and Local Knowledge (ILK). Defined as a cumulative knowledge-practice-belief complex rooted in place, ILK provides critical insights into long-term ecological change (Berkes et al., 2000; Díaz et al., 2015; Brondízio et al., 2021; Molnár et al., 2024). Since Global South scholars serve as the primary channels for this knowledge, their marginalization directly impedes its integration into conservation policy. Key bodies like the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) increasingly recognize the vital role of ILK (Brondízio et al., 2021; Hoppenreijds et al., 2024; IPBES, 2024; Molnár et al., 2024). This holds especially true in aquatic ecosystems, where fishers offer essential management insights (Silvano et al., 2023; Maliao et al., 2025). Yet, despite this recognition (Gómez-Baggethun, 2022), ILK systems face erosion (Aswani et al., 2018; Fernández-Llamazares et al., 2021) and systemic exclusion from governance (van Eijck and Roth, 2007; Bohensky and Maru, 2011; Brondízio et al., 2021; Fernández-Llamazares et al., 2021). This disconnect drives ill-informed interventions, exemplified by the proliferation of ineffective *paper* Marine Protected Areas (MPAs) (Maliao et al., 2009a, 2009b; Relano and Pauly, 2023).

The Philippines serves as a strategic model for analyzing the mechanisms of *conditional visibility*. As an archipelagic biodiversity hotspot in the Global South, the nation possesses rich ILK systems vital for its environmental challenges (DENR, 2016; Maliao et al., 2025). However, we lack a systematic understanding of how intersecting drivers, including geography, funding, and gender, govern this knowledge system. This gap is especially pronounced within the country's academic institutions, which produce most published ILK scholarship. This academic context acts as a field of struggle (Alcazaren, 2021), where institutional policies demand publication in high-impact international journals for career advancement (DBM and CHED, 2022; San Juan, 2024). Yet, the domestic research landscape contends with systemic funding deficits and widespread research hesitancy (Calma, 2010; Barrot, 2021; Durante et al., 2023). The complex interplay of geography, funding, and gender across global and domestic scales represents a critical, unexamined gap in determining the visibility of Philippine aquatic ILK scholarship.

We use scientometric analysis (Van Raan, 2014; Mingers and Leydesdorff, 2015) to examine the intersecting drivers of scholarly visibility. These methods illuminate scholarly visibility across diverse conservation and policy domains (Bikard et al., 2025; Lameira et al., 2025; Maliao and Tóthmérész, 2025a; Smit et al., 2025). Our study examines Philippine scholarship on aquatic Indigenous and Local Knowledge (ILK) and environmental stewardship. We define stewardship as actions designed to protect aquatic resources across freshwater and marine environments (Maliao & Tóthmérész, 2025). First, we hypothesize that internationally affiliated scholars disproportionately focus on topics with higher potential for scholarly visibility. This pattern is predicted by theories of scientific labor division (Bradley, 2008; Nakamura et al., 2023). Second, we hypothesize that scholarly visibility is conditional on specific intersections of funding access, gender, and affiliation. This framework is grounded in intersectionality theory (Crenshaw,

1989). We specifically examine whether these intersectional hierarchies persist or fade in the local context, a phenomenon we term the *disappearing effect*. Ultimately, by elucidating these dynamics, this study seeks to contribute to the foundation for advancing a more equitable global conservation science.

## 2. Methods

This study presents a targeted analysis of aquatic ILK research derived from a broader systematic map of Philippine ILK (Fig. 1). Our methodology adheres to the guidelines of the Collaboration for Environmental Evidence (CEE) and the Reporting Standards for Systematic Evidence Syntheses (ROSES). The full protocol is registered (Maliao and Tóthmérész, 2025b).

### 2.1. Systematic mapping and data curation

To operationalize our analysis, we conducted a comprehensive search of major international bibliographic databases (Web of Science Core Collection, Scopus, PubMed, Directory of Open Access Journals), supplemented by key regional sources (ASEAN Citation Index, Philippine e-Journals) and Google Scholar. Our search strategy combined three core concepts using Boolean operators: (A) ILK and its synonyms, (B) environmental stewardship, and (C) the Philippine context. We defined these broadly to capture the full knowledge-practice-belief complex (see Berkes et al., 2000), explicitly including Indigenous Knowledge Systems and Practices (IKSP), Traditional Ecological Knowledge (TEK), and Local Ecological Knowledge (LEK) related to aquatic resource stewardship. The complete search protocol is registered in protocolRxiv (see Maliao and Tóthmérész, 2025b).

We managed records using EndNote 21.5 (Clarivate Analytics) and screened them in two stages: a Title/Abstract screening in Colandr (Cheng et al., 2018), followed by a full-text review. We manually validated all final eligibility decisions. We restricted eligibility to peer-reviewed, English-language articles meeting our PECO framework:

- **Population:** Any community within the Philippines, encompassing Indigenous Peoples (IPs) and local communities (LCs) situated in freshwater, coastal, or marine ecosystems.
- **Exposure:** Any form of aquatic ILK (including IKSP, TEK, and LEK) pertaining to the understanding or stewardship of aquatic resources, including beliefs, practices, and governance systems.
- **Comparator:** None required.
- **Outcome:** Primary data characterizing the evidence base regarding bibliographic details, environmental domain, and ILK type.

This focus necessarily excludes grey literature and non-English scholarship; however, English remains the mandated medium of instruction and publication in Philippine academia. This process yielded a final corpus of 132 articles (see [Supplementary Information](#)).

### 2.2. Coding and scientometric indicators

To map the field's human geography, we manually coded key production indicators for each article. We classified Institutional Affiliation as Philippines or International to test center-periphery dynamics. We coded Primary Study Site as Luzon, Visayas, or Mindanao to provide a macro-scale framework for regional analysis. We determined Author Gender (Male/Female) based on discernible names and public academic profiles. In indeterminate cases (<10), we used Genderize.io as a [supplementary method](#), acknowledging the limitations of this binary approach. Finally, we classified Funding Status (Funded vs. Unfunded) based on acknowledgements and Journal Indexing (Core [WoS/Scopus], DOAJ, or Local [Philippine e-Journal]).

To measure scholarly visibility, we retrieved citation counts from Google Scholar (GS) as of May 2025. We calculated a normalized metric,

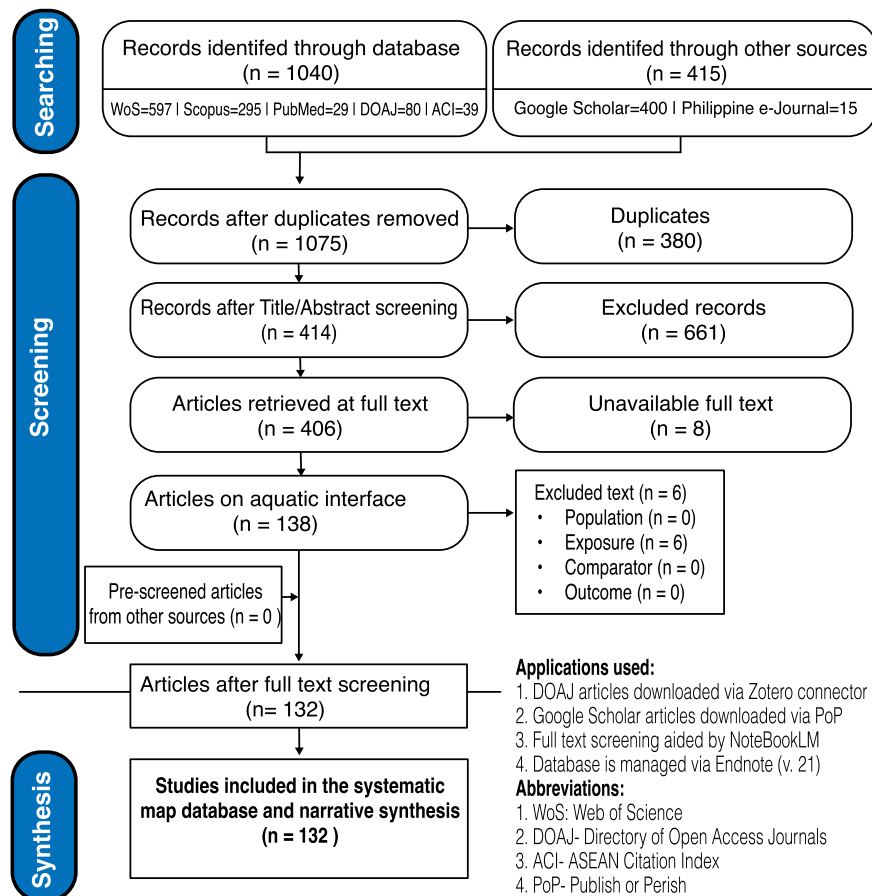


**Fig. 1.** Study selection workflow. The diagram illustrates the systematic study screening and selection process, following the ROSES reporting standard, and shows the number of records at each stage, from initial identification to the final included corpus of 132 articles.

Citations Per Year (CPY), using the formula:

$$CPY = \frac{\text{Total citations}}{(\text{Year of citations} - \text{Publication year}) + 1}$$

While citation metrics are imperfect proxies (MacRoberts and MacRoberts, 1996; Shu, 2021), we strategically selected GS for its broad coverage of the diverse channels inherent to ILK research (Harzing and Van der Wal, 2008). This choice was essential to mitigate the coverage gaps of Core databases (Scopus/WoS), which do not comprehensively index a substantial portion of Philippine-published articles. GS therefore provided the most comprehensive coverage for the entire dataset, balancing its known inclusion of non-peer-reviewed counts with the imperative to capture locally disseminated knowledge (Aguillo, 2012).

### 2.3. Analytical framework

Our analysis proceeded in three stages. First, to visualize the research landscape we performed a scientometric thematic mapping. After standardizing keywords to unify synonyms, we generated a co-occurrence network in VOSviewer 1.6.20 (Van Eck and Waltman, 2010) and categorized each article based on the resulting clusters. Given the skewed nature of citation data (Bornmann and Leydesdorff, 2014), we report descriptive statistics for CPY as medians and interquartile ranges ( $Md \pm IQR$ ).

Second, we conducted bivariate tests to examine specific drivers of thematic choice and scholarly visibility. We used the Chi-Square test of independence to assess associations between categorical variables. This specifically tested for thematic segregation (Thematic Cluster vs. Author Affiliation) and research localization (Author Region vs. Study Site). To

compare citation impact (CPY) across groups, we employed non-parametric tests. We used the Mann-Whitney  $U$  test for pairwise comparisons (Funding Status, Affiliation, Gender) and the Kruskal-Wallis  $H$  test for comparing the three Philippine regions (Luzon, Visayas, Mindanao). We analyzed significant Kruskal-Wallis results using Dunn's pairwise tests with Bonferroni correction.

Third, we used a two-part factorial analysis to statistically test the *disappearing effect*. We first performed a non-parametric Aligned Rank Transform (ART) Analysis of Variance (ANOVA) on the full dataset ( $N = 132$ ) to test the interaction between author gender, affiliation, and funding. We then conducted a separate three-way ART ANOVA on the subset of articles from Philippines-affiliated scholars only ( $N = 88$ ). We analyzed significant interactions using pairwise comparisons on aligned ranks with Tukey's adjustment ( $p < 0.05$ ). All analyses were performed in R (v. 4.3.2).

We acknowledge the small sample size for specific subgroups in this factorial framework, particularly unfunded international scholarship. However, the scarcity of this subgroup reflects real-world research logistics rather than a modeling artifact. Crucially, while low statistical power increases the risk of a Type II error (failing to detect a true effect), it does not inflate the risk of a Type I error (a false positive). This remains strictly controlled by our alpha level ( $\alpha = 0.05$ ). Consequently, the detection of a highly significant three-way interaction ( $p < 0.001$ ) under these conditions suggests the observed effect is statistically robust and practically substantial.

### 3. Results

Our systematic screening yielded a final corpus of 132 peer-reviewed articles. Demographically, the field is dominated by researchers from

Luzon-based ( $N = 59$ ) and International ( $N = 44$ ) institutions. First-author gender distribution appeared relatively balanced across these affiliations, though we interpret this parity cautiously given the limitations of our binary classification. Spatially, a prominent pattern of research localization emerged: scholars overwhelmingly conducted studies within their own major island group (Fig. 2). This trend likely reflects the acute logistical and funding constraints of conducting research across an archipelago.

### 3.1. Thematic segregation in aquatic ILK research

Scientometric mapping revealed three distinct thematic clusters, representing a clear intellectual division of labor (Fig. 3a). Cluster 1 (Applied Conservation) represents the dominant international focus. Cluster 2 (Ethnoecology and Governance) captures the more localized social science dimensions, while Cluster 3 (Climate Adaptation) reflects the emerging adaptation discourse.

These themes reveal a clear disparity in scholarly visibility. The international-dominated Applied Conservation cluster attracted the highest Citations Per Year ( $Md = 2.06 \pm 5.05$  IQR), while the locally driven Ethnoecology and Governance cluster received the lowest ( $Md = 0.80 \pm 1.34$  IQR). In contrast, Cluster 3 (Climate Adaptation) occupies an intermediate position ( $Md = 1.44 \pm 4.10$  IQR), suggesting it functions as a thematic bridge where global and local interests increasingly converge. Temporally, while all themes are growing, publication has

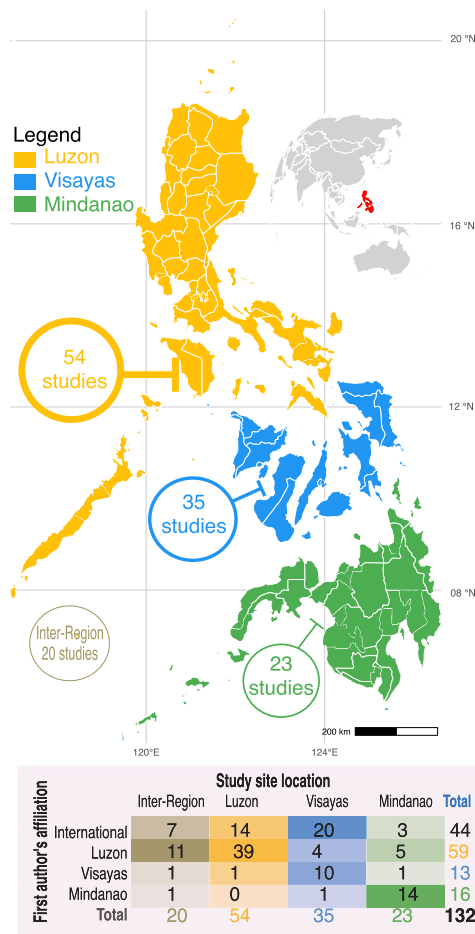


Fig. 2. Research efforts are highly localized. The geographic distribution of the 132 articles analyzed reveals a strong tendency for intra-regional research. The main map provides geographic context, while the inset heatmap quantifies this pattern, showing the number of studies conducted in each Philippine region (columns) by first authors from that same region (rows).

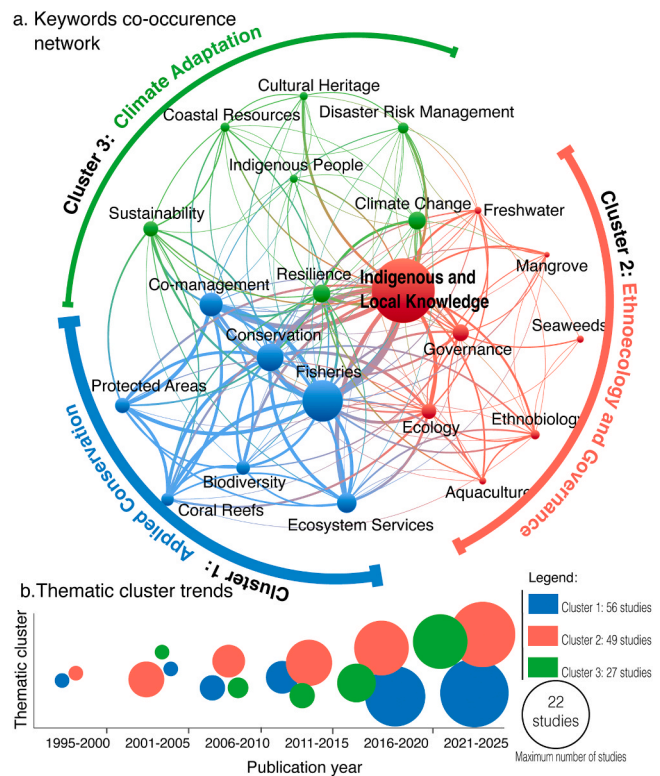


Fig. 3. Thematic landscape reveals a citation disparity. a, A keyword co-occurrence network ( $N = 132$  articles) identifies three distinct thematic clusters. Notably, these clusters have different scholarly impacts, with Applied Conservation (blue) being the most cited and Ethnoecology and Governance (red) the least. b, Publication frequency across all themes has accelerated since 2016, particularly for the Ethnoecology and Governance and Climate Adaptation (green) themes.

accelerated since 2016 (Fig. 3b). Notably, the overlay network exposes a historical bias: research on freshwater ecosystems is a recent phenomenon, emerging almost entirely after 2020.

### 3.2. Patterns of knowledge production and drivers of visibility

Knowledge production is primarily domestic: researchers affiliated with Philippine institutions first-authored two-thirds of all studies ( $N = 88$ , Fig. 4). The field is also well-resourced, with two-thirds of studies reporting financial support. Yet, despite this high domestic volume, scholarly visibility (cumulative CPY) is overwhelmingly concentrated in Core (Scopus/WoS) indexed journals (Fig. 5). Notably, research led from the Philippines contributes a vital share of this high-impact scholarship.

Bivariate analyses reveal that distinct author attributes shape these patterns (Fig. 6a-d). First, geography and affiliation strongly influenced thematic choice. Research proved highly localized, as scholars overwhelmingly studied their own regions ( $\chi^2(9) = 102.81$ ,  $p < 0.001$ ). Institutional affiliation was also significant ( $\chi^2(2) = 6.53$ ,  $p < 0.05$ ): international scholars concentrated on the higher-cited Applied Conservation theme, effectively segregating them from the Ethnoecology and Governance discourse.

Second, funding and location significantly drove citation impact. Funded studies achieved significantly higher CPY ( $Md = 1.71 \pm 3.62$  IQR) than unfunded ones ( $Md = 0.52 \pm 1.92$  IQR) (Mann-Whitney  $U = 2445.5$ ,  $p = 0.014$ ). Within the Philippines, region mattered: studies from the Visayas ( $Md = 0.33 \pm 0.44$  IQR) had a lower median CPY than those from the national capital region of Luzon ( $Md = 1.0 \pm 1.84$  IQR) (Kruskal-Wallis  $H(2) = 7.71$ ,  $p < 0.05$ ). Notably, however, research centered on Mindanao ( $Md = 1.26 \pm 2.15$  IQR) defied this typical

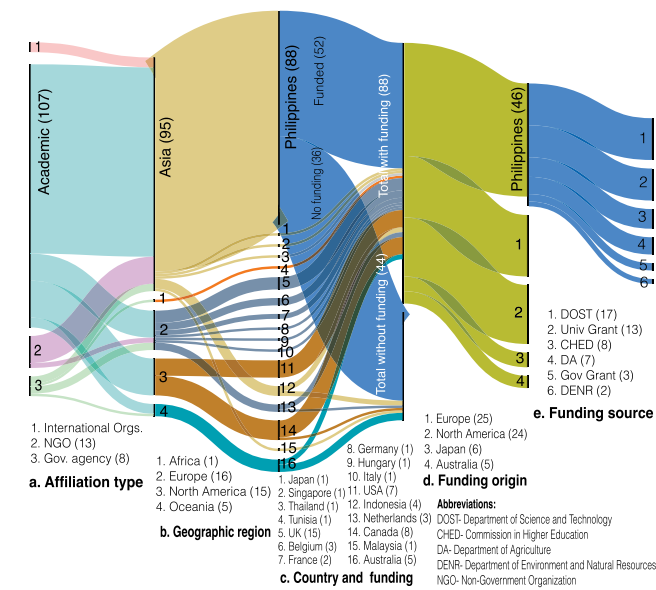


**Fig. 4.** The flow of knowledge production. This Sankey diagram visualizes the flow of 132 studies from author origin (left) to funding source (right). The diagram reveals that while domestic academic institutions are the dominant knowledge producers, international scholars provide a substantial share of the research production. The width of the flow is proportional to the number of studies.

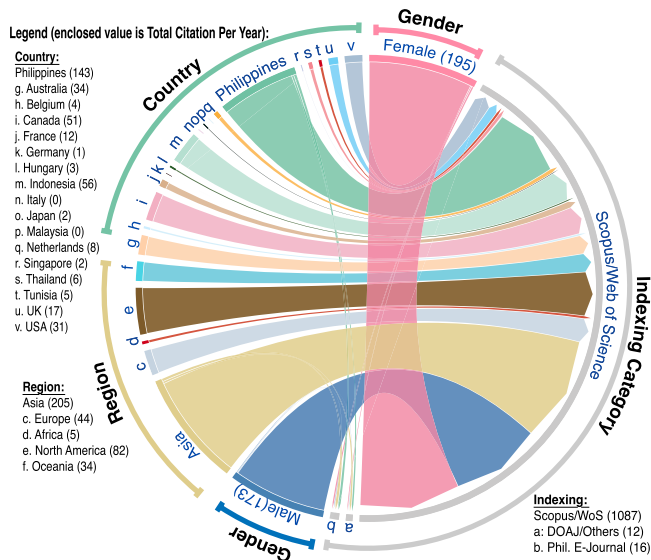


**Fig. 5.** Citation impact is concentrated in Core journals. This chord diagram visualizes the flow of cumulative Citations Per Year (CPY) from different author groups to various journal types. It demonstrates that scholarly impact is overwhelmingly concentrated in Core (Scopus/WoS) indexed journals, with Philippine-led research contributing a key portion of this high-tier impact. Chord width is proportional to the total CPY contributed.

center-periphery gradient. While statistically indistinguishable from the Visayas due to high variance, Mindanao achieved citation parity with Luzon, occupying a unique high-impact niche that challenges the standard regional hierarchy.

Crucially, these direct associations did not extend to our primary demographic variables. We found no significant difference in citation impact between Philippines-affiliated ( $Md = 1.31 \pm 1.89$  IQR) and international-affiliated ( $Md = 1.62 \pm 5.12$  IQR) scholars when tested directly ( $p > 0.05$ ). Similarly, there was no significant difference

between female ( $Md = 1.29 \pm 3.38$  IQR) and male ( $Md = 1.60 \pm 2.91$  IQR) ( $p > 0.05$ ). This apparent contradiction signals a more complex interaction at play.

### 3.3. Quantifying the disappearing effect

Factorial analysis of the global dataset ( $N = 132$ ) isolated the structural drivers of these disparities, revealing a highly significant three-way interaction between author gender, affiliation, and funding ( $F(1, 124) = 12.06, p < 0.001$ ). Pairwise testing clarified the intersectional mechanics of this global inequality. First, among funded international scholars, we found no significant difference in citation impact between males ( $Md = 2.80 \pm 4.11$  IQR) and females ( $Md = 4.50 \pm 4.13$  IQR) ( $p > 0.05$ ). This establishes a high visibility baseline for the Global North.

Against this baseline, funded Philippine male scholars ( $Md = 1.50 \pm 1.80$  IQR) achieved statistical parity, showing no significant difference from their international peers ( $p > 0.05$ ). In stark contrast, funded Philippine female scholars ( $Md = 0.83 \pm 1.11$  IQR) remained significantly less visible than their international counterparts ( $p < 0.01$ ). This indicates that while the structural barriers of the Global South appear permeable for local male scholars, a specific citation penalty effectively marginalizes local female counterparts relative to the global average.

However, this complex demographic hierarchy was absent in the second stage. When we analyzed the Philippines-only subset ( $N = 88$ ), the three-way interaction between gender, region, and funding was non-significant ( $F(3, 72) = 0.92, p > 0.05$ ). This result confirms the *disappearing effect*. It demonstrates that the structural advantages determining global visibility, specifically those privileging male and international scholars, are context-dependent. It suggests that within the domestic arena, local institutional realities render these global drivers of scholarly visibility ineffective.

## 4. Discussion

This study reveals a central paradox in global conservation science: the collaborative frameworks meant to democratize knowledge can instead deepen the inequities that render local scholarship invisible. Our scientometric analysis of Philippine aquatic ILK research uncovers a system of *conditional visibility*. Under this system, the value of Global South scholarship is judged not on its intrinsic merit but is conditioned by intersectional hierarchies of affiliation, funding, and gender. Thematic segregation and these biases drive the *disappearing effect*: the international citation advantage is nullified within the domestic Philippine context. These findings demonstrate how enduring center-periphery dynamics and potential parachute science practices perpetuate marginalization, especially for female scholars. Ultimately, this process undermines equitable sustainability solutions (Schöpf, 2020; Stefanoudis et al., 2021; Castro Torres and Alburez-Gutierrez, 2022; de Vos and Schwartz, 2022; Johnson et al., 2022; Oztig, 2022; Miller et al., 2023; Dawson et al., 2024).

### 4.1. Thematic segregation: Consequences of global-local divides

The expansion of the Philippine aquatic ILK corpus reflects a global renewal of interest in the field (Aswani et al., 2018; Gómez-Baggethun, 2022). While the recent surge in Climate Adaptation research suggests local responsiveness to institutional mandates (Maliao et al., 2025), this growth obscures a significant division of labor. Internationally affiliated scholars disproportionately dominate Applied Conservation, the cluster with the highest citation impact. Conversely, Philippine scholars concentrate on the lower-cited Ethnoecology and Governance cluster. The Climate Adaptation cluster offers a rare convergence point, suggesting the shared urgency of the climate crisis overrides these thematic divides.

This divergence confirms international agendas prioritize topics that

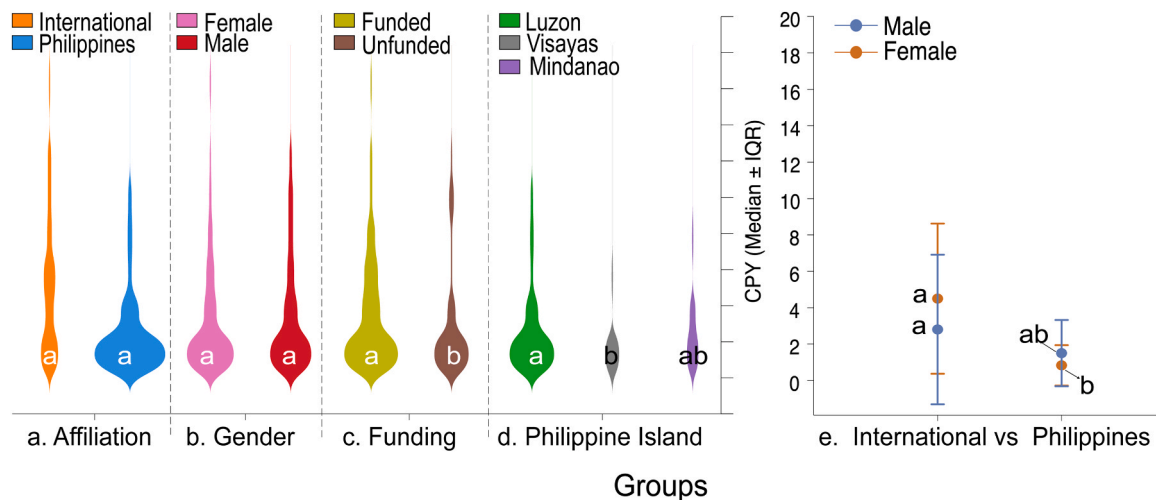


**Fig. 6.** The conditional nature of citation advantage. a–d, Violin plots showing CPY distributions for key bivariate comparisons. Different letters denote significant differences ( $p < .05$ ) based on Mann-Whitney U or Kruskal-Wallis tests. e, Interaction plot highlighting the gendered citation gap among Funded articles ( $N = 88$ ). The significant global three-way interaction ( $p < .001$ ) reveals that the International Advantage is driven by the structural marginalization of Philippine female scholars (orange), whereas Philippine male scholars (blue) achieve statistical parity with their International peers. This demographic structure was absent in the Philippines-only analysis (the disappearing effect), where the interaction between gender, region, and funding becomes non-significant ( $p = .433$ ). Different letters denote statistically significant differences ( $p < .05$ ) based on Tukey's HSD on the aligned rank transformed data.

align with Global North funding priorities and offer broad theoretical generalizability. These topics, published in Core journals gated by prohibitive Article Processing Charges (APCs), make international collaboration a financial necessity for Philippine scholars to access high-visibility venues. This dependency stratifies the landscape: Collaborative research bypasses the global paywall, while independent local scholarship funnels into lower-visibility domestic channels.

This segregation drives a profound knowledge disconnect. When high-visibility Applied Conservation research is decoupled from locally grounded Ethnoecology and Governance, it ill-informs policy. This disconnect drives inefficient or counterproductive interventions (Smit et al., 2025; Dáttilo and Rivera-Núñez, 2025). The proliferation of ineffective *paper* Marine Protected Areas (MPAs) in the Philippines (Maliao et al., 2009a, 2009b) and globally (Relano and Pauly, 2023) exemplifies this gap. This structural decoupling explains how stratified scholarship visibility translates into real-world conservation failures. Furthermore, our analysis exposes an ecosystem-level bias: a long-standing preference for globally recognized marine realms over the more recently studied, yet critical, freshwater systems (Maliao et al., 2025).

#### 4.2. Unmasking nuance: Intersectional gender dynamics in ILK research

Gender dynamics within Philippine aquatic ILK scholarship appear superficially balance. Initial bivariate tests revealed no significant gender-based differences in citation impact or funding access. This finding counters the well-documented gender gaps in global science (Dehdarirad et al., 2015; Bikard et al., 2025). Yet, this statistical parity likely masks underlying systemic stratification. Variables such as academic rank and productivity often mediate gender gaps, suggesting the observed parity may reflect a balanced distribution of these confounding factors rather than a true absence of barriers. Moreover, citation gaps frequently persist at the highest levels of visibility even when medians appear balanced (Chapman et al., 2022).

Our factorial analysis exposes that the international advantage is profoundly gendered. The disparity of global-domestic scholarly visibility is driven primarily by the marginalization of local female scholars. Funded Philippine male scholars achieved statistical parity with their international peers. In sharp contrast, funded Philippine female scholars remained significantly less visible than their international counterparts.

This structural disadvantage is likely compounded by the feminization of poverty (Maliao and Polohan, 2008), where economic barriers disproportionately constrain women in the Global South. This persistent gender disparity, even among funded researchers, echoes broader global trends in scientific valuation (Dehdarirad et al., 2015; Chapman et al., 2022; Bikard et al., 2025). This confirms that *conditional visibility* operates through an intersectional lens. The structural barriers of the Global South are permeable for local male scholars, while local female counterparts remain doubly marginalized. However, the absence of this hierarchy within the Philippine domestic subset suggests that the local academic culture operates with a degree of gender equity that is lost in the global arena. While we cannot definitively isolate gender from unmeasured factors like career stage or risk aversion, the significant interaction confirms that gender remains a central, if complex, determinant of scholarly visibility.

#### 4.3. The Disappearing effect: Evaluating signatures of potential parachute science

Beyond thematic segregation, our factorial analysis reveals a deeper mechanism: the *disappearing effect*. The citation advantage held by funded, internationally affiliated scholars is absent within the Philippines-only subset. This provides a quantitative signature of potential parachute science: the international citation advantage stems from structural advantage, not local relevance. While individual factors like seniority or institutional prestige play a role, the systematic clustering of international scholars in high-citation topics points to a systemic bias, not purely individual advantage. Consequently, our *conditional visibility* framework provides a more robust explanation for these inequities than merit alone. We must, however, distinguish the negative outcomes of extractive research from the potential of equitable, co-creative partnerships, which our policy implications aim to foster.

This global inequities perpetuate a scientific labor division where the Global North functions as the producer of universal theories while the Global South provides localized data (Castro Torres and Alburez-Gutierrez, 2022; Nakamura et al., 2023). This creates a self-reinforcing cycle of invisibility consistent with the Matthew effect in science: recognition accumulates for those already privileged (Merton, 1968). By framing Global South researchers as mere data providers, the current evaluation system overlooks their theoretical contributions. It

also limits their access to the funding and high-impact venues that confer global visibility. This dynamic not only curtails individual careers but constrains the innovative capacity of global conservation science by sidelining the diverse, locally grounded insights essential for tackling complex environmental problems.

#### 4.4. Internal hierarchies: Institutional struggles and regional disparities

The *disappearing effect* highlights external biases, yet our analysis shows domestic academic systems also compound these inequities from within, neutralizing local advantages. Genuine co-production requires institutional readiness (Martins, 2020) in research capacity and maturity. Without this parity, sustaining the investment needed to justify equal rewards is difficult, often fostering tokenistic gift authorship instead of genuine capacity building (da Silva et al., 2025). Crucially, internal Philippine funding yields no significant scholarly visibility, suggesting project-level resources are insufficient to overcome pervasive institutional barriers. Since the academe produces most aquatic ILK scholarship, local scholars are likely disproportionately constrained by heavy teaching loads, entrenched bureaucracy, and the linguistic and APC hurdles of international publication.

These barriers create a field of struggle that fosters research hesitancy among local scholars and limits their ability to capitalize on collaborations and achieve scholarly visibility (Durante et al., 2023). Publish or perish mandates, tied to global university rankings and rigid faculty promotion protocols, intensify this institutional pressure (DBM and CHED, 2022; San Juan, 2024). This dynamic, not unique to the Philippines, is a local manifestation of global knowledge hegemony. In this asymmetrical power structure, the Global South periphery contends with normative pressures from a dominant Global North center (Nchinda, 2002; Beigel, 2014; Marginson and Xu, 2023). The internal struggle is therefore a fundamental component of the center-periphery dynamic, remaining a persistent barrier to achieving equitable global knowledge equity.

These global dynamics replicate at the domestic scale of the Philippines. Research localization strongly frames the citation disparities observed between Philippine Island groups. While Luzon-based scholars dominate overall production, Visayas-affiliated data exposes a critical masking effect. The Visayas serves as a hub for well-funded, internationally affiliated research. However, excluding these high-visibility external studies shows the scholarly visibility of local Visayas-based researchers lags significantly behind their National Capital Region (Luzon) counterparts. This quantifies the well-documented *Imperial Manila syndrome*, reflecting a domestic center-periphery dynamic defined by the hyper-concentration of research funding and institutional power in the capital (Calma, 2010; Tusalem, 2020; Barrot, 2021). This indicates that *conditional visibility* is fractal, operating not just globally but also domestically, replicating structural inequities across the archipelago. A compelling exception is Mindanao, which achieved citation parity with the capital. We attribute this to its status as the ethnolinguistic heartland of the Philippines, where the high density of Indigenous Peoples draws sustained, substantive scholarly attention that transcends typical regional marginalization.

#### 4.5. Pathways to equity: Reforming science for global and local impact

Our findings have profound implications for research methodology and science policy. Methodologically, they demonstrate that citation counts are not neutral metrics; instead, they are artifacts of systemic advantage. This highlights the need for multi-level analyses to disentangle the interplay between global scientific hierarchies and domestic research ecosystems.

Our framework for quantifying *conditional visibility* offers a transferable blueprint for other contexts. Future research should replicate this model by selecting a comparable Global South nation or scientific field, compiling a scientometric dataset using transparent systematic review

protocols, and applying a similar two-stage factorial ANOVA to test if citation advantages are similarly conditional. Such comparative work is essential to build a broader, evidence-based map of scholarly inequity.

For Philippine science policy, enhancing research impact demands confronting systemic institutional barriers. This requires more than simply increasing project-level funding. It demands reforming evaluation protocols that privilege international metrics over local relevance. It requires reassessing promotion criteria that devalue locally focused scholarship. Finally, it demands dismantling the bureaucratic hurdles that foster research hesitancy (Alcazaren, 2021; Durante et al., 2023; San Juan, 2024). Overcoming these barriers is a prerequisite for building a robust national research ecosystem capable of developing effective, locally tailored conservation strategies.

Beyond academic metrics, these Global North-South dynamics directly shape the translation of research into practice. When internationally affiliated Applied Conservation research gains disproportionate visibility, it skews national policy discourse, effectively sidelining local research on Ethnoecology and Governance. For instance, a highly cited conservation study might recommend an MPA design that overlooks the local governance structures detailed in less-visible, locally authored scholarship. This disconnect is a direct policy consequence of the citation dynamics we quantify. The *disappearing effect* thus fosters a policy landscape that prioritizes globally framed interventions over community-led solutions, undermining conservation effectiveness and eroding public trust.

Globally, our findings underscore the urgency for ILK research to move beyond simple instrumentalization (Lam et al., 2020) towards models that genuinely empower Indigenous Peoples and Local Communities (IPLCs) as equitable partners (Brondizio et al., 2021; da Silva et al., 2025). This requires respecting IPLC data sovereignty and their right to Free, Prior, and Informed Consent (Fernández-Llamazares et al., 2021). To operationalize this, journals and funders must actively decolonize their practices (Oztig, 2022; Choquez-Millan et al., 2024). We propose specific, actionable reforms: Funding agencies should mandate local co-Principal Investigators with equitable budget authority. Journals should institute mandatory Ethics and Equity Statements detailing partner roles, data ownership agreements, and concrete plans for local capacity building.

## 5. Conclusion: Toward knowledge equity

Our study establishes the mechanism of *conditional visibility*, demonstrating that scholarly visibility is governed by intersectional hierarchies of affiliation, funding, and gender rather than merit alone. Furthermore, we reveal that the systemic constraints plaguing the domestic landscape effectively neutralize these global structural advantages—a phenomenon we term the *disappearing effect*. Crucially, however, this leveling is incomplete: we identify a persistent double marginalization of female scholars. Even when backed by funding, local women remain structurally excluded from the global visibility premium accessible to their male counterparts. This confirms that global scholarly visibility is fundamentally reliant on the intersection of institutional capacity and demographic privilege. Therefore, fostering genuine knowledge equity demands a dual transformation: reforming global valuation systems while simultaneously strengthening domestic research capacity. Leveling this uneven landscape is more than an academic exercise; it is a prerequisite for effective global sustainability. Achieving equity in conservation science directly strengthens our collective capacity to develop the diverse, context-specific solutions needed to address urgent challenges like biodiversity loss and climate change.

#### CRedit authorship contribution statement

**Maliao Ronald Juanito:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Béla Tóthmérész:** Writing –

review & editing, Writing – original draft, Supervision, Project administration, Formal analysis, Conceptualization.

## Ethics approval and consent to participate

Not applicable.

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The authors have no relevant financial or non-financial interests to disclose.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.envsci.2026.104328](https://doi.org/10.1016/j.envsci.2026.104328).

## Data Availability

Data will be made available on request.

## References

- Aguillo, I.F., 2012. Is Google Scholar useful for bibliometrics? A webometric analysis. *Scientometrics* 91, 343–351. <https://doi.org/10.1007/s11192-011-0582-8>.
- Alcazaren, H.K.G., 2021. A systematic review of Philippine research productivity: a Bourdieusian perspective. *Philipp. Soc. Sci. J.* 4, 113–124. <https://doi.org/10.52006/main.v4i4.428>.
- Aswani, S., Lemahieu, A., Sauer, W.H.H., 2018. Global trends of local ecological knowledge and future implications. *PLoS One* 13, e0195440. <https://doi.org/10.1371/journal.pone.0195440>.
- Barrot, J.S., 2021. Research on education in Southeast Asia (1996–2019): a bibliometric review. *Asia Pac. J. Educ.* 41, 413–432. <https://doi.org/10.1080/00131911.2021.1907313>.
- Beigel, F., 2014. Publishing from the periphery: structural heterogeneity and segmented circuits. The case of Latin America. *Curr. Socio* 62, 701–721. <https://doi.org/10.1177/0011392114533977>.
- Berkes, F., Colding, J., Folke, C., 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecol. Appl.* 10, 1251–1262. <https://doi.org/10.2307/2641280>.
- Bikard, M., Fernandez-Mateo, I., Mogra, R., 2025. Standing on the shoulders of (male) giants: Gender inequality and the technological impact of scientific ideas. *Adm. Sci. Q.* 00018392251331957. <https://doi.org/10.2139/ssrn.4059813>.
- Bohensky, E.L., Maru, Y., 2011. Indigenous Knowledge, science, and resilience: What have we learned from a decade of international literature on "Integration"? *es-2011-4335 Ecol. Soc.* 16. <https://doi.org/10.5751/es-04342-160406>.
- Bornmann, L., Leydesdorff, L., 2014. Scientometrics in a changing research landscape. *EMBO Rep.* 15, 1228–1232. <https://doi.org/10.15252/embr.201439608>.
- Bradley, M., 2008. On the agenda: North–South research partnerships and agenda-setting processes. *Dev. Pr.* 18, 673–685. <https://doi.org/10.1080/09614520802386314>.
- Brondízio, E.S., et al., 2021. Locally based, regionally manifested, and globally relevant: indigenous and Local Knowledge, values, and practices for nature. *Annu. Rev. Environ. Resour.* 46, 481–509. <https://doi.org/10.1146/annurev-environ-012220-012127>.
- Calma, A., 2010. Funding for research and research training and its effects on research activity: the case of the Philippines. *AsiaPac. Educ. Res.* 19, 279–292. <https://doi.org/10.3860/taper.v19i2.1593>.
- Castro Torres, A.F., Alburez-Gutierrez, D., 2022. North and South: Naming practices and the hidden dimension of global disparities in knowledge production. *Proc. Natl. Acad. Sci. U. S. A.* 119, e2119373119. <https://doi.org/10.1073/pnas.2119373119>.
- Chapman, C.A., Hemingway, C.A., Sarkar, D., Gogarten, J.F., Stenseth, N.C., 2022. Altimetric scores in conservation science have gender and regional biases. *Conserv. Soc.* 20, 195–200. <https://doi.org/10.4103/cs.cs.27.21>.
- Cheng, S.H., et al., 2018. Using machine learning to advance synthesis and use of conservation and environmental science. *Conserv. Biol.* 32, 762–764. <https://doi.org/10.1111/cobi.13117>.
- Choquez-Millan, M.F., et al., 2024. Uncovering power asymmetries in North-South research collaborations - An example from sustainability research in Tanzania. *Futures* 156, 103316. <https://doi.org/10.1016/j.futures.2023.103316>.
- Crenshaw, K., 1989. Demarginalizing the intersection of race and sex: a Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *Univ. Chi. Leg. F.* 139–167.
- Dáttilo, W., Rivera-Núñez, T., 2025. Remote-control science in ecology: a hidden face of scientific neocolonialism. *Ecol. Lett.* 28 (10), e70227. <https://doi.org/10.1111/ele.70227>.
- Dawson, N.M., et al., 2024. Reviewing the science on 50 years of conservation: knowledge production biases and lessons for practice. *Ambio* 53, 1395–1413. <https://doi.org/10.1007/s13280-024-02049-w>.
- DBM & CHED, 2022. Joint Circular No. 03, s. 2022: Policy guidelines on the progression to a higher rank of faculty members in State Universities and Colleges (SUCs) and Local Universities and Colleges (LUCs) to align with the latest mandates and requirements of higher education. Department of Budget and Management; Commission on Higher Education, Philippines.
- Dehdarirad, T., Villarroja, A., Barrios, M., 2015. Research on women in science and higher education: a bibliometric analysis. *Scientometrics* 103, 795–812. <https://doi.org/10.1007/s11192-015-1574-x>.
- DENR, 2016. Philippine biodiversity strategy and action plan (2015–2028): bringing resilience to Filipino communities. BMB-DENR, Philippines.
- Díaz, S., Demissew, S., Carabias, J., Joly, C., Lonsdale, M., Ash, N., Zlatanova, D., 2015. The IPBES Conceptual Framework—connecting nature and people. *Curr. Opin. Env. Sust.* 14, 1–16. <https://doi.org/10.1016/j.cosust.2014.11.002>.
- Durante, C.A.G., et al., 2023. Research hesitancy in the academe: a Multi-University study in the Philippines. *Int. J. Multidiscip. Appl. Bus. Educ. Res.* 4, 1442–1446. <https://doi.org/10.11594/ijmaber.04.05.05>.
- van Eijck, M., Roth, W.M., 2007. Keeping the local local: recalibrating the status of science and traditional ecological knowledge (TEK) in education. *Sci. Educ.* 91, 926–947. <https://doi.org/10.1002/sce.20227>.
- Fernández-Llamazares, A., et al., 2021. Scientists' warning to humanity on threats to Indigenous and local knowledge systems. *J. Ethnobiol.* 41, 144–169. <https://doi.org/10.2993/0278-0771-41.2.144>.
- Gómez-Baggethun, E., 2022. Is there a future for indigenous and local knowledge? *J. Peasant Stud.* 49, 1139–1157. <https://doi.org/10.1080/03066150.2021.1926994>.
- Harzing, A.-W.K., Van der Wal, R., 2008. Google Scholar as a new source for citation analysis. *Ethics Sci. Environ. Polit.* 8, 61–73. <https://doi.org/10.3354/esep00076>.
- Hoppenreijds, J.H., Marker, J., Maliao, R.J., Hansen, H.H., Juhász, E., Löhmus, A., Magurran, A.E., 2024. Three major steps toward the conservation of freshwater and riparian biodiversity. *Conserv. Biol.* 38 (3), e14226. <https://doi.org/10.1111/cobi.14226>.
- IPBES, 2024. Summary for policymakers of the thematic assessment report on the interlinkages among biodiversity, water, food and health (NEXUS assessment) (P. D. McElwee, P. A. Harrison, & T. L. van Huysen, Eds.). IPBES secretariat.
- Johnson, A., Saypanya, S., Hansel, T., Rao, M., 2022. More than an academic exercise: structuring international partnerships to build research and professional capacity for conservation impact. *Conserv. Sci. Pr.* 4, e1239. <https://doi.org/10.1111/csp.2539>.
- Lam, D.P., et al., 2020. Indigenous and local knowledge in sustainability transformations research: a literature review. *Ecol. Soc.* 25, 3. <https://doi.org/10.5751/ES-11305-250103>.
- Lameira, H.L.N., Guerrero-Moreno, M.A., da Silva, E.C., Oliveira, F.A., Teodósio, M.A., Dias-Silva, K., Moura Jr, J.F., Juen, L., Oliveira-Junior, J.M.B., 2025. Citizen science as a monitoring tool in aquatic ecology: trends, gaps, and future perspectives. *Sustainability* 17, 4972. <https://doi.org/10.3390/su17114972>.
- MacRoberts, M.H., MacRoberts, B.R., 1996. Problems of citation analysis. *Scientometrics* 36, 435–444. <https://doi.org/10.1007/bf02129604>.
- Maliao, R.J., Polohan, B.B., 2008. Evaluating the impacts of mangrove rehabilitation in Cogtong Bay, Philippines. *Environ. Manag.* 41 (3), 414–424. <https://doi.org/10.1007/s00267-007-9021-2>.
- Maliao, R.J., Tóthmérész, B., 2025b. Indigenous and Local Knowledge (ILK) – environmental stewardship nexus in the Philippines: a systematic map protocol. *protocolRxiv* 00011, 11. <https://doi.org/10.1079/protocolrxiv.2025.00011>.
- Maliao, R.J., Tóthmérész, B., 2025a. Braiding traditional ecological knowledge and Western science in the management of freshwater social-ecological systems: a systematic map protocol. *Environ. Evid.* 14 (1), 17. <https://doi.org/10.1186/s13750-025-00371-8>.
- Maliao, R.J., White, A.T., Maypa, A.P., Turingan, R.G., 2009b. Trajectories and magnitude of change in coral reef fish populations in Philippine marine reserves: a meta-analysis. *Coral Reefs* 28, 809–822. <https://doi.org/10.1007/s00338-009-0532-6>.
- Maliao, R.J., Pomeroy, R.S., Turingan, R.G., 2009a. Performance of community-based coastal resource management (CBCRM) programs in the Philippines: a meta-

- analysis. *Mar. Policy* 33 (5), 818–825. <https://doi.org/10.1016/j.marpol.2009.03.003>.
- Maliao, R.J., Cahilig, R.C., Cahilig, R.R., Jaspe, B.T., 2025. Climate change, traditional ecological knowledge, and riverine biodiversity conservation: a case in Aklan, Central Philippines. *Environ. Dev. Sustain* 27, 4745–4767. <https://doi.org/10.1007/s10668-023-04096-x>.
- Marginson, S., Xu, X., 2023. Hegemony and inequality in global science: Problems of the center-periphery model. *Comp. Educ. Rev.* 67 (1), 31–52. <https://doi.org/10.1086/722760>.
- Martins, A., 2020. Reimagining equity: redressing power imbalances between the global North and the global South. *Gend. Dev.* 28, 135–153. <https://doi.org/10.1080/13552074.2020.1717172>.
- Merton, R.K., 1968. The Matthew effect in science: the reward and communication systems of science are considered. *Science* 159, 56–63. <https://doi.org/10.1126/science.159.3810.56>.
- Miller, J., White, T.B., Christie, A.P., 2023. Parachute conservation: investigating trends in international research. *Conserv. Lett.* 16, e12947. <https://doi.org/10.1111/conl.12947>.
- Mingers, J., Leydesdorff, L., 2015. A review of theory and practice in scientometrics. *Eur. J. Oper. Res.* 246, 1–19. <https://doi.org/10.1016/j.ejor.2015.04.002>.
- Molnár, Z., Aumeeruddy-Thomas, Y., Babai, D., Díaz, S., Garnett, S.T., Hill, R., Bates, P., Brondizio, E.S., Carino, J., Demeter, L., Fernández-Llamazares, Á., 2024. Towards richer knowledge partnerships between ecology and ethnoecology. *Trends Ecol. Evol.* 39, 109–115. <https://doi.org/10.1016/j.tree.2023.10.010>.
- Nakamura, G., Soares, B.E., Pillar, V.D., Diniz-Filho, J.A.F., Duarte, L., 2023. Three pathways to better recognize the expertise of Global South researchers. *npj Biodivers.* 2, 17. <https://doi.org/10.1038/s44185-023-00021-7>.
- Nchinda, T.C., 2002. Research capacity strengthening in the South. *Soc. Sci. Med.* 54, 1699–1711. [https://doi.org/10.1016/s0277-9536\(01\)00338-0](https://doi.org/10.1016/s0277-9536(01)00338-0).
- Oztig, L.I., 2022. The Global North/South inequalities in the IR discipline: Some reflections and insights. *Alternatives* 47, 123–127. <https://doi.org/10.1177/03043754221095304>.
- Relano, V., Pauly, D., 2023. The ‘Paper Park Index’: evaluating Marine Protected Area effectiveness through a global study of stakeholder perceptions. *Mar. Policy* 151, 105571. <https://doi.org/10.1016/j.marpol.2023.105571>.
- San Juan, D.M.M., 2024. A critique of Scopus-centrism in Philippine universities and educational and/or research agencies: why Filipinos should write research in Filipino. *Humanit. Diliman* 21, 133–171.
- Schöpf, C.M., 2020. Conversations on the global South – the coloniality of global knowledge production: theorizing the mechanisms of academic dependency. *Soc. Transform. J. Glob. South* 8 (2). <https://doi.org/10.13185/2799-015x.1144>.
- Shu, F., 2021. Limitations of citation analysis on the measurement of research impact: a summary. *Data Sci. Inf.* 1, 38–45. <https://doi.org/10.59494/dsi.2021.3.4>.
- da Silva, E.C., et al., 2025. The importance of traditional communities in biodiversity conservation: mapping scientific literature and identifying trends, gaps, and areas of focus. *Biodivers. Conserv* 34, 685–714. <https://doi.org/10.1007/s10531-024-02999-3>.
- Silvano, R.A.M., et al., 2023. Fishers’ multidimensional knowledge advances fisheries and aquatic science. *Trends Ecol. Evol.* 38, 8–12. <https://doi.org/10.1016/j.tree.2022.10.002>.
- Smit, I.P., Fernández, R.J., Menvielle, M.F., Roux, D.J., Singh, N., Mabuza, S., Mthombeni, B.M., Macgregor, N.A., Fritz, H., Gandiwa, E., Foxcroft, L.C., 2025. From parachuting to partnership: fostering collaborative research in protected areas. *J. Appl. Ecol.* 62 (1), 28–40. <https://doi.org/10.1111/1365-2664.14814>.
- Stefanoudis, P.V., et al., 2021. Turning the tide of parachute science. *Curr. Biol.* 31, R184–R185. <https://doi.org/10.1016/j.cub.2021.01.029>.
- Tusale, R.F., 2020. Imperial Manila: how institutions and political geography disadvantage Philippine provinces. *Asian J. Comp. Polit.* 5, 235–269. <https://doi.org/10.1177/2057891119841441>.
- Van Eck, N.J., Waltman, L., 2010. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* 84, 523–538. <https://doi.org/10.1007/s11192-009-0146-3>.
- Van Raan, A.F.J., 2014. Advances in bibliometric analysis: research performance assessment and science mapping. In: Engwall, L., Blockmans, W., Weaire, D. (Eds.), *Bibliometrics: Use and Abuse in the Review of Research Performance*. Portland Press Limited, pp. 17–28.
- de Vos, A., Schwartz, M.W., 2022. Confronting parachute science in conservation. *Conserv. Sci. Pr.* 4, e12681. <https://doi.org/10.1111/csp2.12681>.
- WWF (World Wildlife Fund). 2022. Living Planet Report 2022 – Building a nature-positive society. Almond REA, Grooten M, Juffe Bignoli D, and Petersen T (Eds). Gland, Switzerland: WWF.

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