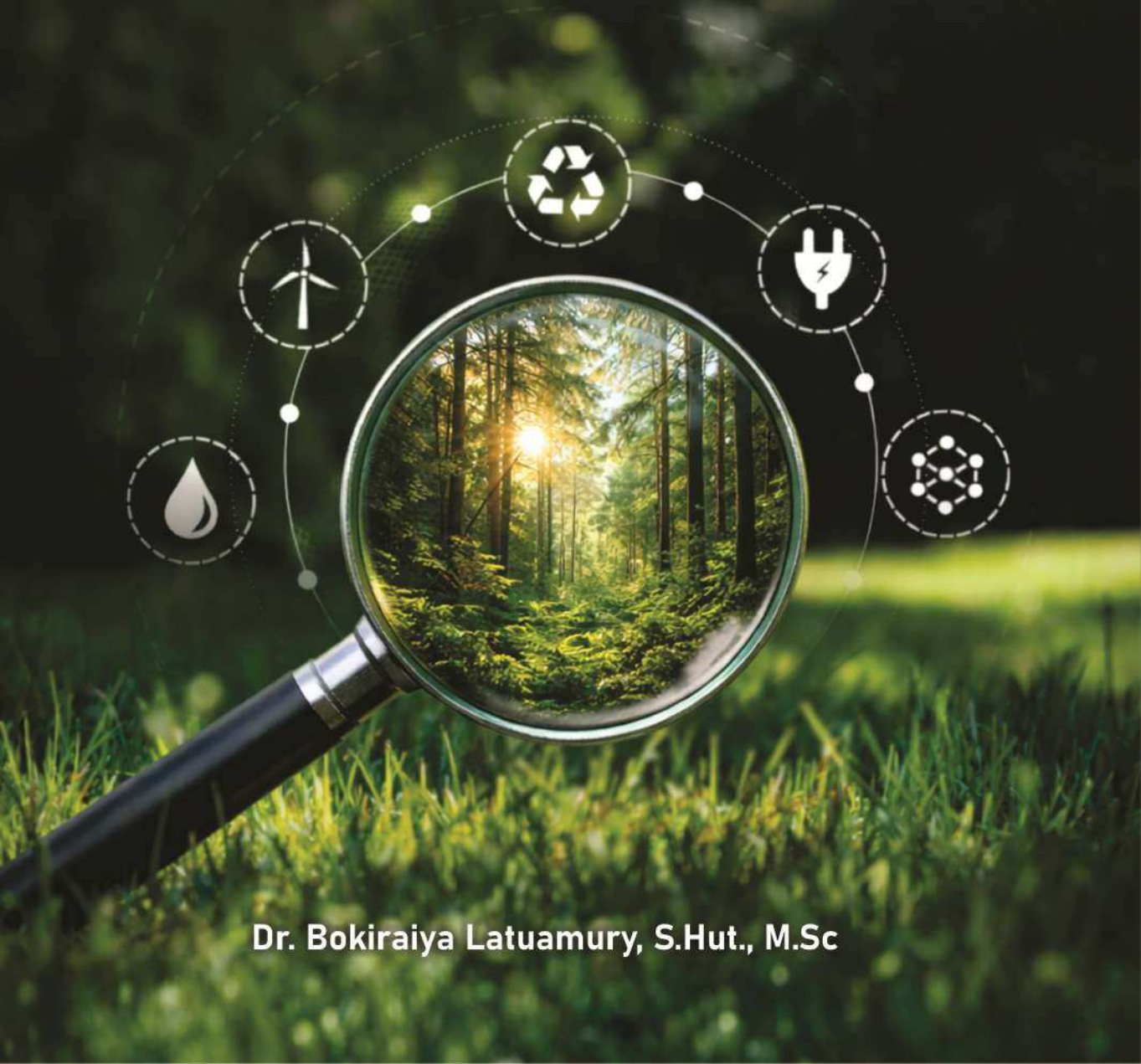
Buku Ajar

METODE PENELITIAN ILMU LINGKUNGAN



Dr. Bokiraiya Latuamury, S.Hut., M.Sc

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Penerbit Widina

BUKU AJAR
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KATA PENGANTAR

Di tengah lanskap global yang ditandai oleh krisis iklim, degradasi ekosistem, dan kompleksitas tata kelola sumber daya alam, Ilmu Lingkungan tidak lagi dapat berdiri sebagai disiplin deskriptif semata. Ia dituntut menjadi disiplin transformatif—mampu menghasilkan pengetahuan yang presisi, reflektif, dan berdampak. Buku ajar ini lahir dari kesadaran bahwa kualitas masa depan keberlanjutan global sangat ditentukan oleh kualitas cara kita meneliti, menganalisis, dan membangun argumen ilmiah. Metodologi bukan sekadar perangkat teknis; ia adalah fondasi arsitektur intelektual yang membentuk arah perubahan. Karya ini disusun untuk menjawab kebutuhan mendesak akan panduan penelitian yang tidak hanya sistematis, tetapi juga strategis. Di dalamnya, pembaca diajak memahami bahwa penelitian lingkungan merupakan proses integratif yang menghubungkan teori, data, teknologi, dan kebijakan dalam satu kerangka berpikir yang koheren. Buku ini dirancang untuk memastikan bahwa mahasiswa dan peneliti muda tidak sekadar menyelesaikan tugas akademik, melainkan membangun kontribusi ilmiah yang memiliki relevansi global.

Dalam penyusunannya, buku ini mengintegrasikan pendekatan kuantitatif, kualitatif, dan spasial sebagai pilar metodologis yang saling melengkapi. Perkembangan teknologi riset—mulai dari Geographic Information Systems (GIS), remote sensing, big data analytics, hingga Artificial Intelligence—diperlakukan bukan sebagai pelengkap, tetapi sebagai instrumen strategis dalam meningkatkan ketajaman analisis dan daya saing internasional. Pendekatan ini menempatkan pembaca pada posisi adaptif terhadap dinamika transformasi digital yang membentuk masa depan penelitian lingkungan. Lebih dari sekadar panduan teknis, buku ini menekankan pentingnya integritas ilmiah, reproducibility, dan etika penelitian sebagai prasyarat reputasi akademik jangka panjang. Dalam ekosistem publikasi global yang semakin kompetitif, kredibilitas ilmuwan dibangun melalui transparansi metodologis dan keberanian intelektual. Oleh karena itu, setiap bab disusun untuk memperkuat logika berpikir kritis, konsistensi argumentatif, dan ketelitian analitis yang menjadi ciri penelitian bereputasi.

Buku ini juga merupakan refleksi perjalanan akademik yang berangkat dari konteks tropis kepulauan, namun berorientasi pada percakapan ilmiah internasional. Isu-isu lokal—seperti tata kelola air, dinamika hutan, dan sistem sosio-ekologis—diposisikan sebagai bagian dari tantangan global yang saling terhubung. Dengan demikian, pembaca diajak melihat penelitian bukan sebagai aktivitas terisolasi, melainkan sebagai kontribusi terhadap komunitas ilmiah lintas negara dan lintas disiplin. Harapan utama dari kehadiran buku ini adalah lahirnya generasi ilmuwan lingkungan abad ke-21 yang reflektif secara filosofis, presisi secara metodologis, adaptif terhadap teknologi, serta bertanggung jawab terhadap keberlanjutan bumi. Buku ini ditujukan tidak hanya untuk ruang kelas, tetapi untuk ruang-ruang diskusi ilmiah yang lebih luas—seminar internasional, konferensi global, dan jurnal bereputasi. Ia dirancang untuk menjadi referensi yang membekali pembaca dengan kompetensi akademik sekaligus visi kepemimpinan intelektual.

Akhirnya, buku ajar ini merupakan undangan intelektual bagi setiap pembaca untuk berpikir lebih dalam, meneliti lebih tajam, dan berkontribusi lebih luas. Di tengah ketidakpastian global, sains yang berkualitas menjadi fondasi harapan. Semoga karya ini tidak hanya menjadi rujukan akademik, tetapi juga inspirasi bagi mereka yang berkomitmen menjadikan penelitian sebagai jalan menuju keberlanjutan dan keadilan sosial-ekologis bagi generasi mendatang.

Ambon, Mei 2026

Penulis

EPILOG

Buku ini mungkin mencapai halaman terakhir, namun perjalanan intelektual yang diharapkannya baru saja dimulai. Penelitian lingkungan bukanlah proyek yang selesai ketika skripsi diserahkan atau artikel dipublikasikan; ia adalah proses reflektif yang terus berkembang seiring kompleksitas zaman. Dalam lanskap global yang ditandai oleh krisis iklim, degradasi ekosistem, dan ketidakpastian tata kelola sumber daya alam, penelitian menjadi instrumen strategis untuk merumuskan arah masa depan. Ilmu yang presisi bukan sekadar kebutuhan akademik—ia adalah kebutuhan peradaban.

Sepanjang buku ini, metodologi ditempatkan bukan sebagai daftar prosedur, melainkan sebagai disiplin berpikir yang menuntut koherensi, ketelitian, dan integritas. Kualitas penelitian tidak diukur dari banyaknya data, melainkan dari kejernihan logika dan kekuatan argumentasi yang dibangun di atas bukti. Ketika ketelitian metodologis berpadu dengan tanggung jawab etis, penelitian menjelma menjadi kontribusi nyata terhadap keberlanjutan dan keadilan sosial-ekologis. Tantangan lingkungan global bersifat saling terhubung dan sistemik. Perubahan iklim memengaruhi ketahanan air; degradasi hutan berdampak pada stabilitas sosial; ketimpangan akses sumber daya memperdalam kerentanan masyarakat. Menjawab kompleksitas ini memerlukan ilmuwan yang tidak hanya mahir secara teknis, tetapi juga reflektif secara filosofis dan berani secara intelektual. Data tanpa konteks tidak cukup; analisis tanpa empati tidak memadai. Ilmuwan masa depan harus mampu menjembatani sains dan kemanusiaan.

Bagi peneliti yang tumbuh dan bekerja dalam konteks tropis kepulauan, tantangan menuju panggung internasional mungkin terasa besar. Namun realitas lokal bukanlah batas; ia adalah kekuatan. Ketika dibingkai dengan ketajaman konseptual dan presisi metodologis, studi berbasis konteks menjadi kontribusi global yang berharga. Dunia akademik membutuhkan perspektif yang lahir dari keragaman ekologi dan budaya—dan suara tersebut memiliki tempat yang sah dalam percakapan ilmiah internasional.

Transformasi teknologi akan terus mengubah lanskap penelitian. Artificial Intelligence, analisis spasial canggih, dan pemodelan sistem kompleks membuka peluang yang belum pernah ada sebelumnya. Namun secanggih apa pun teknologi, ia tidak dapat menggantikan disiplin berpikir kritis, kejujuran ilmiah, dan kerendahan hati akademik. Inovasi harus berjalan beriringan dengan prinsip dasar metodologi agar sains tetap berpijak pada integritas.

Sebagai pembaca dan calon kontributor ilmu pengetahuan, Anda tidak hanya diajak untuk menguasai teknik penelitian, tetapi untuk membangun etos ilmiah yang berkelanjutan—etos yang ditandai oleh rasa ingin tahu yang mendalam, ketekunan dalam menghadapi kritik, kolaborasi lintas disiplin, dan komitmen terhadap dampak sosial. Di abad ke-21, kredibilitas dan relevansi tidak dapat dipisahkan. Penelitian harus mampu berbicara kepada komunitas akademik sekaligus kepada masyarakat luas.

Akhirnya, buku ini adalah undangan untuk melampaui batas kenyamanan intelektual. Untuk berpikir lebih tajam, meneliti lebih dalam, dan berkontribusi lebih luas. Di tengah dunia yang mencari arah keberlanjutan, sains yang berkualitas tetap menjadi salah satu fondasi harapan paling kuat. Tanggung jawab kini berada di tangan pembaca—untuk menjadikan pengetahuan sebagai kontribusi, dan penelitian sebagai jalan menuju perubahan yang bermakna bagi bumi dan generasi mendatang.

PERSEMBAHAN

Karya ini saya persembahkan dengan penuh cinta dan rasa syukur kepada suami tercinta, **Muhammad Amin Pelu, S.Hut**, sahabat intelektual sekaligus penopang keteguhan dalam setiap proses panjang yang tidak selalu mudah. Di balik setiap halaman yang tersusun, terdapat doa, kesabaran, dan dukungan tanpa syarat yang menjadi fondasi kekuatan saya untuk terus berpikir, meneliti, dan menulis. Kehadiranmu bukan hanya sebagai pasangan hidup, tetapi sebagai ruang teduh bagi lahirnya gagasan-gagasan yang berani dan visioner.

Untuk putri dan putraku tersayang, **Qyara Ainun Widyagama Pelu** dan **Muhammad Fardzan Athariz Pelu**, buku ini adalah jejak perjalanan yang ingin Bunda wariskan—bahwa ilmu bukan sekadar kumpulan teori, melainkan cahaya yang menuntun manusia untuk memberi makna bagi dunia. Setiap malam yang Bunda habiskan untuk menulis adalah doa agar kalian tumbuh sebagai generasi yang berpikir kritis, berintegritas, dan berani bermimpi melampaui batas zaman.

Di tengah dinamika akademik dan tanggung jawab profesional, keluarga adalah pusat gravitasi yang menjaga arah dan nilai. Dari rumah inilah lahir ketekunan, disiplin, dan semangat untuk tidak berhenti belajar. Kalian adalah alasan mengapa karya ini tidak hanya ditulis untuk memenuhi kewajiban ilmiah, tetapi untuk membangun masa depan yang lebih adil, berkelanjutan, dan bermartabat.

Buku ini menjadi saksi bahwa perempuan dapat berdiri teguh dalam dunia akademik global tanpa meninggalkan kehangatan keluarga. Bahwa kepemimpinan intelektual dapat berjalan seiring dengan cinta dan pengasuhan. Bahwa visi besar tentang keberlanjutan bumi selalu bermula dari nilai-nilai kecil yang diajarkan di rumah.

Kepada suamiku, terima kasih telah menjadi penyeimbang antara idealisme dan realitas. Kepada anak-anakku, terima kasih telah menjadi inspirasi yang menghidupkan harapan. Semoga suatu hari nanti, ketika kalian membaca buku ini, kalian memahami bahwa setiap paragrafnya ditulis dengan keyakinan bahwa generasi kalian mampu membangun dunia yang lebih baik dari hari ini.

Dengan cinta, doa, dan harapan yang tak pernah padam, karya ini adalah persembahan untuk keluarga—akar kekuatan yang memungkinkan setiap mimpi tumbuh dan setiap visi menemukan jalannya.

(Bunda Qyara Zanzan)

DAFTAR ISI

BAB I

LANDASAN FILOSOFIS DAN EPISTEMOLOGIS METODE ILMIAH

Bab ini meletakkan fondasi konseptual yang akan "mengunci" konsistensi seluruh buku: mahasiswa memahami **mengapa** metode ilmiah bekerja, **bagaimana** kebenaran ilmiah dibangun dan diuji, serta **untuk apa** pengetahuan lingkungan diproduksi—mulai dari skripsi hingga publikasi internasional dan rekomendasi kebijakan. Secara pedagogis, Bab I berfungsi sebagai *kompas akademik* yang akan digunakan kembali pada Bab II (perumusan masalah & literatur), Bab III (desain & hipotesis), Bab IV–VI (pengumpulan dan analisis data), hingga Bab VIII (publikasi internasional). Dengan demikian, bab ini dirancang koheren, terintegrasi teori–praktik, dan adaptif terhadap perkembangan teknologi serta tantangan perubahan iklim global.

A. DEFINISI DAN EVOLUSI METODE ILMIAH PERKEMBANGAN HISTORIS DARI INDUKTIVISME HINGGA FALSIFIKASI DAN POST-POSITIVISME.

Metode ilmiah dalam konteks Ilmu Lingkungan tidak sekadar dipahami sebagai rangkaian langkah teknis, melainkan sebagai kerangka epistemologis untuk membangun, menguji, dan merevisi pengetahuan tentang sistem alam dan sosial. Ia merupakan prosedur sistematis yang mencakup observasi, identifikasi masalah, perumusan hipotesis atau model konseptual, pengujian empiris, analisis data, serta evaluasi kritis terhadap hasil yang diperoleh. Dalam pengertian ini, metode ilmiah berfungsi sebagai mekanisme pengendalian diri (*self-correcting mechanism*) dalam sains, memastikan bahwa klaim pengetahuan tidak berdiri atas asumsi subjektif, melainkan pada argumen yang dapat diuji dan dipertanggungjawabkan. Bagi mahasiswa Ilmu Lingkungan, pemahaman ini menjadi fondasi dalam menyusun skripsi yang tidak hanya deskriptif, tetapi argumentatif dan terstruktur secara logis (Creswel, 2013; Sim et al., 2024).

Secara historis, perkembangan metode ilmiah modern banyak dipengaruhi oleh tradisi induktivisme yang dipopulerkan oleh **Francis Bacon** (Alves, 2021; Setianingsih, 2020). Induktivisme menekankan pentingnya akumulasi observasi empiris untuk membangun generalisasi atau hukum alam. Dalam kerangka ini, alam dipandang sebagai sistem yang keteraturannya dapat "dibaca" melalui pengamatan berulang dan eksperimen yang terkontrol. Tradisi ini memberi kontribusi besar pada perkembangan ilmu alam, termasuk ekologi dan hidrologi awal, di mana pola-pola alamiah diidentifikasi melalui pengukuran sistematis. Namun, induktivisme juga menghadapi kritik mendasar: generalisasi dari sejumlah observasi terbatas menuju klaim universal selalu mengandung unsur

BAB II

PERUMUSAN MASALAH DAN STUDI LITERATUR SISTEMATIS

A. IDENTIFIKASI FENOMENA LINGKUNGAN GLOBAL DAN LOKAL POLUSI, DEFORESTASI, PERUBAHAN IKLIM, KETAHANAN AIR, DEGRADASI PESISIR.

Fenomena lingkungan merupakan titik awal yang menentukan arah, kedalaman, dan kontribusi suatu penelitian. Dalam arsitektur metodologi yang koheren, tahap ini berfungsi sebagai fondasi argumentatif sebelum mahasiswa melangkah ke perumusan masalah, identifikasi research gap, dan desain penelitian. Jika Bab I menanamkan kesadaran filosofis tentang bagaimana pengetahuan dibangun, maka sub-bab ini mengoperasionalkannya dalam bentuk pertanyaan paling mendasar: fenomena apa yang layak diteliti dan mengapa fenomena tersebut penting secara ilmiah dan sosial. Dalam konteks global, fenomena seperti perubahan iklim, deforestasi tropis, hilangnya keanekaragaman hayati, polusi plastik laut, krisis ketahanan air, dan degradasi pesisir telah menjadi agenda utama dalam diskursus ilmiah internasional. Laporan-laporan lembaga global seperti IPCC, FAO, UNEP, dan World Bank menunjukkan bahwa masalah lingkungan bersifat lintas batas dan saling terhubung. Namun demikian, setiap fenomena global selalu termanifestasi secara lokal dengan karakteristik yang berbeda—dipengaruhi oleh kondisi biofisik, struktur sosial, kapasitas kelembagaan, serta dinamika ekonomi setempat. Di sinilah relevansi Ilmu Lingkungan sebagai disiplin interdisipliner menjadi nyata (UNEP, 2022; United Nations, 2022).

Identifikasi fenomena tidak dapat didasarkan pada asumsi atau persepsi personal semata. Mahasiswa harus melakukan *preliminary data review* untuk memastikan bahwa fenomena yang dipilih memiliki basis empiris yang kuat. Sumber data dapat meliputi statistik resmi pemerintah, laporan kualitas lingkungan, citra satelit multi-temporal, data hidrologi, serta publikasi ilmiah terkini. Pendekatan berbasis data ini sejalan dengan prinsip evidence-based inquiry yang telah ditekankan pada Bab I, serta menjadi prasyarat bagi penelitian yang siap dipublikasikan pada tingkat internasional. Dalam praktiknya, fenomena lingkungan hampir selalu bersifat sistemik dan multidimensional. Sebagai contoh, peningkatan frekuensi banjir perkotaan tidak hanya berkaitan dengan intensitas curah hujan, tetapi juga perubahan tutupan lahan, sistem drainase, tata ruang, dan perilaku masyarakat. Demikian pula, penurunan kualitas air sungai dapat dipengaruhi oleh limbah domestik, aktivitas industri, erosi lahan, hingga kebijakan pengelolaan DAS. Oleh karena itu, mahasiswa perlu mengembangkan sensitivitas analitis untuk melihat keterkaitan antar komponen sistem, bukan sekadar mengamati gejala permukaan (Demir & Alp, 2025; Restrepo et al., 2024).

BAB III

HIPOTESIS DAN DESAIN PENELITIAN LINGKUNGAN

A. KONSEP VARIABEL DAN HUBUNGAN ANTARVARIABEL VARIABEL INDEPENDEN, DEPENDEN, MODERATOR, MEDIATOR.

Dalam penelitian lingkungan, variabel merupakan representasi operasional dari konsep teoretis yang telah dirumuskan pada Bab II. Konsep seperti "kerentanan banjir", "ketahanan air", atau "degradasi ekosistem" tidak dapat langsung diuji tanpa diterjemahkan ke dalam indikator yang terukur. Variabel menjembatani abstraksi konseptual dan realitas empiris. Dengan demikian, ketepatan dalam mendefinisikan variabel menjadi fondasi utama agar penelitian tidak berhenti pada deskripsi fenomena, melainkan mampu menghasilkan penjelasan yang sistematis dan dapat diuji. Variabel independen (variabel bebas) adalah faktor yang diasumsikan memengaruhi perubahan pada variabel lain (Corfield et al., 2009; Yandell & Anselin, 1990). Dalam konteks Ilmu Lingkungan, variabel independen dapat berupa perubahan tutupan lahan, intensitas curah hujan, kepadatan penduduk, kebijakan tata ruang, atau tingkat emisi karbon. Sebaliknya, variabel dependen (variabel terikat) adalah respons atau hasil yang diukur, seperti debit puncak sungai, konsentrasi polutan, suhu permukaan, indeks kualitas lingkungan, atau tingkat risiko bencana. Hubungan antara keduanya membentuk inti hipotesis yang akan diuji pada tahap analisis. Namun, penelitian lingkungan modern tidak lagi membatasi diri pada hubungan dua variabel secara langsung. Keberadaan variabel mediator dan moderator memperkaya pemahaman terhadap mekanisme kausal. Variabel mediator menjelaskan bagaimana atau melalui jalur apa suatu pengaruh terjadi. Sebagai contoh, perubahan tutupan lahan dapat meningkatkan limpasan permukaan (mediator), yang pada akhirnya meningkatkan risiko banjir (dependen). Variabel moderator, di sisi lain, memengaruhi kekuatan atau arah hubungan tersebut—misalnya kemiringan lereng atau kapasitas drainase yang memperkuat atau melemahkan dampak perubahan lahan terhadap banjir (Sabia et al., 2023; Ullah et al., 2023).

Dalam sistem lingkungan yang kompleks, hubungan antarvariabel jarang bersifat linear dan sederhana. Non-linearitas, ambang batas (threshold), serta umpan balik (feedback loops) merupakan karakteristik umum dalam dinamika sosial-ekologis. Sebagai ilustrasi, peningkatan curah hujan mungkin tidak langsung menyebabkan banjir hingga kapasitas infiltrasi tanah terlampaui. Setelah ambang batas terlewati, dampak dapat meningkat secara eksponensial. Oleh karena itu, mahasiswa perlu mempertimbangkan model relasional yang lebih reflektif terhadap sifat sistemik, termasuk kemungkinan hubungan non-linear atau interaksi antarvariabel (Bennouna et al., 2012; Corfield et al., 2009). Operasionalisasi variabel merupakan langkah krusial yang menentukan kualitas skripsi dan publikasi. Konsep abstrak harus diterjemahkan menjadi indikator yang terukur secara empiris. Misalnya, "ketahanan

BAB IV

TEKNIK PENGUMPULAN DATA BIOFISIK DAN SOSIAL

A. EKSPERIMEN LABORATORIUM LINGKUNGAN

Eksperimen laboratorium merupakan teknik pengumpulan data biofisik yang memungkinkan pengujian variabel dalam kondisi terkontrol dan terstandar. Dalam Ilmu Lingkungan, pendekatan ini banyak digunakan untuk menganalisis kualitas air, tanah, dan udara melalui parameter seperti pH, BOD, COD, TSS, logam berat, kandungan nutrien, atau konsentrasi partikel. Melalui pengendalian suhu, waktu inkubasi, volume sampel, serta prosedur analisis, laboratorium memberikan ruang untuk meminimalkan gangguan eksternal sehingga hubungan antarvariabel dapat diuji dengan presisi tinggi (Majahana et al., 2025; Tito et al., 2020). Keunggulan utama eksperimen laboratorium terletak pada **validitas internal** yang relatif tinggi. Dengan mengisolasi variabel independen dan mengontrol kondisi lingkungan, peneliti dapat menilai pengaruh perlakuan secara lebih meyakinkan dibandingkan pendekatan observasional. Sebagai contoh, pengujian efektivitas media filtrasi berbasis biochar terhadap penurunan kadar logam berat dapat dilakukan dengan membandingkan konsentrasi awal dan akhir dalam sistem reaktor terkontrol. Desain ini memungkinkan evaluasi kausal yang lebih jelas mengenai mekanisme penurunan polutan. Namun demikian, kondisi laboratorium sering kali tidak sepenuhnya merepresentasikan kompleksitas sistem alami di lapangan. Interaksi antara faktor hidrologi, biologis, dan sosial di lingkungan nyata jauh lebih dinamis dan terbuka. Oleh karena itu, hasil eksperimen perlu diinterpretasikan secara hati-hati, dengan menyatakan batas generalisasi secara eksplisit. Dalam buku ini ditekankan bahwa eksperimen laboratorium sebaiknya diposisikan sebagai bagian dari desain integratif yang dapat dilengkapi dengan data lapangan atau pendekatan observasional (Hanasaki et al., 2008; Wiefek et al., 2024).

Standarisasi prosedur melalui **Standard Operating Procedure (SOP)** dan kalibrasi instrumen merupakan fondasi kualitas eksperimen. Spektrofotometer, turbidimeter, inkubator, atau alat AAS/ICP-OES harus dikalibrasi secara berkala untuk memastikan akurasi pengukuran. Kesalahan kecil dalam preparasi sampel atau pengaturan panjang gelombang dapat menghasilkan deviasi signifikan pada hasil. Oleh karena itu, dokumentasi metadata—waktu pengambilan sampel, suhu penyimpanan, reagen yang digunakan—menjadi bagian integral dari prinsip reproducibility dalam standar publikasi internasional. Dalam konteks skripsi sarjana, eksperimen laboratorium dapat dirancang untuk menguji efektivitas teknologi sederhana namun relevan, seperti sistem biofilter, adsorben alami, fitoremediasi, atau inovasi pengolahan limbah berbasis bahan lokal. Integrasi hasil eksperimen dengan kerangka konseptual yang telah dirumuskan pada Bab III memastikan bahwa data yang dihasilkan tidak berdiri sendiri, melainkan menjelaskan mekanisme hubungan antarvariabel

BAB V

ANALISIS DATA KUANTITATIF DAN PEMODELAN LINGKUNGAN

A. STATISTIK DESKRIPTIF DAN INFERENSIAL

Statistik deskriptif merupakan fondasi awal dalam analisis data kuantitatif pada penelitian lingkungan. Pada tahap ini, peneliti menyusun gambaran sistematis mengenai karakteristik dasar dataset, baik yang berasal dari pengukuran biofisik maupun survei sosial. Ukuran pemusatan seperti *mean*, *median*, dan *modus* membantu menjelaskan kecenderungan umum data, sedangkan ukuran penyebaran seperti varians, standar deviasi, dan rentang memperlihatkan tingkat heterogenitas. Dalam konteks Ilmu Lingkungan, ringkasan ini dapat menggambarkan variasi kadar nitrat dalam air tanah, fluktuasi debit sungai musiman, atau distribusi indeks vegetasi pada lanskap tertentu. Namun, statistik deskriptif tidak boleh dipahami sekadar sebagai prosedur ringkasan numerik. Dalam penelitian lingkungan yang kompleks, statistik deskriptif berfungsi sebagai alat eksploratif untuk mengidentifikasi pola awal, kecenderungan musiman, dan potensi anomali. Nilai ekstrem (*outlier*) dapat menjadi indikasi kesalahan instrumen, tetapi juga dapat merepresentasikan kejadian ekologis penting seperti hujan ekstrem, lonjakan polusi, atau kebakaran lahan. Oleh karena itu, interpretasi deskriptif harus dilakukan secara reflektif dan dikaitkan dengan konteks lapangan (Sandra et al., 2025; Sandra & Hariko, 2025).

Visualisasi data merupakan bagian integral dari statistik deskriptif. Grafik histogram, boxplot, diagram sebar (*scatter plot*), dan kurva densitas membantu memperjelas distribusi data dan hubungan awal antarvariabel. Dalam praktik skripsi, visualisasi yang baik meningkatkan kualitas komunikasi ilmiah dan memudahkan pembaca memahami pola data sebelum memasuki analisis inferensial yang lebih kompleks. Setelah tahap deskriptif, penelitian berlanjut pada statistik inferensial yang memungkinkan peneliti menarik kesimpulan tentang populasi berdasarkan sampel. Uji *t*, ANOVA, uji chi-square, dan korelasi Pearson atau Spearman digunakan untuk menguji hipotesis yang telah dirumuskan pada Bab III. Statistik inferensial memberikan dasar objektif untuk menyatakan apakah perbedaan atau hubungan antarvariabel bersifat signifikan secara statistik (Marshall & Jonker, 2011; Surbhi, 2019).

Dalam penelitian lingkungan, inferensi statistik sering kali digunakan untuk menjawab pertanyaan kausal atau komparatif. Misalnya, apakah terdapat perbedaan signifikan kualitas air antara segmen hulu dan hilir sungai? Apakah perubahan tutupan lahan berkorelasi dengan peningkatan limpasan permukaan? Jawaban atas pertanyaan ini harus didukung oleh uji statistik yang sesuai dengan karakteristik data. Penerapan statistik inferensial menuntut pemahaman terhadap asumsi distribusi data. Banyak teknik parametrik mensyaratkan

BAB VI

ANALISIS KUALITATIF DAN SOSIO-LINGKUNGAN

A. CODING TEMATIK DAN *CONTENT ANALYSIS*

Coding tematik merupakan teknik analisis kualitatif yang bertujuan mengidentifikasi pola makna dalam data tekstual, seperti transkrip wawancara, diskusi kelompok terarah, dokumen kebijakan, atau catatan observasi lapangan. Dalam Ilmu Lingkungan, pendekatan ini sangat relevan ketika penelitian berupaya memahami persepsi masyarakat tentang risiko banjir, konflik tata guna lahan, atau strategi adaptasi perubahan iklim. Coding tidak sekadar menandai teks, tetapi merupakan proses konseptualisasi yang menghubungkan pengalaman empiris dengan kerangka teoretis (Schreier, 2024; Treadwell, 2014). Tahap awal dalam coding tematik adalah ***open coding***, yaitu proses memecah data menjadi unit-unit makna yang lebih kecil. Pada tahap ini, peneliti membaca teks secara mendalam dan mengidentifikasi frasa atau pernyataan yang relevan dengan pertanyaan penelitian. Misalnya, dalam studi ketahanan air, pernyataan tentang "kesulitan akses saat musim kemarau" dapat diberi kode awal sebagai "kerentanan musiman." Selanjutnya, dilakukan ***axial coding***, yaitu pengelompokan kode-kode awal ke dalam kategori yang lebih luas dan terstruktur. Kategori tersebut dapat mencakup tema seperti "akses air," "ketimpangan distribusi," atau "respon kelembagaan." Tahap ini mencerminkan integrasi antara data lapangan dan kerangka konseptual yang telah dirumuskan pada Bab II dan III. Tahap lanjutan adalah ***selective coding***, di mana peneliti mengidentifikasi tema inti yang menjadi pusat narasi penelitian. Tema inti ini menghubungkan berbagai kategori menjadi satu struktur penjelasan yang koheren. Dalam konteks sosio-lingkungan, tema inti dapat berupa "ketidakadilan lingkungan" atau "adaptasi berbasis komunitas (Erlingsson & Brysiewicz, 2017; Vaismoradi et al., 2013).

Coding tematik menuntut refleksi kritis dan kesadaran epistemologis. Peneliti harus menyadari bahwa interpretasi dipengaruhi oleh perspektif teoretis dan posisi sosialnya. Oleh karena itu, transparansi dalam proses coding menjadi bagian dari integritas ilmiah. Content analysis memperluas pendekatan kualitatif dengan menambahkan dimensi kuantifikasi. Melalui penghitungan frekuensi kemunculan tema atau kata kunci tertentu, peneliti dapat mengidentifikasi kecenderungan dominan dalam data. Pendekatan ini berguna untuk menganalisis dokumen kebijakan lingkungan atau pernyataan publik tentang isu perubahan iklim. Dalam penelitian kebijakan lingkungan, content analysis dapat digunakan untuk mengevaluasi konsistensi antara dokumen perencanaan dan implementasi di lapangan. Frekuensi penggunaan istilah seperti "keberlanjutan" atau "partisipasi masyarakat" dapat dibandingkan dengan praktik aktual yang teridentifikasi melalui wawancara. Keandalan proses coding memerlukan konsistensi dan dokumentasi sistematis. Penggunaan perangkat lunak seperti NVivo, Atlas.ti, atau MAXQDA membantu mengorganisasi data, menyimpan

BAB VII

INTERPRETASI, IMPLIKASI KEBIJAKAN, DAN REKOMENDASI

A. PRINSIP INTERPRETASI ILMIAH

Interpretasi ilmiah merupakan tahap krusial yang menjembatani data empiris dengan makna teoretis dan implikasi kebijakan. Interpretasi bukan sekadar pengulangan hasil analisis statistik atau ringkasan temuan kualitatif, melainkan proses sintesis yang menghubungkan temuan dengan kerangka konseptual, hipotesis awal, dan diskursus ilmiah yang lebih luas. Dalam Ilmu Lingkungan, interpretasi menentukan apakah penelitian mampu memberikan kontribusi substantif atau hanya berhenti pada deskripsi teknis. Prinsip pertama interpretasi ilmiah adalah konsistensi dengan desain penelitian. Hasil harus dibaca dalam batasan metodologis yang telah dirumuskan pada bab-bab sebelumnya. Jika penelitian menggunakan desain observasional, maka interpretasi tidak boleh melampaui kapasitas inferensi kausal. Disiplin ini menjaga integritas ilmiah dan menghindari klaim berlebihan. Dalam konteks lingkungan, interpretasi harus mempertimbangkan dimensi spasial dan temporal. Sebuah peningkatan debit sungai, misalnya, dapat bermakna berbeda tergantung pada musim, tutupan lahan, atau perubahan penggunaan lahan jangka panjang. Tanpa konteks, angka kehilangan maknanya. Interpretasi yang baik juga membedakan secara tegas antara korelasi dan kausalitas. Banyak studi lingkungan menemukan hubungan signifikan antarvariabel, tetapi tidak semua hubungan tersebut bersifat sebab-akibat. Oleh karena itu, kehati-hatian analitik menjadi prinsip utama dalam menjaga kredibilitas. Prinsip berikutnya adalah integrasi dengan literatur global. Temuan penelitian perlu ditempatkan dalam percakapan ilmiah yang lebih luas. Apakah hasil sejalan dengan studi sebelumnya? Apakah terdapat perbedaan yang dapat dijelaskan oleh konteks lokal? Perbandingan ini meningkatkan posisi akademik penelitian. Interpretasi ilmiah juga memerlukan refleksivitas. Peneliti harus menyadari asumsi yang mungkin memengaruhi analisis dan terbuka terhadap kemungkinan interpretasi alternatif. Dalam penelitian sosio-lingkungan, bias konseptual dapat muncul dari latar belakang disiplin atau perspektif kebijakan tertentu (Chiblow, 2020; Magno et al., 2024).

Koherensi antar bab menjadi indikator kualitas interpretasi. Hasil yang dipaparkan pada Bab V dan VI harus kembali dikaitkan dengan pertanyaan penelitian dan hipotesis pada Bab III. Tanpa hubungan ini, penelitian kehilangan kesinambungan argumentatif. Dalam penelitian kuantitatif, interpretasi tidak berhenti pada nilai p atau koefisien regresi. Peneliti harus menjelaskan arti substantif dari besaran efek (*effect size*) dan relevansinya bagi sistem lingkungan. Sebuah koefisien kecil dapat memiliki dampak besar jika terjadi pada skala luas. Dalam penelitian kualitatif, interpretasi harus melampaui kutipan naratif menuju model

BAB VIII

PUBLIKASI ILMIAH DAN KOMUNIKASI AKADEMIK INTERNASIONAL

A. STRUKTUR ARTIKEL IMRAD

Struktur IMRAD (Introduction, Methods, Results, and Discussion) merupakan kerangka baku dalam publikasi ilmiah internasional yang menjamin alur argumentasi yang sistematis dan transparan. Format ini tidak sekadar konvensi editorial, melainkan representasi logika ilmiah yang menempatkan pertanyaan penelitian, prosedur metodologis, temuan empiris, dan interpretasi konseptual dalam urutan yang dapat diverifikasi. Dalam konteks Ilmu Lingkungan, IMRAD memiliki fungsi strategis karena penelitian seringkali bersifat multidisipliner dan kompleks. Tanpa struktur yang jelas, integrasi antara data biofisik, sosial, dan spasial berisiko kehilangan koherensi. IMRAD memastikan bahwa setiap komponen penelitian memiliki ruang argumentatif yang terdefinisi dengan baik (Barroga & Matanguihan, 2021; Catur et al., 2024).

Bagian ***Introduction*** berfungsi membangun landasan konseptual penelitian. Penulis harus mengidentifikasi research gap secara eksplisit, menunjukkan urgensi isu, serta merumuskan tujuan dan kontribusi ilmiah. Dalam studi lingkungan, penting untuk mengaitkan konteks lokal—misalnya degradasi DAS atau perubahan tutupan lahan—dengan diskursus global seperti climate resilience atau sustainable governance. Pendahuluan yang kuat tidak hanya deskriptif, tetapi argumentatif. Ia menyusun narasi dari masalah umum menuju pertanyaan spesifik yang dapat diuji. Koherensi dengan Bab II dan III dalam buku ini terlihat ketika kerangka teoretis dan hipotesis terformulasi kembali dalam format ringkas dan fokus (Berbel & Expósito, 2020; Camps, 2007).

Bagian ***Methods*** menjadi fondasi kredibilitas penelitian. Di sinilah desain penelitian, teknik pengumpulan data, instrumen, serta prosedur analisis dijelaskan secara rinci. Prinsip reproducibility menuntut agar peneliti lain dapat mereplikasi prosedur tersebut. Dalam penelitian lingkungan, Methods sering mencakup kombinasi survei lapangan, analisis laboratorium, penginderaan jauh, dan wawancara sosial. Penulisan metode harus sistematis dan bebas ambiguitas, termasuk penyebutan perangkat lunak, parameter statistik, serta prosedur validasi data. Transparansi metodologis juga mencerminkan integritas ilmiah. Pelaporan asumsi model, keterbatasan data, serta prosedur kalibrasi memperkuat kualitas publikasi. Standar internasional mengharuskan kejelasan detail teknis (Isurmin, 2025; Seidl & Barthel, 2017).

Bagian ***Results*** menyajikan temuan empiris secara objektif. Pada tahap ini, interpretasi mendalam belum dilakukan. Tabel, grafik, peta, dan visualisasi spasial digunakan untuk menampilkan pola data secara informatif. Dalam Ilmu Lingkungan, hasil dapat berupa

BAB IX

INOVASI METODE PENELITIAN DI ERA DIGITAL DAN AI

Bab ini menegaskan bahwa penelitian lingkungan tidak berhenti pada penyusunan laporan akademik. Penelitian harus dikomunikasikan secara efektif kepada komunitas ilmiah global dan pemangku kepentingan. Kompetensi publikasi menjadi indikator profesionalisme ilmiah mahasiswa Ilmu Lingkungan di era globalisasi pengetahuan.

A. ARTIFICIAL INTELLIGENCE DALAM ANALISIS LINGKUNGAN

Artificial Intelligence (AI) telah merevolusi analisis lingkungan melalui kemampuannya mengidentifikasi pola kompleks dalam dataset besar yang sebelumnya sulit dianalisis dengan metode statistik konvensional. Dalam konteks Ilmu Lingkungan, AI digunakan untuk prediksi banjir, deteksi deforestasi, klasifikasi tutupan lahan, pemodelan kualitas udara, hingga proyeksi perubahan iklim. Transformasi ini menandai pergeseran metodologis dari analisis linier sederhana menuju pendekatan komputasional berbasis pola dan probabilitas. Secara konseptual, AI bekerja melalui algoritma pembelajaran (*machine learning*) yang meniru proses pengambilan keputusan manusia, tetapi dengan kapasitas komputasi jauh lebih tinggi. Model seperti Artificial Neural Networks (ANN), Random Forest, Support Vector Machine (SVM), dan Deep Learning dirancang untuk mengenali hubungan non-linear yang lazim dalam sistem ekologis dan hidrologis. Dalam sistem lingkungan yang penuh interaksi kompleks, pendekatan ini membuka kemungkinan analisis yang lebih adaptif dan prediktif (Khalifa & Albadawy, 2024; Zheltukhina et al., 2024).

Keunggulan utama AI terletak pada kemampuannya memproses **big data** secara simultan dan real-time. Integrasi citra satelit multi-temporal, sensor IoT, data hidrologi, serta variabel sosial-ekonomi dapat dianalisis dalam satu kerangka model. Dalam penelitian lingkungan, ini memungkinkan analisis lintas skala—dari mikro (sensor kelembaban tanah) hingga makro (perubahan tutupan hutan regional). Dalam konteks penginderaan jauh, AI sangat efektif dalam klasifikasi citra berbasis spektral. Algoritma pembelajaran mendalam mampu mengidentifikasi pola reflektansi yang kompleks untuk membedakan hutan primer, hutan sekunder, lahan pertanian, dan kawasan terbangun dengan akurasi tinggi. Integrasi ini memperkuat metodologi pada Bab IV dan Bab V mengenai analisis spasial dan indeks lingkungan. Di bidang hidrologi, AI digunakan untuk memprediksi debit sungai, banjir, atau kekeringan berdasarkan data historis dan variabel meteorologis. Model prediktif berbasis ANN atau Long Short-Term Memory (LSTM) mampu menangkap dinamika time-series yang tidak sepenuhnya linear. Dengan demikian, AI menjadi pelengkap analisis time-series konvensional seperti ARIMA yang dibahas pada bab sebelumnya. Dalam pengelolaan kualitas

BAB X

PENYUSUNAN PROPOSAL, SKRIPSI, DAN PROYEK RISET SARJANA

A. STRUKTUR PROPOSAL PENELITIAN LINGKUNGAN

Proposal penelitian merupakan dokumen konseptual yang memuat rancangan penelitian secara sistematis, terstruktur, dan argumentatif. Dalam konteks Ilmu Lingkungan, proposal bukan sekadar syarat administratif sebelum skripsi dimulai, melainkan fondasi epistemologis yang menentukan kualitas keseluruhan penelitian. Proposal yang kuat mencerminkan kemampuan mahasiswa dalam merumuskan masalah, membangun kerangka teoretis, dan merancang metode yang relevan serta feasible. Struktur proposal yang baik umumnya mencakup: latar belakang, rumusan masalah, tujuan penelitian, manfaat penelitian, tinjauan pustaka, kerangka konseptual atau hipotesis, metodologi penelitian, rencana analisis data, serta jadwal dan rencana anggaran (jika diperlukan). Setiap komponen memiliki fungsi spesifik dan saling terhubung secara logis (Camps, 2007; Jarrah et al., 2023).

Bagian latar belakang berfungsi membangun urgensi ilmiah dan kebijakan. Mahasiswa perlu menunjukkan bahwa isu yang diangkat memiliki relevansi empiris, teoritis, dan kontekstual. Dalam Ilmu Lingkungan, latar belakang harus mengaitkan fenomena lokal dengan dinamika global seperti perubahan iklim, degradasi lahan, atau krisis air. Latar belakang yang kuat tidak berhenti pada deskripsi masalah, tetapi mengarah pada identifikasi *research gap*. Mahasiswa perlu menunjukkan celah pengetahuan yang belum terjawab oleh studi sebelumnya. Inilah titik awal kontribusi ilmiah proposal (Tecson-Mendoza, 2015; R. F. Vieira et al., 2019). Rumusan masalah disusun dalam bentuk pertanyaan penelitian yang jelas, spesifik, dan terukur. Pertanyaan tersebut harus konsisten dengan kerangka konseptual dan metode yang akan digunakan. Proposal yang baik menghindari pertanyaan yang terlalu luas atau normatif. Tujuan penelitian merupakan turunan langsung dari rumusan masalah. Tujuan harus dirumuskan secara operasional dan realistis. Dalam konteks sarjana, ruang lingkup penelitian perlu disesuaikan dengan keterbatasan waktu dan sumber daya. Manfaat penelitian mencakup kontribusi teoretis dan praktis. Kontribusi teoretis menjelaskan bagaimana penelitian memperkuat atau memperluas kerangka konseptual, sedangkan manfaat praktis menjelaskan relevansi hasil terhadap kebijakan atau pengelolaan lingkungan (Catur et al., 2024; Tecson-Mendoza, 2015).

Tinjauan pustaka berfungsi sebagai landasan teoretis dan empiris. Mahasiswa perlu mengkaji literatur terkini dari jurnal bereputasi untuk menunjukkan posisi penelitian dalam diskursus ilmiah global. Kualitas referensi menjadi indikator kesiapan publikasi internasional. Kerangka konseptual atau model penelitian menjelaskan hubungan antar variabel secara sistematis. Pada penelitian kuantitatif, kerangka ini dapat dituangkan dalam diagram model

DAFTAR PUSTAKA

Abalkina, A. (2025). Prevalence of plagiarism in hijacked journals: A text similarity analysis. *Accountability in Research*, *32*(8). https://doi.org/10.1080/08989621.2024.2387210

Abba, A., Sankarannair, S., Ibrahim, Y., & Kaparaju, P. (2026). A participatory approach to water hyacinth management: Enhancing livelihoods and ecosystem sustainability. *Environmental Management*, *76*(1). https://doi.org/10.1007/s00267-025-02314-y

Abdrabo, K. I., Kantoush, S. A., Esmaiel, A., Saber, M., Sumi, T., Almamari, M., Elboshy, B., & Ghoniem, S. (2023). An integrated indicator-based approach for constructing an urban flood vulnerability index as an urban decision-making tool using the PCA and AHP techniques: A case study of Alexandria, Egypt. *Urban Climate*, *48*. https://doi.org/10.1016/j.uclim.2023.101426

Abele-Brehm, A. E., Gollwitzer, M., Steinberg, U., & Schönbrodt, F. D. (2019). Attitudes Toward Open Science and Public Data Sharing: A Survey among Members of the German Psychological Society. In *Social Psychology* (Vol. 50, Issue 4). https://doi.org/10.1027/1864-9335/a000384

Aberson, C. L. (2022). BetterReg: An R package for Useful Regression Statistics. *Journal of Open Source Software*, *7*(74). https://doi.org/10.21105/joss.04280

Achadah, A., & Fadil, M. (2020). Filsafat Ilmu: Pertautan Aktivitas Ilmiah, Metode Ilmiah dan Pengetahuan Sistematis. *Jurnal Pendidikan Islam*, *4*(1 Juni).

Adler, C., Hirsch Hadorn, G., Breu, T., Wiesmann, U., & Pohl, C. (2018). Conceptualizing the transfer of knowledge across cases in transdisciplinary research. *Sustainability Science*, *13*(1). https://doi.org/10.1007/s11625-017-0444-2

Agassi, J. (1963). Empiricism and inductivism. *Philosophical Studies*, *14*(6). https://doi.org/10.1007/BF00424642

Aggarwal, P., Roy, J., Pathak, H., Naresh Kumar, S., Venkateswarlu, B., Ghosh, A., & Ghosh, D. (2022). *Managing Climatic Risks in Agriculture*. https://doi.org/10.1007/978-981-19-0763-0_4

Aguirre, K. A., & Paredes Cuervo, D. (2023). Water Safety and Water Governance: A Scientometric Review. In *Sustainability (Switzerland)* (Vol. 15, Issue 9). https://doi.org/10.3390/su15097164

AHER, A., AHER, V., SHRISHRIMAL, A., CHAVAN, P., & PUNSE, D. (2025). IOT-BASED ENVIRONMENT MONITORING SYSTEM. *International Journal For Multidisciplinary Research*, *7*(6). https://doi.org/10.36948/ijfmr.2025.v07i06.62498

Ahmed, M., Othman, R., Noordin, M. F., Ibrahim, A. A., & Al-Hussaini, A. I. S. (2025). Factors influencing open science participation through research data sharing and reuse among researchers: a systematic literature review. *Knowledge and Information Systems*, *67*(3). https://doi.org/10.1007/s10115-024-02284-3

Al-Marsomi, M. S. K., & Al-Zwainy, F. M. S. (2023). Structural equation modeling of critical success factors in the programs of development regional. *Journal of Project Management (Canada)*, *8*(2). https://doi.org/10.5267/j.jpm.2022.11.002

Alharbi, R. S., Nath, S., Faizan, O. M., Hasan, M. S. U., Alam, S., Khan, M. A., Bakshi, S., Sahana, M., & Saif, M. M. (2022). Assessment of Drought vulnerability through an integrated

approach using AHP and Geoinformatics in the Kangsabati River Basin. *Journal of King Saud University - Science*, *34*(8). https://doi.org/10.1016/j.jksus.2022.102332

Aljuaid, H. (2024). The Impact of Artificial Intelligence Tools on Academic Writing Instruction in Higher Education: A Systematic Review. *Arab World English Journal*, *2024*(Special Issue). https://doi.org/10.24093/awej/ChatGPT.2

Alves, H. N. (2021). Inductivism and Legal Science. *Revista Brasileira de Estudos Politicos*, *123*. https://doi.org/10.9732/2021.V123.733

Amalia, T., & Wachidah, L. (2022). Fixed Effect Panel Spatial Durbin Error Model pada Indeks Pembangunan Manusia di Jawa Barat Tahun 2017-2020. *Bandung Conference Series: Statistics*, *2*(2). https://doi.org/10.29313/bcss.v2i2.3050

Amirzhanov, A., Turan, C., & Makhmutova, A. (2025). Plagiarism types and detection methods: a systematic survey of algorithms in text analysis. In *Frontiers in Computer Science* (Vol. 7). https://doi.org/10.3389/fcomp.2025.1504725

Anderson, M. H., & Lemken, R. K. (2023). Citation Context Analysis as a Method for Conducting Rigorous and Impactful Literature Reviews. *Organizational Research Methods*, *26*(1). https://doi.org/10.1177/1094428120969905

Anderson, M. J. (2001). A new method for non-parametric multivariate analysis of variance. *Austral Ecology*, *26*(1). https://doi.org/10.1046/j.1442-9993.2001.01070.x

Andi Yaksa, R., Fitrah, Y., Kusuma, A., & Ayu Wulandari, B. (2024). POSITIVISME: LANDASAN FILOSOFIS DAN IMPLIKASINYA PADA METODE ILMIAH. *Jurnal Muara Pendidikan*, *9*(2). https://doi.org/10.52060/mp.v9i2.2471

Andrade, C. (2011). How to write a good abstract for a scientific paper or conference presentation. *Indian Journal of Psychiatry*, *53*(2). https://doi.org/10.4103/0019-5545.82558

Andretta, M., Coppola, F., Modelli, A., Santopuoli, N., & Seccia, L. (2017). Proposal for a new environmental risk assessment methodology in cultural heritage protection. *Journal of Cultural Heritage*, *23*. https://doi.org/10.1016/j.culher.2016.08.001

Andure, D. D. (2022). Reading a Scientific Article. *VIMS Health Science Journal*, *9*(1). https://doi.org/10.46858/vimshsj.9101

Annahar, N., Widianingsih, I., Paskarina, C., & Muhtar, E. A. (2023). A bibliometric review of inclusive governance concept. In *Cogent Social Sciences* (Vol. 9, Issue 1). https://doi.org/10.1080/23311886.2023.2168839

Ansari, S. A., & Vidyarthi, V. K. (2025). Use of Internet of Things in water resources applications: challenges and future directions: a critical review. In *Discover Internet of Things* (Vol. 5, Issue 1). https://doi.org/10.1007/s43926-025-00193-7

Antwi, S. H., Rolston, A., Linnane, S., & Getty, D. (2022). Communicating water availability to improve awareness and implementation of water conservation: A study of the 2018 and 2020 drought events in the Republic of Ireland. *Science of the Total Environment*, *807*. https://doi.org/10.1016/j.scitotenv.2021.150865

Anyolitho, M. K., Huyse, T., Masquillier, C., Nyakato, V. N., & Poels, K. (2024). Empowering communities through citizen science and participatory action research: implementation of a schistosomiasis communication campaign in Uganda. *Humanities and Social Sciences Communications*, *11*(1). https://doi.org/10.1057/s41599-024-02714-1

Apeh, O. O., & Nwulu, N. I. (2024). The Food-Energy-Water Nexus Optimization: A Systematic Literature Review. *Research on World Agricultural Economy*, *5*(4). https://doi.org/10.36956/rwae.v5i4.1170

Apipalakul, C., Wirojangud, W., & Ngang, T. K. (2015). Development of Community Participation on Water Resource Conflict Management. *Procedia - Social and Behavioral Sciences*, *186*. https://doi.org/10.1016/j.sbspro.2015.04.048

Apostoloua, A., & Koulaidisb, V. (2010). Epistemology and science education: A study of epistemological views of teachers. *Research in Science and Technological Education*, *28*(2). https://doi.org/10.1080/02635141003750396

Apriani, E., Hamidah Daulay, S., Aprilia, F., Gafur Marzuki, A., Warsah, I., Supardan, D., & Muthmainnah. (2025). A Mixed-Method Study on the Effectiveness of Using ChatGPT in Academic Writing and Students' Perceived Experiences. *Journal of Language and Education*, *11*(1). https://doi.org/10.17323/jle.2025.17913

Archer, R. (2024). Retiring Popper: Critical realism, falsificationism, and the crisis of replication. *Theory and Psychology*, *34*(5). https://doi.org/10.1177/09593543241250079

Arias-Carrión, O. (2024). Guide to write a scientific article. In *Revista Espanola de Geriatria y Gerontologia* (Vol. 59, Issue 1). https://doi.org/10.1016/j.regg.2023.101424

Asbjornsen, H., Goldsmith, G. R., Alvarado-Barrientos, M. S., Rebel, K., Van Osch, F. P., Rietkerk, M., Chen, J., Gotsch, S., Tobón, C., Geissert, D. R., Gómez-Tagle, A., Vache, K., & Dawson, T. E. (2011). Ecohydrological advances and applications in plant-water relations research: A review. In *Journal of Plant Ecology* (Vol. 4, Issues 1–2). https://doi.org/10.1093/jpe/rtr005

Assyakurrohim, D., Ikhram, D., Sirodj, R. A., & Afgani, M. W. (2022). Metode Studi Kasus dalam Penelitian Kualitatif. *Jurnal Pendidikan Sains Dan Komputer*, *3*(01). https://doi.org/10.47709/jpsk.v3i01.1951

Awasthi, S. (2019). Plagiarism and academic misconduct: A systematic review. In *DESIDOC Journal of Library and Information Technology* (Vol. 39, Issue 2). https://doi.org/10.14429/djlit.39.2.13622

Baako, I., Alhassan, H., & Gidisu, P. (2022). Understanding and spotting research gaps through a systematic literature review. *International Journal of Research and Innovation in Social Science*.

Bahnsen, G. L. (1973). Inductivism, inerrancy, and presuppositionalism. *Journal of the Evangelical Theological Society*, *2*.

Bailey, K., Basu, A., & Sharma, S. (2022). The Environmental Impacts of Fast Fashion on Water Quality: A Systematic Review. *Water (Switzerland)*, *14*(7). https://doi.org/10.3390/w14071073

Bakhtiari, V., Piadeh, F., Chen, A. S., & Behzadian, K. (2024). Stakeholder analysis in the application of cutting-edge digital visualisation technologies for urban flood risk management: A critical review. In *Expert Systems with Applications* (Vol. 236). https://doi.org/10.1016/j.eswa.2023.121426

Bargali, H., Pandey, A., Bhatt, D., Sundriyal, R. C., & Uniyal, V. P. (2024). Forest fire management, funding dynamics, and research in the burning frontier: A comprehensive review. In *Trees, Forests and People* (Vol. 16). https://doi.org/10.1016/j.tfp.2024.100526

Barroga, E., & Matanguihan, G. J. (2021). Creating Logical Flow When Writing Scientific Articles. *Journal of Korean Medical Science*, *36*(40). https://doi.org/10.3346/jkms.2021.36.e275

Basu, M., & Dasgupta, R. (2021). Where do we stand now? A bibliometric analysis of water research in support of the sustainable development goal 6. In *Water (Switzerland)* (Vol. 13, Issue 24). https://doi.org/10.3390/w13243591

Becker, J.-M., Klein, K., & Wetzels, M. (2012). Hierarchical Latent Variable Models in PLS-SEM: Guidelines for Using Reflective-Formative Type Models. *Long Range Planning*, *45*, 359–394. https://doi.org/10.1016/j.lrp.2012.10.001

Békés, E. (2019). A Handbook for Exploratory Action Research. *ELT Journal*, *73*(2). https://doi.org/10.1093/elt/ccy058

Belcher, B., & Claus, R. (2025). A quality assessment framework for transdisciplinary research design, monitoring, and evaluation: Guidance for application. *MethodsX*, *14*. https://doi.org/10.1016/j.mex.2025.103264

Bennouna, A., Document, G., E&Y, Hadadin, N., Qaqish, M., Akawwi, E., Bdour, A., Iv, T., Making, L., Happen, I., Yearbook, E. S., America, S., Council, W. E., Journal, I., Scientific, O. F., Lalzad, P., Morrison, J., Morikawa, M., Murphy, M., … UN-Water. (2012). An Overview of the Global Water Problems and Solutions. *Water*, *301*(5).

Berbel, J., & Expósito, A. (2020). The theory and practice of water pricing and cost recovery in the water framework directive. *Water Alternatives*, *13*(3).

Bertule, M., Glennie, P., Bjørnsen, P. K., Lloyd, G. J., Kjellen, M., Dalton, J., Rieu-Clarke, A., Romano, O., Tropp, H., Newton, J., & Harlin, J. (2018). Monitoring water resources governance progress globally: Experiences from monitoring SDG indicator 6.5.1 on integrated water resources management implementation. *Water (Switzerland)*, *10*(12). https://doi.org/10.3390/w10121744

Bezerra, M. O., Vollmer, D., Souter, N. J., Shaad, K., Hauck, S., Marques, M. C., Mtshali, S., Acero, N., Zhang, Y., & Mendoza, E. (2023). Stakeholder engagement and knowledge co-production for better watershed management with the Freshwater Health Index. *Current Research in Environmental Sustainability*, *5*. https://doi.org/10.1016/j.crsust.2022.100206

Birks, M., & Mills, J. (2024). Grounded Theory: A Practical Guide. *QMiP Bulletin*, *1*(37). https://doi.org/10.53841/bpsqmip.2024.1.37.59

Bisol, G. D., Anagnostou, P., Capocasa, M., Bencivelli, S., Cerroni, A., Contreras, J., Enke, N., Fantini, B., Greco, P., Heeney, C., Luzi, D., Manghi, P., Mascalzoni, D., Molloy, J. C., Parenti, F., Wicherts, J. M., & Boulton, G. (2014). Perspectives on open science and scientific data sharing: An interdisciplinary workshop. *Journal of Anthropological Sciences*, *92*(2014). https://doi.org/10.4436/JASS.92006

Blair, P., & Buytaert, W. (2016). Socio-hydrological modelling: A review asking "why, what and how?" *Hydrology and Earth System Sciences*, *20*(1). https://doi.org/10.5194/hess-20-443-2016

Bondarenko, A., & Lapach, S. (2023). Advantages of multivariate regression analysis over ANOVA. *International Scientific and Technical Conference "The Progressive Technics, Technology and Engineering Education," XXIII*. https://doi.org/10.20535/2409-7160.2023.xxiii.278756

Botai, C. M., Botai, J. O., Murambadoro, M., Zwane, N. N., Adeola, A. M., de Wit, J. P., & Adisa, O. M. (2022). Scope, trends and opportunities for sociohydrology research in Africa: A bibliometric analysis. *South African Journal of Science*, *118*(112). https://doi.org/10.17159/sajs.2022/8742

Botero-Valencia, J., García-Pineda, V., Valencia-Arias, A., Valencia, J., Reyes-Vera, E., Mejia-Herrera, M., & Hernández-García, R. (2025). Machine Learning in Sustainable Agriculture: Systematic Review and Research Perspectives. In *Agriculture (Switzerland)* (Vol. 15, Issue 4). https://doi.org/10.3390/agriculture15040377

Boyden, H., Gillan, M., Molina, J., Gadgil, A., & Tseng, W. (2023). Community Perceptions of Arsenic Contaminated Drinking Water and Preferences for Risk Communication in California's San Joaquin Valley. *International Journal of Environmental Research and Public Health*, *20*(1). https://doi.org/10.3390/ijerph20010813

Brandt, P., Ernst, A., Gralla, F., Luederitz, C., Lang, D. J., Newig, J., Reinert, F., Abson, D. J., & Von Wehrden, H. (2013). A review of transdisciplinary research in sustainability science. In *Ecological Economics* (Vol. 92). https://doi.org/10.1016/j.ecolecon.2013.04.008

Bremer, S., & Wagner, P. (2025). A Model at its Limits: The Intergovernmental Panel on Climate Change (IPCC) from the Inside. *European Review*. https://doi.org/10.1017/S1062798725100458

Brennan, M., & Rondón-Sulbarán, J. (2019). Transdisciplinary research: Exploring impact, knowledge and quality in the early stages of a sustainable development project. *World Development*, *122*. https://doi.org/10.1016/j.worlddev.2019.06.001

Brennan, M., Rondón-Sulbarán, J., Sabogal-Paz, L. P., Fernandez-Ibañez, P., & Galdos-Balzategui, A. (2021). Conceptualising global water challenges: A transdisciplinary approach for understanding different discourses in sustainable development. *Journal of Environmental Management*, *298*. https://doi.org/10.1016/j.jenvman.2021.113361

Bridges, T. S., Smith, J. M. K., King, J. K., Simm, J. D., Dillard, M., deVries, J., Reed, D., Piercy, C. D., van Zanten, B., Arkema, K., Swannack, T., de Looff, H., Lodder, Q., Jeuken, C., Ponte, N., Gailani, J. Z., Whitfield, P., Murphy, E., Lowe, R. J., … Naylor, L. A. (2022). Coastal Natural and Nature-Based Features: International Guidelines for Flood Risk Management. *Frontiers in Built Environment*, *8*. https://doi.org/10.3389/fbuil.2022.904483

Brittan, G., & Bandyopadhyay, P. S. (2019). Ecology, Evidence, and Objectivity: In Search of a Bias-Free Methodology. *Frontiers in Ecology and Evolution*, *7*. https://doi.org/10.3389/fevo.2019.00399

Bruno, E. M., & Jessoe, K. (2021). Using price elasticities of water demand to inform policy. In *Annual Review of Resource Economics* (Vol. 13). https://doi.org/10.1146/annurev-resource-110220-104549

Budds, J., & Sultana, F. (2013). Exploring political ecologies of water and development. *Environment and Planning D: Society and Space*, *31*(2).

Budiasih, I. G. A. N. (2014). Metode Grounded Theory dalam Riset Kualitatif. *Jurnal Ilmiah Akuntansi Dan Bisnis*, *09*.

Butt, A. N., & Dimitrijević, B. (2025). Collaborative Transdisciplinary Research, Knowledge Sharing and Governance for Disaster Prevention and Mitigation. *Transdisciplinary Journal of Engineering and Science*, *16*. https://doi.org/10.22545/2025/00274

Bwalya, B., & Mwanza, K. (2025). Co-production of knowledge on climate change, its effects, and adaptation measures: A gender-responsive qualitative study of smallholder farmers. *PLOS Climate*, *4*(8). https://doi.org/10.1371/journal.pclm.0000531

Cabello, V., Romero, D., Musicki, A., Guimarães Pereira, Â., & Peñate, B. (2021). Co-creating narratives for WEF nexus governance: a Quantitative Story-Telling case study in the Canary Islands. In *Sustainability Science* (Vol. 16, Issue 4). https://doi.org/10.1007/s11625-021-00933-y

Cain, T. (2014). The Sage handbook of action research: participative inquiry and practice. *International Journal of Research & Method in Education*, *37*(4). https://doi.org/10.1080/1743727x.2014.937521

Calizaya, A., Meixner, O., Bengtsson, L., & Berndtsson, R. (2010). Multi-criteria decision analysis (MCDA) for integrated water resources management (IWRM) in the Lake Poopo basin, Bolivia. *Water Resources Management*, *24*(10). https://doi.org/10.1007/s11269-009-9551-x

Camps, D. (2007). Scientific article: Since writting begginings to IMRaD. *Revista Cubana de Medicina General Integral*, *3*(5).

Cannata, M., Neumann, J., & Rossetto, R. (2018). Open source GIS platform for water resource modelling: FREEWAT approach in the Lugano Lake. *Spatial Information Research*, *26*(3). https://doi.org/10.1007/s41324-017-0140-4

Caputo, P., Ducoli, C., & Clementi, M. (2014). Strategies and tools for eco-efficient local food supply scenarios. *Sustainability (Switzerland)*, *6*(2). https://doi.org/10.3390/su6020631

Carrera-Villacrés, D., Villacrés, J. L. C., Braun, T., Zhao, Z., Gómez, J., & Quinteros-Carabalí, J. (2020). Fog harvesting and iot based environment monitoring system at the ilalo volcano in ecuador. *International Journal on Advanced Science, Engineering and Information Technology*, *1*. https://doi.org/10.18517/ijaseit.10.1.10775

Castanha, R. G., Grácio, M. C. C., & Perianes-Rodríguez, A. (2024). Co-citation analysis between coupler authors of a scientific domain's citation identity: a case study in scientometrics. *Scientometrics*, *129*(3). https://doi.org/10.1007/s11192-023-04927-8

Catur, A., Suyitno, I., & Nurhadi. (2024). CRITICAL THINKING IN WRITING SCIENTIFIC ARTICLES FOR STUDENTS. *ISCE: Journal of Innovative Studies on Character and Education ISSN 2523-613X*, *8*(1).

Chamara, N., Islam, M. D., Bai, G. (Frank), Shi, Y., & Ge, Y. (2022). Ag-IoT for crop and environment monitoring: Past, present, and future. In *Agricultural Systems* (Vol. 203). https://doi.org/10.1016/j.agsy.2022.103497

Chan, S. W., Abid, S. K., Sulaiman, N., Nazir, U., & Azam, K. (2022). A systematic review of the flood vulnerability using geographic information system. In *Heliyon* (Vol. 8, Issue 3). https://doi.org/10.1016/j.heliyon.2022.e09075

Charmaz, K., & Thornberg, R. (2021). The pursuit of quality in grounded theory. *Qualitative Research in Psychology*, *18*(3). https://doi.org/10.1080/14780887.2020.1780357

Chaudhury, M., Kristjanson, P., Kyagazze, F., Naab, J., & Neelormi, S. (2012). Participatory Gender-Sensitive Approaches for Addressing Key Climate Change-Related Research Issues: Evidence from Bangladesh, Ghana and Uganda. *Ccafs*, *37*(19).

Chaves, A. C., Alonso, A. N., & Soares, A. L. (2026). Data Spaces as Enablers of Digital Twin Ecosystems: Challenges and Requirements. *IFIP Advances in Information and*

Communication Technology, *768 IFIPAICT*. https://doi.org/10.1007/978-3-032-03546-2_23

Chen, C., & Gong, Y. (2025). The Role of AI-Assisted Learning in Academic Writing: A Mixed-Methods Study on Chinese as a Second Language Students. *Education Sciences*, *15*(2). https://doi.org/10.3390/educsci15020141

Chen, W., Hao, X., Lu, J., Yan, K., Liu, J., He, C., & Xu, X. (2021). Research and Design of Distributed IoT Water Environment Monitoring System Based on LoRa. *Wireless Communications and Mobile Computing*, *2021*. https://doi.org/10.1155/2021/9403963

Chen, W. J., Jan, J. F., Chung, C. H., & Liaw, S. C. (2023). Do Eco-Based Adaptation Measures Enhance Ecosystem Adaptation Services? Economic Evidence from a Study of Hillside Forests in a Fragile Watershed in Northeastern Taiwan. *Sustainability (Switzerland)*, *15*(12). https://doi.org/10.3390/su15129685

Cheng, A., Calhoun, A., & Reedy, G. (2025). Artificial intelligence-assisted academic writing: recommendations for ethical use. In *Advances in Simulation* (Vol. 10, Issue 1). https://doi.org/10.1186/s41077-025-00350-6

Chevalier, J., & Buckles, D. (2013). Handbook for Participatory Action Research, planning and Evaluation. *SAS2 Dialogue, Ottawa*, *41*(March).

Chi, G., & Zhu, J. (2008). Spatial regression models for demographic analysis. In *Population Research and Policy Review* (Vol. 27, Issue 1). https://doi.org/10.1007/s11113-007-9051-8

Chiblow, S. (2020). An indigenous research methodology that employs anishinaabek elders, language speakers and women's knowledge for sustainable water governance. *Water (Switzerland)*, *12*(11). https://doi.org/10.3390/w12113058

Chin, W., & Marcoulides, G. (1998). The Partial Least Squares Approach to Structural Equation Modeling. *Modern Methods for Business Research*, *8*.

Chun Tie, Y., Birks, M., & Francis, K. (2019). Grounded theory research: A design framework for novice researchers. *SAGE Open Medicine*, *7*. https://doi.org/10.1177/2050312118822927

Claus, R., Davel, R., Heykoop, C., Pinto, D., & Belcher, B. M. (2023). How to build Theories of Change for transdisciplinary research: Guidance and considerations. *GAIA - Ecological Perspectives for Science and Society*, *32*(1). https://doi.org/10.14512/gaia.32.1.18

Cleland, C. E. (2001). Historical science, experimental science, and the scientific method. *Geology*, *29*(11). https://doi.org/10.1130/0091-7613(2001)029<0987:HSESAT>2.0.CO;2

Cobb, A. D. (2012). Inductivism in Practice: Experiment in John Herschel's Philosophy of Science. *HOPOS: The Journal of the International Society for the History of Philosophy of Science*, *2*(1). https://doi.org/10.1086/663302

Cooke, S. J., Johansson, S., Andersson, K., Livoreil, B., Post, G., Richards, R., Stewart, R., & Pullin, A. S. (2017). Better evidence, better decisions, better environment: emergent themes from the first environmental evidence conference. *Environmental Evidence*, *6*(1). https://doi.org/10.1186/s13750-017-0092-0

Corfield, D., Schölkopf, B., & Vapnik, V. (2009). Falsificationism and statistical learning theory: Comparing the popper and vapnik-chervonenkis dimensions. *Journal for General Philosophy of Science*, *40*(1). https://doi.org/10.1007/s10838-009-9091-3

Corsita, L., Marganingrum, D., & Iriyanto, S. M. (2024). Participatory action research method of drinking water supply framework innovation for local indigenous community in Indonesia. *E3S Web of Conferences*, *485*. https://doi.org/10.1051/e3sconf/202448504014

Cowey, A. (2007). Water industry value framework. *IET Seminar Digest*, *2007*(11804). https://doi.org/10.1049/ic:20070562

Crawford, P. S., Al-Zarrad, M. A., Graettinger, A. J., Hainen, A. M., Back, E., & Powell, L. (2018). Rapid disaster data dissemination and vulnerability assessment through synthesis of a web-based extreme event viewer and deep learning. *Advances in Civil Engineering*, *2018*. https://doi.org/10.1155/2018/7258156

Cresswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). In *SAGE Publications*.

Creswel, J. W. (2013). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. In *Research design Qualitative quantitative and mixed methods approaches*.

Creswell, W. John & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. *Sage*, *53*(9).

Creswell, J. W. (2003). A framework for design. Research design: Qualitative, quantitative, and mixed methods approaches. *Political Science & Politics*, *44*(04).

Creswell, J. W., & Inoue, M. (2025). A process for conducting mixed methods data analysis. *Journal of General and Family Medicine*, *26*(1). https://doi.org/10.1002/jgf2.736

Creswell John, C. D. (2023). Research Design, Qualitative, Quantitative and Mixed Methods Approaches. In *SAGE Publications,Inc.: Vol. Sixth* (Issue 1).

Creswell John W., & Creswell J. David. (2023). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. In *Thousand Oaks, CA:*

Curran-Everett, D. (2011). Explorations in statistics: Regression. *American Journal of Physiology - Advances in Physiology Education*, *35*(4). https://doi.org/10.1152/advan.00051.2011

Dai, J., Wu, S., Han, G., Weinberg, J., Xie, X., Wu, X., Song, X., Jia, B., Xue, W., & Yang, Q. (2018). Water-energy nexus: A review of methods and tools for macro-assessment. *Applied Energy*, *210*. https://doi.org/10.1016/j.apenergy.2017.08.243

Dai, Z. W. (2022). Meta-analytic structural equation modeling: a primer. *Medical Data Mining*, *5*(2). https://doi.org/10.53388/MDM20220520010

Dal Barco, M. K., Furlan, E., Pham, H. V., Torresan, S., Zachopoulos, K., Kokkos, N., Sylaios, G., & Critto, A. (2024). Multi-scenario analysis in the Apulia shoreline: A multi-tiers analytical framework for the combined evaluation and management of coastal erosion and water quality risks. *Environmental Science and Policy*, *153*. https://doi.org/10.1016/j.envsci.2023.103665

Davies, P. J., & Wright, I. A. (2014). A review of policy, legal, land use and social change in the management of urban water resources in Sydney, Australia: A brief reflection of challenges and lessons from the last 200 years. *Land Use Policy*, *36*. https://doi.org/10.1016/j.landusepol.2013.09.009

Day, A. M., O'Shay, S., Islam, K., Seeger, M. W., Sperone, F. G., & McElmurry, S. P. (2024). Boil water notices as health-risk communication: risk perceptions, efficacy, and compliance

during winter storm Uri. *Scientific Reports*, *14*(1). https://doi.org/10.1038/s41598-023-50286-y

Day, R. A. (1998). How to Write and Publish Scientific Papers. *Memórias Do Instituto Oswaldo Cruz*, *93*(3). https://doi.org/10.1590/s0074-02761998000300029

Day, R. a, & Gastel, B. (2006). How to Write and Publish a Scientific Paper (How to Write and Publish a Scientific Paper. In *Medical Physics* (Vol. 7, Issue 5).

Dayioğlu, M. A., & Türker, U. (2021). Digital transformation for sustainable future-agriculture 4.0: A review. In *Tarim Bilimleri Dergisi* (Vol. 27, Issue 4). https://doi.org/10.15832/ankutbd.986431

de Castro-Pardo, M., Cabello, J. M., Martín, J. M., & Ruiz, F. (2023). A multi reference point based index to assess and monitor European water policies from a sustainability approach. *Socio-Economic Planning Sciences*, *89*. https://doi.org/10.1016/j.seps.2022.101433

de Melo, M. B., Daldegan-Bueno, D., Menezes Oliveira, M. G., & de Souza, A. L. (2022). Beyond ANOVA and MANOVA for repeated measures: Advantages of generalized estimated equations and generalized linear mixed models and its use in neuroscience research. *European Journal of Neuroscience*, *56*(12). https://doi.org/10.1111/ejn.15858

DE Souza, A. P., De Melo, R. R., Castagna, D., & Stangerlin, D. M. (2024). Nativa Journal: consolidation and contributions to scientific dissemination. In *Nativa* (Vol. 12, Issue 1). https://doi.org/10.31413/nat.v12i1.17169

de Souza Bispo, M. (2023). Scientific Articles' Theoretical, Practical, Methodological, and Didactic Contributions. In *Revista de Administracao Contemporanea* (Vol. 27, Issue 1). https://doi.org/10.1590/1982-7849rac2023220256.en

De Strasser, L., Lipponen, A., Howells, M., Stec, S., & Bréthaut, C. (2016). A methodology to assess thewater energy food ecosystems nexus in transboundary river basins. *Water (Switzerland)*, *8*(2). https://doi.org/10.3390/w8020059

Demir, E., & Alp, E. (2025). A framework for assessing the circular economy potential in the water and agriculture sectors in Türkiye through the water-energy-food-ecosystem nexus. *Sustainable Production and Consumption*, *54*. https://doi.org/10.1016/j.spc.2025.01.009

Deppisch, S., & Hasibovic, S. (2013). Social-ecological resilience thinking as a bridging concept in transdisciplinary research on climate-change adaptation. *Natural Hazards*, *67*(1). https://doi.org/10.1007/s11069-011-9821-9

Derryberry, D. W., Aho, K., Edwards, J., & Peterson, T. (2018). Model Selection and Regression t-Statistics. In *American Statistician* (Vol. 72, Issue 4). https://doi.org/10.1080/00031305.2018.1459316

Dhawale, R., Schuster-Wallace, C. J., & Pietroniro, A. (2024). Assessing the multidimensional nature of flood and drought vulnerability index: A systematic review of literature. *International Journal of Disaster Risk Reduction*, *112*(February), 104764. https://doi.org/10.1016/j.ijdrr.2024.104764

Di Baldassarre, G., Viglione, A., Carr, G., Kuil, L., Salinas, J. L., & Blöschl, G. (2013). Socio-hydrology: Conceptualising human-flood interactions. *Hydrology and Earth System Sciences*, *17*(8). https://doi.org/10.5194/hess-17-3295-2013

Díez, J. A. (2011). On Popper's strong inductivism (or strongly inconsistent anti-inductivism). *Studies in History and Philosophy of Science Part A*, *42*(1). https://doi.org/10.1016/j.shpsa.2010.11.023

DiFilippo, R. M., David, C. P., & Bosher, L. (2022). Groundwater Vulnerability Indicator Assessment of Karst Island Water Resources: Enhancement of the Freshwater Lens Assessment Protocol. *Water (Switzerland)*, *14*(24). https://doi.org/10.3390/w14244071

Dillera-Prejoles, M. J. (2025). Analyzing the Conclusion Sections of Language Research Articles in Asia: A Move-Based Approach. *Pedagogy Review: An International Journal of Educational Theories, Approaches and Strategies*, *4*(2). https://doi.org/10.62718/vmca.pr-ijetas.4.2.sc-0125-019

Diver, S., Eitzel, M. V., Fricke, S., & Hillman, L. (2022). Networked Sovereignty: Polycentric Water Governance and Indigenous Self-determination in the Klamath Basin. *Water Alternatives*, *15*(2).

Djenontin, I. N. S., Daher, B., Johnson, J. W., Adule, K., Hishe, B. K., Kekirunga, P., King, V., Mullaney, E. G., Nimushaba, P., Jacobson, M. G., Huber-Lee, A., Kayendeke, E. J., Konak, A., Morrone, V. L., Obonyo, E., Sanya, L. N., Olabisi, L. S., Jiménez, S. U., & Scott, C. A. (2025). Coproducing water-energy-food Nexus actionable knowledge: Lessons from a multi-actor collaborative learning school in Uganda, East Africa. *Environmental Science and Policy*, *166*. https://doi.org/10.1016/j.envsci.2025.104028

Dong, S., Ahmed, M., & Chatpattananan, V. (2025). Analysis of Key Factors of Cost Overrun in Construction Projects Based on Structural Equation Modeling. *Sustainability (Switzerland)*, *17*(5). https://doi.org/10.3390/su17052119

Draper, P. (2001). Handbook of Action Research – Participative Inquiry and Practice edited by Peter Reason. *Journal of Advanced Nursing*, *34*(4).

Du, P., Li, X., Cao, W., Luo, Y., & Zhang, H. (2010). Monitoring urban land cover and vegetation change by multi-temporal remote sensing information. *Mining Science and Technology*, *20*(6). https://doi.org/10.1016/S1674-5264(09)60308-2

Duan, M., Song, X., Liu, X., Cui, D., & Zhang, X. (2022). Mapping the soil types combining multi-temporal remote sensing data with texture features. *Computers and Electronics in Agriculture*, *200*. https://doi.org/10.1016/j.compag.2022.107230

Dube, T. V. (2025). Research data management in academic libraries: institutional repositories as a reservoir for research data. *Library Management*, *46*(5). https://doi.org/10.1108/LM-06-2024-0070

Dunn, G., Bos, J. J., & Brown, R. R. (2018). Mediating the science-policy interface: Insights from the urban water sector in Melbourne, Australia. *Environmental Science and Policy*, *82*. https://doi.org/10.1016/j.envsci.2018.02.001

Durán-Sánchez, A., del Río-Rama, M. de la C., Álvarez-García, J., & Castellano-álvarez, F. J. (2019). Scientific coverage in water governance: Systematic analysis. *Water (Switzerland)*, *11*(1). https://doi.org/10.3390/w11010177

Ecarnot, F., Seronde, M. F., Chopard, R., Schiele, F., & Meneveau, N. (2015). Writing a scientific article: A step-by-step guide for beginners. *European Geriatric Medicine*, *6*(6). https://doi.org/10.1016/j.eurger.2015.08.005

Edenhofer, O., & Seyboth, K. (2013). Intergovernmental Panel on Climate Change (IPCC). In *Encyclopedia of Energy, Natural Resource, and Environmental Economics* (Vols. 1–3). https://doi.org/10.1016/B978-0-12-375067-9.00128-5

Edington, J. (2017). Indigenous environmental knowledge: Reappraisal. In *Indigenous Environmental Knowledge: Reappraisal*. https://doi.org/10.1007/978-3-319-62491-4

Eliakimu, E. S., & Mans, L. (2022). Addressing Inequalities Toward Inclusive Governance for Achieving One Health: A Rapid Review. In *Frontiers in Public Health* (Vol. 9). https://doi.org/10.3389/fpubh.2021.755285

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1). https://doi.org/10.1111/j.1365-2648.2007.04569.x

Emerson, R. W. (2018). Manova (Multivariate analysis of variance): An expanded form of the anova (analysis of variance). In *Journal of Visual Impairment and Blindness* (Vol. 112, Issue 1). https://doi.org/10.1177/0145482x1811200113

Enayati, M., A.P., D., R.C., A., Prashanth, V., H.V., P., Kushalappa, M., Mohan, R., & Arlikatti, S. (2025). Combining Participatory Rural Appraisal with "Circles of Sustainability" for rural development: A field investigation in India. *Journal of Cleaner Production*, *530*. https://doi.org/10.1016/j.jclepro.2025.146763

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. In *African Journal of Emergency Medicine* (Vol. 7, Issue 3). https://doi.org/10.1016/j.afjem.2017.08.001

Fang, X., Li, J., & Ma, Q. (2023). Integrating green infrastructure, ecosystem services and nature-based solutions for urban sustainability: A comprehensive literature review. In *Sustainable Cities and Society* (Vol. 98). https://doi.org/10.1016/j.scs.2023.104843

Farias, M. de O., Cirilo, J. A., & Ribeiro Neto, A. (2025). Unmanned Aerial Vehicles (UAVS) in Water Resources Management: A Systematic Review. *Revista de Gestão Social e Ambiental*, *19*(5). https://doi.org/10.24857/rgsa.v19n5-059

Fatima, B. . M. A. F. U. H. (2023). Policy Brief Sustainable Development Goal 6: Setting the Course Right. Pakistan Council of Research in Water Resources (PCRWR),Islamabad, pp.46. In *… Council of Research in Water …*.

Fattah, J., Ezzine, L., Aman, Z., El Moussami, H., & Lachhab, A. (2018). Forecasting of demand using ARIMA model. *International Journal of Engineering Business Management*, *10*. https://doi.org/10.1177/1847979018808673

Favretto, N., Afionis, S., Stringer, L. C., Dougill, A. J., Quinn, C. H., & Ranarijaona, H. L. T. (2020). Delivering climate-development co-benefits through multi-stakeholder forestry projects in Madagascar: Opportunities and challenges. *Land*, *9*(5). https://doi.org/10.3390/LAND9050157

Florena, F. F., Irwansyah, F. S., & Karman, K. (2021). The Future of Water: Technology, Challenges, and Islamic Perspective. *Jurnal Kajian Peradaban Islam*, *4*(2). https://doi.org/10.47076/jkpis.v4i2.70

Foad, E. S., Heng, C. S., & Abdullah, A. N. (2014). Discourse functions of grammatical subject in results and discussion sections of research article across four disciplines. *Journal of Writing Research*, *6*(2). https://doi.org/10.17239/jowr-2014.06.02.2

Forouharfar, A., Rowshan, S. A., & Salarzehi, H. (2018). An epistemological critique of social entrepreneurship definitions. *Journal of Global Entrepreneurship Research*, *8*(1). https://doi.org/10.1186/s40497-018-0098-2

Forsyth, T. (2020). Who Shapes the Politics of Expertise? Co-Production and Authoritative Knowledge in Thailand's Political Forests. *Antipode*, *52*(4). https://doi.org/10.1111/anti.12545

Fortin, M. J., James, P. M. A., MacKenzie, A., Melles, S. J., & Rayfield, B. (2012). Spatial statistics, spatial regression, and graph theory in ecology. *Spatial Statistics*, *1*. https://doi.org/10.1016/j.spasta.2012.02.004

Frické, M. (2009). The knowledge pyramid: A critique of the DIKW hierarchy. *Journal of Information Science*, *35*(2). https://doi.org/10.1177/0165551508094050

Friesen, J., Rodriguez Sinobas, L., Foglia, L., & Ludwig, R. (2017). Environmental and socio-economic methodologies and solutions towards integrated water resources management. In *Science of the Total Environment* (Vols. 581–582). https://doi.org/10.1016/j.scitotenv.2016.12.051

Fritsch, O., & Benson, D. (2020). Mutual learning and policy transfer in integrated water resources management: A research agenda. In *Water (Switzerland)* (Vol. 12, Issue 1). https://doi.org/10.3390/w12010072

Fritz, L., & Binder, C. R. (2020). Whose knowledge, whose values? An empirical analysis of power in transdisciplinary sustainability research. *European Journal of Futures Research*, *8*(1). https://doi.org/10.1186/s40309-020-0161-4

Fu, Z., Zhang, J., & Tang, B. H. (2024). Multi-Temporal Snow-Covered Remote Sensing Image Matching via Image Transformation and Multi-Level Feature Extraction. *Optics*, *5*(4). https://doi.org/10.3390/opt5040029

Gagliardi, V., Tosti, F., Bianchini Ciampoli, L., Battagliere, M. L., D'Amato, L., Alani, A. M., & Benedetto, A. (2023). Satellite Remote Sensing and Non-Destructive Testing Methods for Transport Infrastructure Monitoring: Advances, Challenges and Perspectives. In *Remote Sensing* (Vol. 15, Issue 2). https://doi.org/10.3390/rs15020418

Gai, D. H. B., Shittu, E., Ethan Yang, Y. C., & Li, H.-Y. (2022). A Comprehensive Review of the Nexus of Food, Energy, and Water Systems: What the Models Tell Us. *Journal of Water Resources Planning and Management*, *148*(6). https://doi.org/10.1061/(asce)wr.1943-5452.0001564

Gaonkar, S. R., Shetty, S., & Sriraksha, S. (2025). Big Data Analytics and Predictive Modeling for Climate Change Impact Assessment. *Proceedings of the 6th International Conference on Inventive Research in Computing Applications, ICIRCA 2025*. https://doi.org/10.1109/ICIRCA65293.2025.11089870

Gebrehiwot, G. H., Bekitie, K. T., Yohannes, H., Anose, F. A., & Gebremichael, H. B. (2024). Time series land use/land cover mapping and change detection to support policies on sustainable environmental and economic management. *Environmental Systems Research*, *13*(1). https://doi.org/10.1186/s40068-024-00365-4

Gebrehiwot, S. G., Bewket, W., & Bishop, K. (2014). Community perceptions of forest–water relationships in the Blue Nile Basin of Ethiopia. *GeoJournal*, *79*(5). https://doi.org/10.1007/s10708-013-9519-5

George, D. R., Kuiken, T., & Delborne, J. A. (2019). Articulating "free, prior and informed consent" (FPIC) for engineered gene drives. *Proceedings of the Royal Society B: Biological Sciences*, *286*(1917). https://doi.org/10.1098/rspb.2019.1484

Gergen, K. J., & Gergen, M. M. (2014). The SAGE Handbook of Action Research. Participative Inquiry and Practice. Second Edition. In *Sage Publications*.

Ghauri, P., Grønhaug, K., & Strange, R. (2020). Research Methods in Business Studies. In *Research Methods in Business Studies*. https://doi.org/10.1017/9781108762427

Ghosh, P. (2023). Virtual physical digital twin ecosystem. *US Patent App. 17/407,467*.

Ghosh, S. (2020). Forecasting of demand using ARIMA model. *American Journal of Applied Mathematics and Computing*, *1*(2). https://doi.org/10.15864/ajamc.124

Giordano, R., Osann, A., Henao, E., López, M. L., Piqueras, J. G., Nikolaidis, N. P., Lilli, M., Coletta, V. R., & Pagano, A. (2025). Causal Loop Diagrams for bridging the gap between Water-Energy-Food-Ecosystem Nexus thinking and Nexus doing: Evidence from two case studies. *Journal of Hydrology*, *650*. https://doi.org/10.1016/j.jhydrol.2024.132571

Giulianelli, A., Burattini, S., Ciortea, A., & Ricci, A. (2025). HWoDT Framework: A toolchain to build interoperable Digital Twin Ecosystems. *SoftwareX*, *31*. https://doi.org/10.1016/j.softx.2025.102275

Giupponi, C., Mysiak, J., & Sgobbi, A. (2011). Participatory Modelling and Decision Support for Natural Resources Management in Climate Change Research. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1304007

Glago, F. J. (2019). Household disaster awareness and preparedness: A case study of flood hazards in Asamankese in the West Akim Municipality of Ghana. *Jamba: Journal of Disaster Risk Studies*, *11*(1). https://doi.org/10.4102/JAMBA.V11I1.789

Gosselink, P., & Thompson, J. (1997). Application of Participatory Rural Appraisal Methods for Action Research on Water Management. *IIMI*, *(Short Report series on locally managed irrigation*, *18)*.

Grootjans, A. P. (2017). Paludiculture – Productive Use of Wet Peatlands. *Restoration Ecology*, *25*(4). https://doi.org/10.1111/rec.12568

Gunawan, D., & Astika, W. (2022). The Autoregressive Integrated Moving Average (ARIMA) Model for Predicting Jakarta Composite Index. *Jurnal Informatika Ekonomi Bisnis*. https://doi.org/10.37034/infeb.v4i1.114

Gurzki, H., & Woisetschläger, D. M. (2017). Mapping the luxury research landscape: A bibliometric citation analysis. *Journal of Business Research*, *77*. https://doi.org/10.1016/j.jbusres.2016.11.009

Gustafsson, A., Högström, C., Radnor, Z., Friman, M., Heinonen, K., Jaakkola, E., & Mele, C. (2016). Developing service research – paving the way to transdisciplinary research. *Journal of Service Management*, *27*(1). https://doi.org/10.1108/JOSM-03-2015-0098

Gustavsen, B., Hansson, A., & Qvale, T. U. (2014). Action Research and the Challenge of Scope. In *The SAGE Handbook of Action Research*. https://doi.org/10.4135/9781848607934.n10

Haddaway, N. R., Bernes, C., Jonsson, B. G., & Hedlund, K. (2016). The benefits of systematic mapping to evidence-based environmental management. *Ambio*, *45*(5). https://doi.org/10.1007/s13280-016-0773-x

Hagemann, N., & Kirschke, S. (2017). Key issues of interdisciplinary NEXUS governance analyses: Lessons learned from research on integrated water resources management. *Resources*, *6*(1). https://doi.org/10.3390/resources6010009

Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. In *European Business Review* (Vol. 26, Issue 2). https://doi.org/10.1108/EBR-10-2013-0128

Hamilton, V. (2017). Cite them right: the essential referencing guide (10th edition). *Reference Reviews*, *31*(1). https://doi.org/10.1108/rr-08-2016-0211

Hanasaki, N., Kanae, S., Oki, T., Masuda, K., Motoya, K., Shirakawa, N., Shen, Y., & Tanaka, K. (2008). An integrated model for the assessment of global water resources – Part 1: Model description and input meteorological forcing. *Hydrology and Earth System Sciences*, *12*(4).

Handayani, V. A., Railis, R. M., Sunarsono, H., Azzahra, N., Iby, I. C., Abral, H., Rushdan, A. I., Salit, M. S., & Azka, M. A. (2025). Comparison of Tensile Properties Data Analyzed Using ANOVA and MANOVA Methods: Case Study Data of PVA-Gambir Blend Film. *Pertanika Journal of Science and Technology*, *33*(1). https://doi.org/10.47836/pjst.33.1.24

Harris, J. E., Sheean, P. M., Gleason, P. M., Bruemmer, B., & Boushey, C. (2012). Publishing nutrition research: A review of multivariate techniques-part 2: Analysis of variance. *Journal of the Academy of Nutrition and Dietetics*, *112*(1). https://doi.org/10.1016/j.jada.2011.09.037

Harwood, S. A. (2018). In search of a (WEF) nexus approach. *Environmental Science and Policy*, *83*. https://doi.org/10.1016/j.envsci.2018.01.020

Haulussy, R., Latuamury, B., & Iskar, I. (2024). Analisis Pemangku Kepentingan (Stakeholder) Terhadap Pengelolaan Sumberdaya Air Das Wae Batu Merah Kota Ambon. *Makila*, *18*(1), 52–67. https://doi.org/10.30598/makila.v18i1.10561

Haupt, S. E., Gagne, D. J., Hsieh, W. W., Krasnopolsky, V., McGovern, A., Marzban, C., Moninger, W., Lakshmanan, V., Tissot, P., & Williams, J. K. (2022). The History and Practice of AI in the Environmental Sciences. In *Bulletin of the American Meteorological Society* (Vol. 103, Issue 5). https://doi.org/10.1175/BAMS-D-20-0234.1

Hayes, A. (2024). Autoregressive Integrated Moving Average (ARIMA) Prediction Model. In *Investopedia*.

Hidayah, N. R., & Indrasetianingsih, A. (2019). Analisis Regresi Spatial Durbin Model (SDM) untuk Pemodelan Kemiskinan Provinsi Jawa Timur Tahun 2017. *J Statistika: Jurnal Ilmiah Teori Dan Aplikasi Statistika*, *12*(1). https://doi.org/10.36456/jstat.vol12.no1.a1994

Hidayah, Z., Rachman, H. A., & As-Syakur, A. R. (2022). Mapping of mangrove forest and carbon stock estimation of east coast Surabaya, Indonesia. *Biodiversitas*, *23*(9). https://doi.org/10.13057/biodiv/d230951

Hilario, E. C. R., Lazarte, E. G. F., Rojas, E. U. A., & Carcausto-Calla, W. (2025). Critical Thinking in Academic Writing at the University: A Scoping Review. *Journal of Educational and Social Research*, *15*(4). https://doi.org/10.36941/jesr-2025-0135

Hines, R. D. (1988). Popper's Methodology of Falsificationism and Accounting Research. *Accounting Review*, *63*(4).

Hjørland, B. (2013). Citation analysis: A social and dynamic approach to knowledge organization. *Information Processing and Management*, *49*(6). https://doi.org/10.1016/j.ipm.2013.07.001

Hoffmann, S., Thompson Klein, J., & Pohl, C. (2019). Linking transdisciplinary research projects with science and practice at large: Introducing insights from knowledge utilization. In *Environmental Science and Policy* (Vol. 102). https://doi.org/10.1016/j.envsci.2019.08.011

Hofmann, B., Fischer, M., Ingold, K., Lieberherr, E., & Hoffmann, S. (2025). Knowledge Cumulation at Science-Policy Interfaces: Opportunities for Environmental Governance Research. *Environmental Policy and Governance*, *35*(3). https://doi.org/10.1002/eet.2155

Holmatov, B., Lautze, J., & Uhlenbrook, S. (2023). The nexus across water, energy and food (WEF): Learning from research, building on evidence, strengthening practice. *Natural Resources Forum*, *47*(4). https://doi.org/10.1111/1477-8947.12352

Holtz, P., & Monnerjahn, P. (2017). Falsificationism is not just 'potential' falsifiability, but requires 'actual' falsification: Social psychology, critical rationalism, and progress in science. *Journal for the Theory of Social Behaviour*, *47*(3). https://doi.org/10.1111/jtsb.12134

Hong, S. T. (2014). Ten tips for authors of scientific articles. *Journal of Korean Medical Science*, *29*(8). https://doi.org/10.3346/jkms.2014.29.8.1035

Hooker, C., Capon, A., & Leask, J. (2017). Communicating about risk: Strategies for situations where public concern is high but the risk is low. *Public Health Research and Practice*, *27*(1). https://doi.org/10.17061/phrp2711709

Horobet, A., Botoroga, C. A., Rahat, B., & Girlovan, A. (2025). Charting the waters: a bibliometric analysis of blue economy research. In *Review of Accounting and Finance*. https://doi.org/10.1108/RAF-01-2025-0014

Hossain, M. B., & Mertig, A. G. (2020). Socio-structural forces predicting global water footprint: socio-hydrology and ecologically unequal exchange. *Hydrological Sciences Journal*, *65*(4). https://doi.org/10.1080/02626667.2020.1714052

Howarth, C., & Monasterolo, I. (2017). Opportunities for knowledge co-production across the energy-food-water nexus: Making interdisciplinary approaches work for better climate decision making. *Environmental Science and Policy*, *75*. https://doi.org/10.1016/j.envsci.2017.05.019

Hsieh, W. W. (2022). Evolution of machine learning in environmental science - A perspective. *Environmental Data Science*, *1*. https://doi.org/10.1017/eds.2022.2

Huberty, C. J., & Morris, J. D. (1989). Multivariate Analysis Versus Multiple Univariate Analyses. *Psychological Bulletin*, *105*(2). https://doi.org/10.1037/0033-2909.105.2.302

Hysaj, A., Dean, B. A., & Freeman, M. (2025). Exploring the purposes and uses of generative artificial intelligence tools in academic writing for multicultural students. *Higher Education Research and Development*, *44*(7). https://doi.org/10.1080/07294360.2025.2488862

Ikegwu, A. C., Nweke, H. F., Mkpojiogu, E., Anikwe, C. V., Igwe, S. A., & Alo, U. R. (2024). Recently emerging trends in big data analytic methods for modeling and combating climate change effects. In *Energy Informatics* (Vol. 7, Issue 1). https://doi.org/10.1186/s42162-024-00307-5

Ilmonen, K. (2016). Book review: Intersectionality (Patricia Hill Collins and Sirma Bilge). *European Journal of Women's Studies*, *249*.

Intan, N. R., & Sulistiyawan, E. (2018). Spatial Autoregressive Model untuk Pemodelan Angka Harapan Hidup (AHH) di Provinsi Jawa Timur. *J Statistika: Jurnal Ilmiah Teori Dan Aplikasi Statistika*, *11*(2). https://doi.org/10.36456/jstat.vol11.no2.a2178

İri, R., & Ünal, E. (2024). Bibliometric Analysis Bibliometric Analysis of Research (1980-2023). *Ahi Evran Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *10*(2). https://doi.org/10.31592/aeusbed.1446738

Islam Bhuiyan, M. R., Faraji, M. R., Rashid, M., Bhuyan, M. K., Hossain, R., & Ghose, P. (2024). Digital Transformation in SMEs Emerging Technological Tools and Technologies for Enhancing the SME's Strategies and Outcomes. *Journal of Ecohumanism*, *3*(4). https://doi.org/10.62754/joe.v3i4.3594

Isurmin, I. (2025). Systematic Literature Review Metode Ilmiah. *Journal of Innovation in Teaching and Instructional Media*, *5*(2). https://doi.org/10.52690/jitim.v5i2.1028

Jacobson, M. R., Baker, S. N., Yang, Y., Childs, J., Wang, Z., & Garbrecht, L. S. (2024). Data Sharing and Evaluation: Evaluation's Role in Improving the Quality of Open Science Data Sharing Platforms. *New Directions for Evaluation*, *2024*(184). https://doi.org/10.1002/ev.20621

Jan, F., Min-Allah, N., & Düştegör, D. (2021). Iot based smart water quality monitoring: Recent techniques, trends and challenges for domestic applications. In *Water (Switzerland)* (Vol. 13, Issue 13). https://doi.org/10.3390/w13131729

Jaravani, F. G., Massey, P. D., Judd, J., Taylor, K. A., Allan, J., Allan, N., Durrheim, D. N., & Oelgemoeller, M. (2017). Working with an aboriginal community to understand drinking water perceptions and acceptance in rural New South Wales. *International Indigenous Policy Journal*, *8*(3). https://doi.org/10.18584/iipj.2017.8.3.4

Jarrah, A. M., Wardat, Y., & Fidalgo, P. (2023). Using ChatGPT in academic writing is (not) a form of plagiarism: What does the literature say? *Online Journal of Communication and Media Technologies*, *13*(4). https://doi.org/10.30935/ojcmt/13572

Jayaraman, P., Nagarajan, K. K., Partheeban, P., & Krishnamurthy, V. (2024). Critical review on water quality analysis using IoT and machine learning models. *International Journal of Information Management Data Insights*, *4*(1). https://doi.org/10.1016/j.jjimei.2023.100210

JEET, P., GHODKI, B. M., AMAT, D., R, A. A., BALODI, R., & UPADHYAYA, A. (2020). Enhancement of Land and Water Productivity through Participatory Rural Appraisal. *Journal of AgriSearch*, *7*(04). https://doi.org/10.21921/jas.v7i04.19396

Jimma, B. L. (2023). Artificial intelligence in healthcare: A bibliometric analysis. In *Telematics and Informatics Reports* (Vol. 9). https://doi.org/10.1016/j.teler.2023.100041

John, C., & Creswell David. (2014). Research design: qualitative, quantitative, and mixed methods approaches. *Sage Publications*, *16*(4).

Jonsson, E., Todorović, A., Blicharska, M., Francisco, A., Grabs, T., Sušnik, J., & Teutschbein, C. (2024). An introduction to data-driven modelling of the water-energy-food-ecosystem nexus. *Environmental Modelling and Software*, *181*. https://doi.org/10.1016/j.envsoft.2024.106182

Juhola, S., Huotari, E., Kolehmainen, L., Silfverberg, O., & Korhonen-Kurki, K. (2024). Knowledge brokering at the environmental science-policy interface — examining structure and activity. *Environmental Science and Policy*, *153*. https://doi.org/10.1016/j.envsci.2024.103672

Jumanto, J., Waluyo, D. E., Purwatiningsih, A. P., Andono, P. N., Nugroho, R. A., Ramayanti, I., & Minghat, A. D. Bin. (2024). IMRAD, Synthesis, and Hedging within Expert Academic

Writing to Encourage a World Discussion Platform. *Studies in English Language and Education*, *11*(3). https://doi.org/10.24815/siele.v11i3.34776

Kabisch, N., Frantzeskaki, N., Pauleit, S., Naumann, S., Davis, M., Artmann, M., Haase, D., Knapp, S., Korn, H., Stadler, J., Zaunberger, K., & Bonn, A. (2016). Nature-based solutions to climate change mitigation and adaptation in urban areas: Perspectives on indicators, knowledge gaps, barriers, and opportunities for action. *Ecology and Society*, *21*(2). https://doi.org/10.5751/ES-08373-210239

Kabisch, N., Selsam, P., Kirsten, T., Lausch, A., & Bumberger, J. (2019). A multi-sensor and multi-temporal remote sensing approach to detect land cover change dynamics in heterogeneous urban landscapes. *Ecological Indicators*, *99*. https://doi.org/10.1016/j.ecolind.2018.12.033

Kagan, C., Burton, M., & Siddiquee, A. (2006). The Handbook of Action Research - Introduction. *Handbook of Qualitative Research Methods in Psychology*.

Kaizer, J. V., de Souza, R. C. T., & Aylon, L. B. R. (2022). Quantitative Models for Forecasting Demand for Perishable Products: A Systematic Review. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *13788 LNAI*. https://doi.org/10.1007/978-3-031-22419-5_33

Kantartzis, A. (2023). Implementation of multi-criteria evaluation for mapping the spatial variability of optimal forest road network. *International Journal of Sustainable Agricultural Management and Informatics*, *9*(3). https://doi.org/10.1504/IJSAMI.2023.131908

Karabulut, A. A., Crenna, E., Sala, S., & Udias, A. (2018). A proposal for integration of the ecosystem-water-food-land-energy (EWFLE) nexus concept into life cycle assessment: A synthesis matrix system for food security. *Journal of Cleaner Production*, *172*. https://doi.org/10.1016/j.jclepro.2017.05.092

Kashiha, H. (2015). Recurrent formulas and moves in writing research article conclusions among native and nonnative writers. *3L: Language, Linguistics, Literature*, *21*(1). https://doi.org/10.17576/3L-2015-2101-05

Kemmis, S., & Mctaggart, R. (2005). PARTICIPATORY ACTION RESEARCH Communicative Action and the Public Sphere. *The Sage Handbook of Qualitative Research* , *3*.

Khalifa, M., & Albadawy, M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. In *Computer Methods and Programs in Biomedicine Update* (Vol. 5). https://doi.org/10.1016/j.cmpbup.2024.100145

Khalilzadeh, M., Banihashemi, S. A., Heidari, A., Božanić, D., & Milić, A. (2025). Risk Analysis and Assessment of Water Supply Projects Using the Fuzzy DEMATEL-ANP and Artificial Neural Network Methods. *Water (Switzerland)*, *17*(13). https://doi.org/10.3390/w17131995

Kidd, S. A., & Kral, M. J. (2005). Practicing participatory action research. In *Journal of Counseling Psychology* (Vol. 52, Issue 2). https://doi.org/10.1037/0022-0167.52.2.187

Kim, J., Yu, S., Detrick, R., & Li, N. (2025). Exploring students' perspectives on Generative AI-assisted academic writing. *Education and Information Technologies*, *30*(1). https://doi.org/10.1007/s10639-024-12878-7

Kokkonen, K., Hannola, L., Rantala, T., Ukko, J., Saunila, M., & Rantala, T. (2023). Preconditions and benefits of digital twin-based business ecosystems in manufacturing.

International Journal of Computer Integrated Manufacturing, *36*(5). https://doi.org/10.1080/0951192X.2022.2145022

Koskinen, J., Knaapi-Junnila, S., Helin, A., Rantanen, M. M., & Hyrynsalmi, S. (2023). Ethical governance model for the data economy ecosystems. *Digital Policy, Regulation and Governance* , *25*(3). https://doi.org/10.1108/DPRG-01-2022-0005

Kotsou, G. (2023). Functional informality: crafting social interaction toward scientific productivity at the Gordon Research Conferences, 1950-1980. *British Journal for the History of Science*, *56*(4). https://doi.org/10.1017/S0007087423000389

Koutsovili, E. I., Tzoraki, O., Kalli, A. A., Provatas, S., & Gaganis, P. (2023). Participatory approaches for planning nature-based solutions in flood vulnerable landscapes. *Environmental Science and Policy*, *140*. https://doi.org/10.1016/j.envsci.2022.11.012

Kozitsyn, A. S. (2024). About the Criteria for Ranking Conferences. *Russian Digital Libraries Journal*, *27*(6). https://doi.org/10.26907/1562-5419-2024-27-6-1001-1030

Kozlov, A., & Stuart, M. T. (2024). Scientific experimental articles are modernist stories. *European Journal for Philosophy of Science*, *14*(3). https://doi.org/10.1007/s13194-024-00592-7

Kramer, A., & Pahl-Wostl, C. (2014). The global policy network behind integrated water resources management: Is it an effective norm diffusor? *Ecology and Society*, *19*(4).

Kruijf, J. V. de, Verbrugge, L., Schröter, B., den Haan, R. J., Cortes Arevalo, J., Fliervoet, J., Henze, J., & Albert, C. (2022). Knowledge co-production and researcher roles in transdisciplinary environmental management projects. *Sustainable Development*, *30*(2). https://doi.org/10.1002/sd.2281

Kumar, P., Liu, W., Chu, X., Zhang, Y., & Li, Z. (2019). Integrated water resources management for an inland river basin in China. In *Watershed Ecology and the Environment* (Vol. 1). https://doi.org/10.1016/j.wsee.2019.10.002

Kumar, V., & Mishra, N. (2023). Sustainable watering of the watershed: a qualitative analysis of the Choral River Revival Project in Narmada Basin, India. *Development in Practice*, *33*(1). https://doi.org/10.1080/09614524.2021.1958164

Lackner, M., Sajjadi, B., & Chen, W. Y. (2022). Handbook of Climate Change Mitigation and Adaptation: Third Edition. In *Handbook of Climate Change Mitigation and Adaptation: Third Edition*. https://doi.org/10.1007/978-3-030-72579-2

Lagodiienko, N., Rybalko, S., & Bendasiuk, O. (2025). THEORETICAL ASPECTS OF FORMING A DIGITAL TOOLKIT FOR MONITORING RISKY FARMING IN THE CONTEXT OF WATER RESOURCE MANAGEMENT. *Energy Saving. Power Engineering. Energy Audit.*, *1 (204)*. https://doi.org/10.20998/2313-8890.2025.01.06

Lahay, R. J., Koem, S., & Nasib, S. K. (2020). Adaptasi Perubahan Iklim Berbasis Masyarakat Melalui Pendekatan Ekosistem Di Desa Ilodulunga Kabupaten Gorontalo Utara. *Jurnal Penelitian Dan Pengabdian Kepada Masyarakat UNSIQ*, *7*(2), 170–178. https://doi.org/10.32699/ppkm.v7i2.980

Lai, C., Sun, H., Wu, X., Li, J., Wang, Z., Tong, H., & Feng, J. (2024). Water availability may not constrain vegetation growth in Northern Hemisphere. *Agricultural Water Management*, *291*. https://doi.org/10.1016/j.agwat.2023.108649

Lalwani, N. (2025). Plagiarism in Publications: All about Being Fair! In *Indian Journal of Radiology and Imaging* (Vol. 35, Issue 1). https://doi.org/10.1055/s-0044-1791745

Lang, D. J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., Swilling, M., & Thomas, C. J. (2012). Transdisciplinary research in sustainability science: Practice, principles, and challenges. *Sustainability Science*, *7*(SUPPL. 1). https://doi.org/10.1007/s11625-011-0149-x

Latuamury, B. (2013). HUBUNGAN ANTARA INDEKS VEGETASI NDVI (NORMALIZED DIFFERENCE VEGETATION INDEX) DAN KOEFISIEN RESESI BASEFLOW PADA BEBERAPA SUBDAS PROPINSI JAWA TENGAH DAN DAERAH ISTIMEWA YOGYAKARTA. *Jurnal Teknosains*, *2*(2). https://doi.org/10.22146/teknosains.5998

Latuamury, B., Aponno, H. S. E. S., Marasabessy, H., Hadijah, M. H., & Imlabla, W. (2020). The spatial dynamics of land cover change along the Wallacea corridor in the key biodiversity area 'Buano Island', Maluku, Indonesia. *Journal of Degraded and Mining Lands Management*, *7*(4). https://doi.org/10.15243/JDMLM.2020.074.2241

Latuamury, B., Imlabla, W. N., Sahusilawane, F., & Marasabessy, H. (2025). Spatial Patterns of NDVI Vegetation Greenness Index and NDWI Water Content Index Using Sentinel 2A Imagery. *IOP Conference Series: Earth and Environmental Science*, *1527*(1). https://doi.org/10.1088/1755-1315/1527/1/012002

Latuamury, B., Imlabla, W. N., Sahusilawane, J. F., & Marasabessy, H. (2023). One-Way ANOVA Test of Five Digital Filter Recursive Graphic Methods in Baseflow Separation on Wae Tomu Watershed Ambon City. *AIP Conference Proceedings*, *2588*(January). https://doi.org/10.1063/5.0111720

Latuamury, B., Marasabessy, H., Talaohu, M., & Imlabla, W. (2021). Small island watershed morphometric and hydrological characteristics in Ambon Region, Maluku Province. *IOP Conference Series: Earth and Environmental Science*, *800*(1). https://doi.org/10.1088/1755-1315/800/1/012047

Latuamury, B., Parera, L. R., & Marasabessy, H. (2020). Characterizing river baseflow recession using linear reservoir model in Alang Watershed, Central Java, Indonesia. *Indonesian Journal of Geography*, *52*(1), 22–28. https://doi.org/10.22146/ijg.43565

Latuamury, B., & Talaohu, M. (2021). Correlating Spatial Pattern of Canopy Greenness Derived from the NDVI with Hydrological Characteristics of Small Island Watersheds. *Journal of Geographical Studies*, *5*(1). https://doi.org/10.21523/gcj5.21050101

Latuamury, B., Talaohu, M., Sahusilawane, F., & Imlabla, W. N. (2021). Correlation of normalized difference water index and baseflow index in small island watershed landscapes. *IOP Conference Series: Earth and Environmental Science*, *883*(1). https://doi.org/10.1088/1755-1315/883/1/012072

Lazarides, M. K., Lazaridou, I. Z., & Papanas, N. (2025). Bibliometric Analysis: Bridging Informatics With Science. In *International Journal of Lower Extremity Wounds* (Vol. 24, Issue 3). https://doi.org/10.1177/15347346231153538

Le Heron, R., Lundquist, C. J., Logie, J., Blackett, P., Heron, E. Le, Awatere, S., & Hyslop, J. (2022). A socio-ecological appraisal of perceived risks associated with mangrove (Mānawa) management in Aotearoa New Zealand. *New Zealand Journal of Marine and Freshwater Research*, *56*(3). https://doi.org/10.1080/00288330.2022.2097270

Lei, K., Huang, S., Fang, J., Huang, J., Xie, Y., & Peng, B. (2020). Intelligent Eco Networking (IEN): Knowledge-Driven and Value-Oriented Future Internet Infrastructure. *Yingyong Kexue Xuebao/Journal of Applied Sciences*, *38*(1). https://doi.org/10.3969/j.issn.0255-8297.2020.01.012

Lhosupasirirat, P., Dahdouh-Guebas, F., Hugé, J., Wodehouse, D., & Enright, J. (2023). Stakeholder perceptions on Community-Based Ecological Mangrove Restoration (CBEMR): a case study in Thailand. *Restoration Ecology*, *31*(5). https://doi.org/10.1111/rec.13894

Liao, C., Li, Y., Guo, R., & Li, X. (2025). Artificial intelligence for spatial analysis in cities. *Cities*, *167*. https://doi.org/10.1016/j.cities.2025.106334

Liisa Swantz, M. (2008). Participatory Action Research as Practice In: The SAGE Handbook of Action Research. In *The SAGE Handbook of Action Research*.

Lilhare, S., & Sanodiya, P. (2025). Participatory Technology Development (PTD) in Agronomic Research and Extension. *Journal of Extension Systems*, *40*(1). https://doi.org/10.48165/jes.2024.40.1.4

Lim, W. M., & Kumar, S. (2024). Guidelines for interpreting the results of bibliometric analysis: A sensemaking approach. *Global Business and Organizational Excellence*, *43*(2). https://doi.org/10.1002/joe.22229

Lin, C. H., & Chiu, J. Y. (2016). Romanization of referencing styles for Arts & Humanities Science Journals in Taiwan. *Journal of Educational Media and Library Sciences*, *53*(3). https://doi.org/10.6120/JoEMLS.2016.533/0048

Liu, J. (2025). Integrating Big Data Analytics and Visualization in Ocean Circulation Modeling for Climate and Ecosystem Insights. *Theoretical and Natural Science*, *84*(1). https://doi.org/10.54254/2753-8818/2025.21024

Liu, J., & Xiao, L. (2022). A multi-dimensional analysis of conclusions in research articles: Variation across disciplines. *English for Specific Purposes*, *67*. https://doi.org/10.1016/j.esp.2022.04.003

Liu, L., Cheng, W., & Kuo, H. W. (2025). A Narrative Review on Smart Sensors and IoT Solutions for Sustainable Agriculture and Aquaculture Practices. In *Sustainability (Switzerland)* (Vol. 17, Issue 12). https://doi.org/10.3390/su17125256

Liu, Y., Fang, Y., Hu, H., Tian, F., Dong, Z., & Ali Khan, M. Y. (2020). Ecohydrological separation hypothesis: Review and prospect. In *Water (Switzerland)* (Vol. 12, Issue 8). https://doi.org/10.3390/W12082077

Lopez-Alvarez, B., Urbano-Peña, M. A., Moran-Ramírez, J., Ramos-Leal, J. A., & Tuxpan-Vargas, J. (2020). Estimation of the environment component of the Water Poverty Index via remote sensing in semi-arid zones. *Hydrological Sciences Journal*, *65*(16). https://doi.org/10.1080/02626667.2020.1839081

Lu, P., Sun, Y., & Steffen, N. (2023). Scenario-based performance assessment of green-grey-blue infrastructure for flood-resilient spatial solution: A case study of Pazhou, Guangzhou, greater Bay area. *Landscape and Urban Planning*, *238*. https://doi.org/10.1016/j.landurbplan.2023.104804

Lund, J. R. (2021). Approaches to Planning Water Resources. *Journal of Water Resources Planning and Management*, *147*(9). https://doi.org/10.1061/(asce)wr.1943-5452.0001417

Mach, K. J., & Siders, A. R. (2021). Reframing strategic, managed retreat for transformative climate adaptation. In *Science* (Vol. 372, Issue 6548). https://doi.org/10.1126/science.abh1894

Mafi-Gholami, D., Frazier, T. G., Heydari, M., Danekar, A., & Nouri-kamari, A. (2026). A socio-ecological resilience index (SERI) framework for multi-hazard exposure: Insights from

the Persian Gulf and Gulf of Oman. *Ocean and Coastal Management*, *272*. https://doi.org/10.1016/j.ocecoaman.2025.108011

Magazzino, C. (2024). The impact of deep learning on environmental science. *BMC Environmental Science*, *1*(1). https://doi.org/10.1186/s44329-024-00003-5

Magno, F., Cassia, F., & Ringle, C. M. (2024). A brief review of partial least squares structural equation modeling (PLS-SEM) use in quality management studies. *TQM Journal*, *36*(5). https://doi.org/10.1108/TQM-06-2022-0197

Majahana, J. M., Kalumba, A. M., Zhou, L., Mazinyo, S. P., & Afuye, G. A. (2025). Global trend analysis of climate change adaptation policy and governance in the water sector. *Discover Sustainability*, *6*(1). https://doi.org/10.1007/s43621-025-01111-1

Malley, Z. J. U., Taeb, M., Matsumoto, T., & Takeya, H. (2009). Environmental sustainability and water availability: Analyses of the scarcity and improvement opportunities in the Usangu plain, Tanzania. *Physics and Chemistry of the Earth*, *34*(1–2). https://doi.org/10.1016/j.pce.2008.02.034

Mandavilli, S. R. (2024). Forging "Methodological Inductivism" in the Interests of Better Science: Encouraging Methodological Inductivism as a Harbinger of Meaningful Change in Different Kinds of Scientific Endeavour. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4725952

Marinova, S., Bach, V., Link, A., & Finkbeiner, M. (2025). Criticality assessment of global freshwater resource use: Adapting abiotic resource criticality frameworks – Water SCARCE. *Science of the Total Environment*, *966*. https://doi.org/10.1016/j.scitotenv.2025.178676

Marquet, P. A., Allen, A. P., Brown, J. H., Dunne, J. A., Enquist, B. J., Gillooly, J. F., Gowaty, P. A., Green, J. L., Harte, J., Hubbell, S. P., O'Dwyer, J., Okie, J. G., Ostling, A., Ritchie, M., Storch, D., & West, G. B. (2014). On theory in ecology. In *BioScience* (Vol. 64, Issue 8). https://doi.org/10.1093/biosci/biu098

Marshall, G., & Jonker, L. (2011). An introduction to inferential statistics: A review and practical guide. In *Radiography* (Vol. 17, Issue 1). https://doi.org/10.1016/j.radi.2009.12.006

Martínez-García, A., Alvarez-Romero, C., Román-Villarán, E., Bernabeu-Wittel, M., & Luis Parra-Calderón, C. (2023). FAIR principles to improve the impact on health research management outcomes. *Heliyon*, *9*(5). https://doi.org/10.1016/j.heliyon.2023.e15733

Martínez-Harms, M. J., Estévez, R. A., & Álvarez-Miranda, E. (2024). Conservation triage in action: Planning, governance and knowledge co-production for biodiversity protection. *Journal of Applied Ecology*, *61*(10). https://doi.org/10.1111/1365-2664.14763

Martinez-Hernandez, E., Leach, M., & Yang, A. (2017). Understanding water-energy-food and ecosystem interactions using the nexus simulation tool NexSym. *Applied Energy*, *206*. https://doi.org/10.1016/j.apenergy.2017.09.022

Mas'uddin, Karlinasari, L., Pertiwi, S., & Erizal. (2023). Urban Heat Island Index Change Detection Based on Land Surface Temperature, Normalized Difference Vegetation Index, Normalized Difference Built-Up Index: A Case Study. *Journal of Ecological Engineering*, *24*(11). https://doi.org/10.12911/22998993/171371

Mashala, M. J., Dube, T., Mudereri, B. T., Ayisi, K. K., & Ramudzuli, M. R. (2023). A Systematic Review on Advancements in Remote Sensing for Assessing and Monitoring Land Use and Land Cover Changes Impacts on Surface Water Resources in Semi-Arid Tropical

Environments. In *Remote Sensing* (Vol. 15, Issue 16). https://doi.org/10.3390/rs15163926

Mason, R. J., Johnson, M. F., Wohl, E., Russell, C. E., Olden, J. D., Polvi, L. E., Rice, S. P., Hemsworth, M. J., Sponseller, R. A., & Thorne, C. R. (2025). Rebalancing River Lateral Connectivity: An Interdisciplinary Focus for Research and Management. In *Wiley Interdisciplinary Reviews: Water* (Vol. 12, Issue 1). https://doi.org/10.1002/wat2.1766

Mata, D. A. da, Silva, T. B. da, Macena, R. A., Pereira, F. M., Veloso, F. de S., De Sá, C. H., Oliveira, I. R. de, & Silva, G. de F. da. (2025). Application of Digital Technologies in Horticulture. *Fronteira: Journal of Social, Technological and Environmental Science*, *14*(4). https://doi.org/10.21664/2238-8869.2025v14i4.8337

McCabe, M. F., Rodell, M., Alsdorf, D. E., Miralles, D. G., Uijlenhoet, R., Wagner, W., Lucieer, A., Houborg, R., Verhoest, N. E. C., Franz, T. E., Shi, J., Gao, H., & Wood, E. F. (2017). The future of Earth observation in hydrology. *Hydrology and Earth System Sciences*, *21*(7). https://doi.org/10.5194/hess-21-3879-2017

McGregor, D. (2012). Traditional knowledge: Considerations for protecting water in Ontario. *International Indigenous Policy Journal*, *3*(3). https://doi.org/10.18584/iipj.2012.3.3.11

Megdal, S. B., Eden, S., & Shamir, E. (2017). Water governance, stakeholder engagement, and sustainable water resources management. In *Water (Switzerland)* (Vol. 9, Issue 3). https://doi.org/10.3390/w9030190

Memar, S., Jiang, E., Prado, V. F., Saksida, L. M., Bussey, T. J., & Prado, M. A. M. (2023). Open science and data sharing in cognitive neuroscience with MouseBytes and MouseBytes+. *Scientific Data*, *10*(1). https://doi.org/10.1038/s41597-023-02106-1

Meran, G., Siehlow, M., & von Hirschhausen, C. (2021). Integrated Water Resource Management: Principles and Applications. In *Springer Water*. https://doi.org/10.1007/978-3-030-48485-9_3

Mick, M. M. A. P., Kovaleski, J. L., & Chiroli, D. M. de G. (2024). Sustainable Digital Transformation Roadmaps for SMEs: A Systematic Literature Review. In *Sustainability (Switzerland)* (Vol. 16, Issue 19). https://doi.org/10.3390/su16198551

Milasari, M., Syukri, A., Badarussyamsi, B., & Fadhil Rizki, A. (2021). Filsafat Ilmu dan Pengembangan Metode Ilmiah. *Jurnal Filsafat Indonesia*, *4*(3). https://doi.org/10.23887/jfi.v4i3.35499

Miles, D. A. (2017). A taxonomy of research gaps:Identifying and defining the seven research gaps. *Journal of Research Methods and Strategies*, *August*.

Mills, J., Bonner, A., & Francis, K. (2006). The Development of Constructivist Grounded Theory. *International Journal of Qualitative Methods* , *5*(1). https://doi.org/10.1177/160940690600500103

Min, J., & Lee, H. (2023). Utilizing Big Data Analysis in Problem Finding of Design Thinking: Deriving Meaning from Climate Change in South Korea Using LDA Topic Modeling. *Archives of Design Research*, *36*(4). https://doi.org/10.15187/ADR.2023.11.36.4.211

Mireku, D. O., Dzamesi, P. D., & Bervell, B. (2024). Plagiarism in Higher Education (PLAGiHE) within Sub-Saharan Africa: A systematic review of a decade (2012–2022) literature. In *Research Ethics* (Vol. 20, Issue 2). https://doi.org/10.1177/17470161231189646

Misra, D. P., Gasparyan, A. Y., Zimba, O., Yessirkepov, M., Agarwal, V., & Kitas, G. D. (2021). Formulating Hypotheses for Different Study Designs. *Journal of Korean Medical Science*, *36*(50). https://doi.org/10.3346/jkms.2021.36.e338

Moiroux-Arvis, L., Royer, L., Sarramia, D., De Sousa, G., Claude, A., Latour, D., Roussel, E., Voldoire, O., Chardon, P., Vandaële, R., Améglio, T., & Chanet, J. P. (2023). ConnecSenS, a Versatile IoT Platform for Environment Monitoring: Bring Water to Cloud. *Sensors*, *23*(6). https://doi.org/10.3390/s23062896

Mondal, I., Hossain, S. A., Roy, S. K., Karmakar, J., Jose, F., De, T. K., Nguyen, T. T., Elkhrachy, I., & Nguyen, N. M. (2024). Assessing intra and interannual variability of water quality in the Sundarban mangrove dominated estuarine ecosystem using remote sensing and hybrid machine learning models. *Journal of Cleaner Production*, *442*. https://doi.org/10.1016/j.jclepro.2024.140889

Monico-Gonzalez, V., Martinez-Domingo, D., & Gomez-Martin, E. (2024). Towards sustainable water-energy-food-ecosystems governance: an integrating participatory approach and systems modelling for co-exploring the nexus. *EGU24*.

Moore, S. (2013). Issue Brief: Water Resource Issues, Policy and Politics in China. *The Brookings Institute*.

Morante, M. C. D., Casas, A. F., & Rodríguez, C. M. (2025). Adaptive Water Management from a Socio-Ecological Perspective: A Systematic Review of Co-Learning Strategies and Traditional Knowledge. In *Sustainability (Switzerland)* (Vol. 17, Issue 21). https://doi.org/10.3390/su17219597

Morchid, A., El Alami, R., Raezah, A. A., & Sabbar, Y. (2024). Applications of internet of things (IoT) and sensors technology to increase food security and agricultural Sustainability: Benefits and challenges. *Ain Shams Engineering Journal*, *15*(3). https://doi.org/10.1016/j.asej.2023.102509

Moreno, C. S., Roman-Cuesta, R. M., Canty, S. W. J., Herrera, J., Teutli, C., Muñiz-Castillo, A. I., McField, M., Soto, M., do Amaral, C., Paton, S., González-Trujillo, J. D., Poulter, B., Schumacher, M., & Durán-Díaz, P. (2022). Stakeholders' Perceptions of Nature-Based Solutions for Hurricane Risk Reduction Policies in the Mexican Caribbean. *Land*, *11*(10). https://doi.org/10.3390/land11101701

Moreno Vargas, D. C., Quiñones Hoyos, C. del P., & Hernández Manrique, O. L. (2023). The water-energy-food nexus in biodiversity conservation: A systematic review around sustainability transitions of agricultural systems. In *Heliyon* (Vol. 9, Issue 7). https://doi.org/10.1016/j.heliyon.2023.e17016

Morgan, D. L. (2020). Pragmatism as a basis for grounded theory. *Qualitative Report*, *25*(1). https://doi.org/10.46743/2160-3715/2020.3993

Morrison, M., Merlo, K., & Woessner, Z. (2020). How to Boost the Impact of Scientific Conferences. *Cell*, *182*(5). https://doi.org/10.1016/j.cell.2020.07.029

Moulaert, F., MacCallum, D., Mehmood, A., & Hamdouch, A. (2014). THE international handbook on social innovation: Collective action, social learning and transdisciplinary research. *Revija Za Socijalnu Politiku*, *21*(3). https://doi.org/10.3935/rsp.v21i3.1225

Mshana, S., E. Mosha, G., & O. Siyao, P. (2023). Evaluation of APA Citation and Referencing Style for Dissertations Uploaded in the Mzumbe University Institutional Repository. *Sustainability (Switzerland)*, *11*(1).

Mukarram, M. M. T., Kafy, A. Al, Mukarram, M. M. T., Rukiya, Q. U., Almulhim, A. I., Das, A., Fattah, M. A., Rahman, M. T., & Chowdhury, M. A. (2023). Perception of coastal citizens on the prospect of community-based rainwater harvesting system for

sustainable water resource management. *Resources, Conservation and Recycling*, *198*. https://doi.org/10.1016/j.resconrec.2023.107196

Mukherjee, D., Lim, W. M., Kumar, S., & Donthu, N. (2022). Guidelines for advancing theory and practice through bibliometric research. *Journal of Business Research*, *148*. https://doi.org/10.1016/j.jbusres.2022.04.042

Mukherjee, J. (2018). *Hydrosocial Implications of Hydropolitical Trajectories: Exploring the Farakka Barrage Project from Indo-Bangladesh Perspectives*. https://doi.org/10.1007/978-981-10-3889-1_39

Mulligan, J., Bukachi, V., Clause, J. C., Jewell, R., Kirimi, F., & Odbert, C. (2020). Hybrid infrastructures, hybrid governance: New evidence from Nairobi (Kenya) on green-blue-grey infrastructure in informal settlements: "Urban hydroclimatic risks in the 21st century: Integrating engineering, natural, physical and social sciences to build resilience." *Anthropocene*, *29*. https://doi.org/10.1016/j.ancene.2019.100227

Mumford, S. (2003). Review: Understanding Philosophy of Science. *Mind*, *112*(446). https://doi.org/10.1093/mind/112.446.353

Muñoz-Erickson, T. A., Miller, C. A., & Miller, T. R. (2017). How cities think: Knowledge co-production for urban sustainability and resilience. In *Forests* (Vol. 8, Issue 6). https://doi.org/10.3390/f8060203

Muratoglu, A. (2019). Water footprint as a new sustainability indicator for regional and global water resources. *ISTE-CE'2019- International Conference on Innovation, Sustainability, Technology and Education in Civil Engineering*, *June*.

Mutero, C. M., Kabutha, C., Kimani, V., Kabuage, L., Gitau, G., Ssennyonga, J., Githure, J., Muthami, L., Kaida, A., Musyoka, L., Kiarie, E., & Oganda, M. (2004). A transdisciplinary perspective on the links between malaria and agroecosystems in Kenya. *Acta Tropica*, *89*(2). https://doi.org/10.1016/j.actatropica.2003.07.003

Nabhan, S., & Habók, A. (2025). The Digital Literacy Academic Writing Scale: Exploratory Factor Analysis. *SAGE Open*, *15*(1). https://doi.org/10.1177/21582440241311709

Naeem, M., Jia, Z., Wang, J., Poudel, S., Manjankattil, S., Adhikari, Y., Bailey, M., & Bourassa, D. (2025). Advancements in machine learning applications in poultry farming: a literature review. In *Journal of Applied Poultry Research* (Vol. 34, Issue 4). https://doi.org/10.1016/j.japr.2025.100602

Naik, V. M. (2025). Statistical Methods In Behavioral Research: The Role Of Anova And Manova In Experimental Psychology. *International Journal of Creative Research Thoughts*, *13*(6).

Natasya, A., Putri, T., Siahaan, R. P. J., & Khoirunnisa, A. (2022). Filsafat Ilmu dan Pengembangan Metode Ilmiah. *Mahaguru: Jurnal Pendidikan Guru Sekolah Dasar* , *3*(1). https://doi.org/10.33487/mgr.v3i1.3932

Nativi, S., Mazzetti, P., & Craglia, M. (2021). Digital ecosystems for developing digital twins of the earth: The destination earth case. *Remote Sensing*, *13*(11). https://doi.org/10.3390/rs13112119

Newlands, N. K., & Lyubchich, V. (2025). "Assessing Predictability of Environmental Time Series With Statistical and Machine Learning Models." In *Environmetrics* (Vol. 36, Issue 2). https://doi.org/10.1002/env.70000

Nguyen, T. T. B., & Li, D. (2022). A systematic literature review of food safety management system implementation in global supply chains. *British Food Journal*, *124*(10). https://doi.org/10.1108/BFJ-05-2021-0476

Nichols, S. J., Peat, M., & Webb, J. A. (2017). Challenges for evidence-based environmental management: What is acceptable and sufficient evidence of causation? In *Freshwater Science* (Vol. 36, Issue 1). https://doi.org/10.1086/690106

Nisa, K., Ramadhan, S., & Thahar, H. E. (2023). Writing scientific articles for undergraduate students: A need analysis. *International Journal of Evaluation and Research in Education*, *12*(3). https://doi.org/10.11591/ijere.v12i3.24999

Noffke, S., & Somekh, B. (2014). The SAGE Handbook of Educational Action Research. In *The SAGE Handbook of Educational Action Research*. https://doi.org/10.4135/9780857021021

Ntassiou, K. (2025). Participating in Rural Appraisal? A Review of Participatory GIS and Citizen Science Approaches. In *Geography Compass* (Vol. 19, Issue 3). https://doi.org/10.1111/gec3.70023

Nur Cahyo, E., & Susanti*, E. (2023). Analisis Time Series Untuk Deep Learning Dan Prediksi Data Spasial Seismik: Studi Literatur. *Jurnal Teknologi*, *15*(2). https://doi.org/10.34151/jurtek.v15i2.3581

Nwagwu, C. C., Ogorodnyk, O., Sølvsberg, E., Eleftheriadis, R. J., & Meskers, C. (2025). Integrating Artificial Intelligence into Life Cycle Assessment: A Framework for Balancing Automation and Human Expertise. *Journal of Sustainable Metallurgy*, *11*(4). https://doi.org/10.1007/s40831-025-01305-x

Nwagwu, W. E. (2025). Citation analysis of global research on data literacy. *Education and Information Technologies*, *30*(11). https://doi.org/10.1007/s10639-025-13397-9

Nyang'au, I. M., Kelboro, G., Hornidge, A. K., Midega, C. A. O., & Borgemeister, C. (2018). Transdisciplinary research: Collaborative leadership and empowerment towards sustainability of push-pull technology. *Sustainability (Switzerland)*, *10*(7). https://doi.org/10.3390/su10072378

O'Donovan, C., Michalec, A. O., & Moon, J. R. (2022). Capabilities for transdisciplinary research. *Research Evaluation*, *31*(1). https://doi.org/10.1093/reseval/rvab038

O'Hara, S. L. (2000). Lessons from the past: Water management in Central Asia. *Water Policy*, *2*(4–5). https://doi.org/10.1016/S1366-7017(00)00010-6

Obi, C. C. (2013). Inductivism and Science: An Appraisal of Scientific Methodology. *An International Journal of Science and Technology*, *2*(1).

Odo, J., & Solomon, E. (2019). A functional-semiotic investigation of traditional funeral rites and rituals in Elugwu Ezike in Igboland. *International Journal of Language Studies*, *13*.

Oglethorpe, D., & Heron, G. (2013). Testing the theory of constraints in UK local food supply chains. *International Journal of Operations and Production Management*, *33*(10). https://doi.org/10.1108/IJOPM-05-2011-0192

Oknisia, E., & Nugraini, L. D. A. (2025). Effectiveness of Normalized Difference Built-Up Index in Mapping Built-Up Features across Arid Rural Regions. *Jurnal Penginderaan Jauh Dan Pengolahan Data Citra Digital*, *19*(1). https://doi.org/10.12962/inderaja.v19i1.5084

Oktavia, Y., Atmazaki, A., Zaim, M., Husda, N. E., Ramadhan, S., & Setiawan, A. (2025). The Role of Blended Learning and Creative Problem-Solving in Scientific Article Writing: A

Case Study in Higher Education. *TEM Journal*, *14*(2). https://doi.org/10.18421/TEM142-45

Olosutean, H., & Cerciu, M. (2022). Water Sustainability in the Context of Global Warming: A Bibliometric Analysis. *Sustainability (Switzerland)*, *14*(14). https://doi.org/10.3390/su14148349

Omondi, L. A. (2023). Learning together: Participatory rural appraisal for coproduction of climate change knowledge. *Action Research*, *21*(2). https://doi.org/10.1177/1476750320905901

Ożegalska-Trybalska, J. (2021). Plagiarism and self-plagiarism – facts and myths. *Nowotwory*, *71*(1). https://doi.org/10.5603/NJO.2021.0012

Öztürk, O., Kocaman, R., & Kanbach, D. K. (2024). How to design bibliometric research: an overview and a framework proposal. *Review of Managerial Science*, *18*(11). https://doi.org/10.1007/s11846-024-00738-0

Padilla-Santamaría, F. (2022). The p-value: how to analyze it to separate from extreme positivism and naive inductivism? *Investigacion En Educacion Medica*, *11*(44). https://doi.org/10.22201/fm.20075057e.2022.44.22442

Pahl-Wostl, C., & Knieper, C. (2023). Pathways towards improved water governance: The role of polycentric governance systems and vertical and horizontal coordination. *Environmental Science and Policy*, *144*. https://doi.org/10.1016/j.envsci.2023.03.011

Pal, D., Saha, S., Mukherjee, A., Sarkar, P., Banerjee, S., & Mukherjee, A. (2025). GIS-Based Modeling for Water Resource Monitoring and Management: A Critical Review. In *Springer Geography: Vol. Part F207*. https://doi.org/10.1007/978-3-031-62376-9_24

Pallett, H., & Chilvers, J. (2015). Organizations in the making: Learning and intervening at the science-policy interface. *Progress in Human Geography*, *39*(2). https://doi.org/10.1177/0309132513518831

Pangeran, Tomy Sun Siagian, Rizky Saputra, Dhea Agusty Ningrum, & MHD. Andi Rasyid. (2025). Integrated Water and Waste Management: A Systematic Literature Review on the Role of Human Resources and Sustainable Practices. *Proceedings of The International Conference on Computer Science, Engineering, Social Science, and Multi-Disciplinary Studies*, *1*. https://doi.org/10.64803/cessmuds.v1.29

Pantelidakis, M., Mykoniatis, K., Liu, J., & Harris, G. (2022). A digital twin ecosystem for additive manufacturing using a real-time development platform. *International Journal of Advanced Manufacturing Technology*, *120*(9–10). https://doi.org/10.1007/s00170-022-09164-6

Papadopoulou, C. A., Kourtis, I. M., Laspidou, C., Tsihrintzis, V. A., & Papadopoulou, M. P. (2025). An integrated methodology for systematic stakeholder engagement in environmental decision-making under the Water-Energy-Food-Ecosystems nexus framework. *Environmental Development*, *56*. https://doi.org/10.1016/j.envdev.2025.101268

Park, H., & Shea, P. (2020). A review of ten-year research through co-citation analysis: Online learning, distance learning, and blended learning. *Online Learning Journal*, *24*(2). https://doi.org/10.24059/olj.v24i2.2001

Park, Y. J., Kaplan, D., Ren, Z., Hsu, C. W., Li, C., Xu, H., Li, S., & Li, J. (2024). Can ChatGPT be used to generate scientific hypotheses? *Journal of Materiomics*, *10*(3). https://doi.org/10.1016/j.jmat.2023.08.007

Parkhi, V., Chavhan, N., Chandak, S., Chaware, B., & Bongarde, P. (2023). An IoT Based Environment Monitoring & Controlling System for Food Grain Warehouse. *Lecture Notes in Networks and Systems*, *528*. https://doi.org/10.1007/978-981-19-5845-8_16

Pasmore, W. (2006). Action research in the workplace: The socio-technical perspective. *Handbook of Action Research: The Concise Paperback Edition*.

Pathmudi, V. R., Khatri, N., Kumar, S., Abdul-Qawy, A. S. H., & Vyas, A. K. (2023). A systematic review of IoT technologies and their constituents for smart and sustainable agriculture applications. *Scientific African*, *19*. https://doi.org/10.1016/j.sciaf.2023.e01577

Pears, R., & Shields, G. (2016). Harvard referencing style. In *Cite Them Right*. https://doi.org/10.1007/978-1-137-58506-6_5

Peck, A. J., Adams, S. L., Armstrong, A., Bartlett, A. K., Bortman, M. L., Branco, A. B., Brown, M. L., Donohue, J. L., Kodis, M., McCann, M. J., & Smith, E. (2022). A new framework for flood adaptation: introducing the Flood Adaptation Hierarchy. *Ecology and Society*, *27*(4). https://doi.org/10.5751/ES-13544-270405

Pediconi, F., & Moffa, G. (2025). Contrast-Enhanced Mammography: Bridging the research gaps and defining the future. In *European Journal of Radiology* (Vol. 192). https://doi.org/10.1016/j.ejrad.2025.112351

Pedraza, S., Clerici, N., Gaviria, J. D. Z., & Sanchez, A. (2021). Global research on riparian zones in the xxi century: A bibliometric analysis. In *Water (Switzerland)* (Vol. 13, Issue 13). https://doi.org/10.3390/w13131836

Pérez-Cova, M., Platikanov, S., Stoll, D. R., Tauler, R., & Jaumot, J. (2022). Comparison of Multivariate ANOVA-Based Approaches for the Determination of Relevant Variables in Experimentally Designed Metabolomic Studies. *Molecules*, *27*(10). https://doi.org/10.3390/molecules27103304

Pham, T. M., Dinh, H. T., Pham, T. A., Nguyen, T. S., & Duong, N. T. (2024). Modeling of water scarcity for spatial analysis using Water Poverty Index and fuzzy-MCDM technique. *Modeling Earth Systems and Environment*, *10*(2). https://doi.org/10.1007/s40808-023-01884-2

Plassin, S., Koch, J., Paladino, S., Friedman, J. R., Spencer, K., & Vaché, K. B. (2020). A socio-environmental geodatabase for integrative research in the transboundary Rio Grande/Río Bravo basin. *Scientific Data*, *7*(1). https://doi.org/10.1038/s41597-020-0410-1

Popescu, S. M., Mansoor, S., Wani, O. A., Kumar, S. S., Sharma, V., Sharma, A., Arya, V. M., Kirkham, M. B., Hou, D., Bolan, N., & Chung, Y. S. (2024). Artificial intelligence and IoT driven technologies for environmental pollution monitoring and management. In *Frontiers in Environmental Science* (Vol. 12). https://doi.org/10.3389/fenvs.2024.1336088

Possantti, I., & Marques, G. (2022). A modelling framework for nature-based solutions expansion planning considering the benefits to downstream urban water users. *Environmental Modelling and Software*, *152*. https://doi.org/10.1016/j.envsoft.2022.105381

Prasad, S., Garg, A., & Saini, J. (2025). Turning Your Presentations/Posters to Publications. In *Indian Journal of Radiology and Imaging* (Vol. 35, Issue 1). https://doi.org/10.1055/s-0044-1800864

Prashar, A., Gupta, P., & Dwivedi, Y. K. (2024). Plagiarism awareness efforts, students' ethical judgment and behaviors: a longitudinal experiment study on ethical nuances of plagiarism in higher education. *Studies in Higher Education*, *49*(6). https://doi.org/10.1080/03075079.2023.2253835

Pratolo, B. W., Purwanti, E., Humanika, E. S., Bao, D., Hassan Najmi, A., Oktavianti, I. N., Surono, S., & Sari, D. M. (2025). Eco-Lexicons in ELT: Analyzing Environmental Narratives through Critical Discourse Analysis. *BIO Web of Conferences*, *148*. https://doi.org/10.1051/bioconf/202414802035

Priyanti, R. P., Hidayah, N., Rosmaharani, S., Nahariani, P., Asri, Mukarromah, N., & Mundakir. (2019). Community Preparedness in Flood Disaster: A Qualitative Study. *International Quarterly of Community Health Education*, *40*(1). https://doi.org/10.1177/0272684X19853169

Pro, A., & esri. (2022). Enhanced Vegetation Index (EVI). In *Band Indices | Documentation*.

Psomas, E., & Antony, J. (2019). Research gaps in Lean manufacturing: a systematic literature review. In *International Journal of Quality and Reliability Management* (Vol. 36, Issue 5). https://doi.org/10.1108/IJQRM-12-2017-0260

Puspitasari, W. (2025). Result and Discussion: Analysis of Learning Outcomes in Primary Education. *Journal of Primary Education Research*, *10*(2).

Putra, I. E., Jazilah, N. I., Adishesa, M. S., Al Uyun, D., & Wiratraman, H. P. (2023). Denying the accusation of plagiarism: power relations at play in dictating plagiarism as academic misconduct. *Higher Education*, *85*(5). https://doi.org/10.1007/s10734-022-00875-z

Qiu, Y., & Hu, Z. (2025). Data governance and open sharing in the fields of life sciences and medicine: A bibliometric analysis. In *Digital Health* (Vol. 11). https://doi.org/10.1177/20552076251320302

Rahman, H. Z., Miraj, P., Andreas, A., & Perdana, R. (2022). Research trends, themes and gaps of public private partnership in water sector: a two decade review. In *Urban Water Journal* (Vol. 19, Issue 8). https://doi.org/10.1080/1573062X.2022.2088393

Ram, A., & Arunachalam, A. (2024). DRONE APPLICATION IN AGRICULTURE AND AGROFORESTRY. *International Journal on Agricultural Sciences*, *15*(01). https://doi.org/10.53390/ijas.2024.15103

Rammelt, C. F. (2014). Participatory Action Research in Marginalised Communities: Safe Drinking Water in Rural Bangladesh. *Systemic Practice and Action Research*, *27*(3). https://doi.org/10.1007/s11213-013-9280-1

Reason, P., & Bradbury, H. (2012). The SAGE Handbook of Action Research. In *The SAGE Handbook of Action Research*. https://doi.org/10.4135/9781848607934

Redhu, S., & Jain, P. (2025). Exploring the Interwoven Pathways of Water Sustainability and Poverty: Insights From a 2SLS Analysis. *World Water Policy*, *11*(3). https://doi.org/10.1002/wwp2.70006

Reichmann, S., & Wieser, B. (2022). Open science at the science–policy interface: bringing in the evidence? *Health Research Policy and Systems*, *20*(1). https://doi.org/10.1186/s12961-022-00867-6

Reizinger, P. (2023). The Falsificationist View of Machine Learning. *Informacios Tarsadalom*, *23*(2). https://doi.org/10.22503/INFTARS.XXIII.2023.2.7

Research methods for business: A skill building approach. (1993). *Long Range Planning*, *26*(2). https://doi.org/10.1016/0024-6301(93)90168-f

Restrepo, J. D., Bottaro, G., Barci, L., Beltrán, L. M., Londoño-Behaine, M., & Masiero, M. (2024). Assessing the Impacts of Nature-Based Solutions on Ecosystem Services: A Water-Energy-Food-Ecosystems Nexus Approach in the Nima River Sub-Basin (Colombia). *Forests*, *15*(11). https://doi.org/10.3390/f15111852

Retisfa Khairanis, & Muhammad Aldi. (2025). EPISTEMOLOGI FILSAFAT ILMU: METODE ILMIAH DAN NON-ILMIAH DALAM PENELITIAN. *Journal Central Publisher*, *2*(2). https://doi.org/10.60145/jcp.v2i2.345

Riehle, D., Harutyunyan, N., & Barcomb, A. (2025). Pattern Discovery and Validation Using Scientific Research Methods. In *Lecture Notes in Computer Science: Vol. 14630 LNCS*. https://doi.org/10.1007/978-3-662-70810-1_6

Ringle, C., Sarstedt, M., Mitchell, R., & Gudergan, S. (2017). Partial Least Squares Structural Equation Modeling in Human Resource Management Research. *The International Journal of Human Resource Management*.

Robertson, D. S., Wason, J. M. S., & Ramdas, A. (2023). Online Multiple Hypothesis Testing. *Statistical Science*, *38*(4). https://doi.org/10.1214/23-STS901

Robinson Sihombing, P., Prasetia Hendarsin, O., Sholikhatun Risma, S., & Endar Susilowati, B. (2020). The Application Of Autoregressive Integrated Moving Average Generalized Autoregressive Conditional Heteroscedastic (Arima - Garch). *Udayana Journal of Social Sciences and Humanities (UJoSSH)*, *4*(2). https://doi.org/10.24843/ujossh.2020.v04.i02.p04

Rolobessy, M. J., Soasio, S., & Rukoyah. (2023). Navigating E-Government Realities: Insights from Rural Administration in Central Maluku, Indonesia: Melintasi Realitas E-Government: Wawasan dari Administrasi Desa di Maluku Tengah, Indonesia. *Indonesian Journal of Innovation Studies*, *24*(SE-Innovation in Social Science).

Romero-Lankao, P., & Gnatz, D. (2019). Risk Inequality and the Food-Energy-Water (FEW) Nexus: A Study of 43 City Adaptation Plans. *Frontiers in Sociology*, *4*. https://doi.org/10.3389/fsoc.2019.00031

Rood, S. B., Scott, M. L., Dixon, M., González, E., Marks, C. O., Shafroth, P. B., & Volke, M. A. (2020). Ecological Interfaces between Land and Flowing Water: Themes and Trends in Riparian Research and Management. In *Wetlands* (Vol. 40, Issue 6). https://doi.org/10.1007/s13157-020-01392-4

Ross, D. (2019). Empiricism, sciences, and engineering: cognitive science as a zone of integration. In *Cognitive Processing* (Vol. 20, Issue 2). https://doi.org/10.1007/s10339-019-00916-z

Ross, J. S., & Krumholz, H. M. (2013). Ushering in a new era of open science through data sharing: The wall must come down. In *JAMA* (Vol. 309, Issue 13). https://doi.org/10.1001/jama.2013.1299

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*. https://doi.org/10.18637/jss.v048.i02

Rubin, M., & Donkin, C. (2024). Exploratory hypothesis tests can be more compelling than confirmatory hypothesis tests. *Philosophical Psychology*, *37*(8). https://doi.org/10.1080/09515089.2022.2113771

Ruggerio, C. A., Lindig-Cisneros, R., & Méndez-Lemus, Y. (2024). A complex transdisciplinary approach to achieve water sustainability: lessons from a case study in Morelia, Mexico. *Sustainability Science*, *19*(3). https://doi.org/10.1007/s11625-024-01503-8

Rumanovská, Ľ., Lazíková, J., Takáč, I., & Stoličná, Z. (2024). Plagiarism in the Academic Environment. *Societies*, *14*(7). https://doi.org/10.3390/soc14070128

Ruszczyk, H. A., Upadhyay, B. K., Kwong, Y. M. (Connie), Khanal, O., Bracken, L. J., Pandit, S., & Bastola, R. (2020). Empowering women through participatory action research in community-based disaster risk reduction efforts. *International Journal of Disaster Risk Reduction*, *51*. https://doi.org/10.1016/j.ijdrr.2020.101763

Sabia, G., Mattioli, D., Langone, M., & Petta, L. (2023). Methodology for a preliminary assessment of water use sustainability in industries at sub-basin level. *Journal of Environmental Management*, *343*. https://doi.org/10.1016/j.jenvman.2023.118163

Säfsten, K., Elgh, F., Linnéusson, G., Stolt, R., & Wlazlak, P. (2025). A Framework for Transdisciplinary Engineering Research: Integrating Interactive Research and Design Methodologies. *Journal of Integrated Design and Process Science*. https://doi.org/10.1177/10920617251368348

Sage Publications. (2006). Introduction: Inquiry & Participation in Search of a World Worhty of Human Aspiration. *The Handbook of Action Research*.

Salmoral, G., Schaap, N. C. E., Walschebauer, J., & Alhajaj, A. (2019). Water diplomacy and nexus governance in a transboundary context: In the search for complementarities. *Science of the Total Environment*, *690*. https://doi.org/10.1016/j.scitotenv.2019.06.513

Samak, T., Samak, C., Kandhasamy, S., Krovi, V., & Xie, M. (2023). AutoDRIVE: A Comprehensive, Flexible and Integrated Digital Twin Ecosystem for Autonomous Driving Research & Education. *Robotics*, *12*(3). https://doi.org/10.3390/robotics12030077

Sand, A. (2022). Inferential Statistics Is an Unfit Tool for Interpreting Data. *Applied Sciences (Switzerland)*, *12*(15). https://doi.org/10.3390/app12157691

Sanders, A. (2020). Mastering American Psychological Association (APA, 6th edition) Referencing Style for Educational Leaders. *Journal of Education & Social Policy*, *7*(2).

Sandra, R., Daharnis, & Hariko, R. (2025). Application of Descriptive and Inferential Statistics in Guidance and Counseling Research. *Kawakib: Journal of Multidisciplinary Research*, *1*(3).

Sandra, R., & Hariko, R. (2025). Inferential Statistics in Guidance and Counseling Research. *Kawakib: Journal of Multidisciplinary Research*, *1*(3).

Santesteban-Echarri, O., & Núñez-Morales, N. I. (2017). How to write a scientific article for the first time. In *Psiquiatria Biologica* (Vol. 24, Issue 1). https://doi.org/10.1016/j.psiq.2017.01.004

Santoso, A. D., Aryansah, J. E., & Nasyaya, A. (2024). Writing about smart cities in Indonesia: A bibliometric analysis. *Journal of Regional and City Planning*, *35*(1). https://doi.org/10.5614/jpwk.2024.35.1.4

Sanusi, W., Ihsan, H., & Syam, N. H. (2019). Model Regresi Spasial dan Aplikasinya dalam Menganalisis Angka Putus Sekolah Usia Wajib Belajar di Provinsi Sulawesi Selatan. *Journal of Mathematics, Computations, and Statistics*, *1*(2). https://doi.org/10.35580/jmathcos.v1i2.9241

Saravani, M. J., Saadatpour, M., & Shahvaran, A. R. (2024). A web GIS based integrated water resources assessment tool for Javeh Reservoir. *Expert Systems with Applications*, *252*. https://doi.org/10.1016/j.eswa.2024.124198

Sarker, J., Rolfe, J., & Akbar, D. (2025). Mapping the Landscape: A Bibliometric Analysis of Water Security, Governance, and Trading in Australia. *Water (Switzerland)*, *17*(7). https://doi.org/10.3390/w17071035

Saul, N., Marjanneke J, V., Willemien, D., Leocadia, Z., Germarié, V., Patrick, N., Tiisetso J, R., Naziha, M., Bronwen, Q., Sibulele, B., & Alois A, M. (2024). A multivariate dataset on water–energy–food nexus: Multi-actor governance for social justice. *Data in Brief*, *56*. https://doi.org/10.1016/j.dib.2024.110805

Schreier, M. (2024). Introduction: What is Qualitative Content Analysis? In *Qualitative Content Analysis in Practice*. https://doi.org/10.4135/9781529682571.n1

Schützenhofer, S., Pibal, S., Wieser, A., Bosco, M., Fellner, M., Petrinas, V., & Kovacic, I. (2024). Digital Ecosystem to Enable Circular Buildings – the Circular Twin Framework Proposal. *Journal of Sustainable Development of Energy, Water and Environment Systems*, *12*(2). https://doi.org/10.13044/j.sdewes.d12.0500

Seidl, R., & Barthel, R. (2017). Linking scientific disciplines: Hydrology and social sciences. *Journal of Hydrology*, *550*. https://doi.org/10.1016/j.jhydrol.2017.05.008

Sen, R., & Das, S. (2023). Inferential Statistics. In *Indian Statistical Institute Series*. https://doi.org/10.1007/978-981-19-2008-0_13

Setianingsih, Y. (2020). Induktivisme-Empirisisme Francis Bacon dan Relevansinya Bagi Ilmu-Ilmu Keagamaan. *Indonesian Journal of Islamic Theology and Philosophy*, *1*(2). https://doi.org/10.24042/ijitp.v1i2.4930

Shankar, R., & Gupta, L. (2024). An integrated AI framework for managing organizational risk and climate change concerns in B2B market. *Industrial Marketing Management*, *117*. https://doi.org/10.1016/j.indmarman.2023.12.019

Shao, Y. E., & Dai, J. T. (2018). Integrated feature selection of ARIMA with computational intelligence approaches for food crop price prediction. *Complexity*, *2018*. https://doi.org/10.1155/2018/1910520

Sharma, S. K., & Anjaneyulu, D. (1993). Application of remote sensing and GIS in water resource management. *International Journal of Remote Sensing*, *14*(17). https://doi.org/10.1080/01431169308904435

Sherman, K., & Duda, A. M. (1999). An ecosystem approach to global assessment and management of coastal waters. In *Marine Ecology Progress Series* (Vol. 190). https://doi.org/10.3354/meps190271

Shu, X., Ye, C., Xu, Z., Liao, R., & Zhang, S. (2025). A multiscale physically-based approach to urban flood risk assessment using ABM and multi-source remote sensing data. *International Journal of Disaster Risk Reduction*, *119*. https://doi.org/10.1016/j.ijdrr.2025.105332

Shuvo, R. M., Chowdhury, R. R., Chakroborty, S., Das, A., Kafy, A. Al, Altuwaijri, H. A., & Rahman, M. T. (2024). Geospatially Informed Water Pricing for Sustainability: A Mixed Methods Approach to the Increasing Block Tariff Model for Groundwater Management in Arid Regions of Northwest Bangladesh. *Water (Switzerland)*, *16*(22). https://doi.org/10.3390/w16223298

Shweta, Gurumayum, P., Tiwari, N., Kaushik, M., Jha, C., & Arora, M. (2024). AI-Driven Transformations in Higher Education: A Citation and Co-citation Analysis. In *International Journal of Experimental Research and Review* (Vol. 45). https://doi.org/10.52756/ijerr.2024.v45spl.021

Sianturi, R. (2025). Test Normality As a Condition of Hypothesis Testing. *Jurnal Pembelajaran Dan Matematika Sigma (Jpms)*, *11*(1).

Sibanda, M., Mutanga, O., Chimonyo, V. G. P., Clulow, A. D., Shoko, C., Mazvimavi, D., Dube, T., & Mabhaudhi, T. (2021). Application of drone technologies in surface water resources monitoring and assessment: A systematic review of progress, challenges, and opportunities in the global south. In *Drones* (Vol. 5, Issue 3). https://doi.org/10.3390/drones5030084

Sim, J., Cho, J., Lee, K., Lee, Y., Badan Pusat Statistik, Alonso-Sarría, F., Valdivieso-Ros, C., Gomariz-Castillo, F., Li, Y., Zhang, Y. Y., Cai, Y., Mahmud, T., Datta, N., Chakma, R., Das, U. K., Aziz, M. T., Islam, M., Salimullah, A. H. M., Hossain, M. S., … Junadhi. (2024). Research design : qualitative, quantitative, and mixed methods approaches. *Remote Sensing*, *12*(1).

Sit, M., Demiray, B. Z., Xiang, Z., Ewing, G. J., Sermet, Y., & Demir, I. (2020). A comprehensive review of deep learning applications in hydrology and water resources. *Water Science and Technology*, *82*(12). https://doi.org/10.2166/wst.2020.369

Sivakumar, B. (2011). Global climate change and its impacts on water resources planning and management: Assessment and challenges. In *Stochastic Environmental Research and Risk Assessment* (Vol. 25, Issue 4). https://doi.org/10.1007/s00477-010-0423-y

Sivapalan, M. (2015). Debates—Perspectives on socio-hydrology: Changing water systems and the "tyranny of small problems"—Socio-hydrology. *Water Resources Research*, *51*(6), 4795–4805. https://doi.org/https://doi.org/10.1002/2015WR017080

Skea, J., Shukla, P., Al Khourdajie, A., & McCollum, D. (2021). Intergovernmental Panel on Climate Change: Transparency and integrated assessment modeling. *Wiley Interdisciplinary Reviews: Climate Change*, *12*(5). https://doi.org/10.1002/wcc.727

Sloane-Seale, A. (2009). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. *Canadian Journal of University Continuing Education*, *35*(2). https://doi.org/10.21225/d54s3d

Smajgl, A., & Ward, J. (2015). Evaluating participatory research: Framework, methods and implementation results. *Journal of Environmental Management*, *157*. https://doi.org/10.1016/j.jenvman.2015.04.014

Smith, R., & Rebolledo, P. (2022). A Handbook for Exploratory Action Research. *ELT Journal*, *76*(2). https://doi.org/10.1093/elt/ccz025

Soukotta, E., Oszaer, R., & Latuamury, B. (2019). The Microbiology Quality Analysis of the Waters of Riuapa River and Its Impact on the Environment. *International Journal of Current Microbiology and Applied Sciences*, *8*(07), 11–22. https://doi.org/10.20546/ijcmas.2019.807.003

Souto-Manning, M. (2014). Critical narrative analysis: The interplay of critical discourse and narrative analyses. *International Journal of Qualitative Studies in Education*, *27*(2). https://doi.org/10.1080/09518398.2012.737046

Sozon, M., Mohammad Alkharabsheh, O. H., Fong, P. W., & Chuan, S. B. (2024). Cheating and plagiarism in higher education institutions (HEIs): A literature review. In *F1000Research* (Vol. 13). https://doi.org/10.12688/f1000research.147140.2

Spano, N. (2022). Book Review: The Routledge Handbook of Phenomenology of Agency. *Husserl Studies*, *38*(2). https://doi.org/10.1007/s10743-022-09303-7

Sreejith, S., Panigrahy, A. K., Ajayan, J., Radhika, J. M., Reddy, N. V. R., Reddy, N. V. U., & Umamaheswaran, S. (2025). IoT sensor-based systems in real-time monitoring of health and environment: a review. In *Journal of the Korean Physical Society* (Vol. 87, Issue 1). https://doi.org/10.1007/s40042-025-01378-7

Sri Wahyuni, N., Komarudin, D., Rifki, M., Bhakti Persada Bandung, S., Sunan Gunung Djati Bandung, U., & Miftahul Huda Subang, I. (2025). Pendekatan Filsafat Ilmu Terhadap Metode Ilmiah (Studi Epistemologi, Etika, Dan Inovasi). *Jurnal Pendidikan Indonesia*, *5*.

Sriskandarajah, N., & Sivapalan, M. (2023). Water security, participatory governance, and dialogue spaces for change in Northern Sri Lanka. In *World Water Policy* (Vol. 9, Issue 3). https://doi.org/10.1002/wwp2.12128

Srivastava, M. (2024). REFERENCING AND REFERENCING STYLES. *ShodhKosh: Journal of Visual and Performing Arts*, *5*(4). https://doi.org/10.29121/shodhkosh.v5.i4.2024.3571

Staunton, C., Barragán, C. A., Canali, S., Ho, C., Leonelli, S., Mayernik, M., Prainsack, B., & Wonkham, A. (2021). Open science, data sharing and solidarity: who benefits? *History and Philosophy of the Life Sciences*, *43*(4). https://doi.org/10.1007/s40656-021-00468-6

Stefanis, C., Stavropoulou, E., Stavropoulos, A., Gyriki, D., Nikolaidis, C. G., Vassos, V., Nena, E., Tsigalou, C., & Bezirtzoglou, E. (2025). Innovative methodological pillars for bibliometric studies: AI screening, data normalization and dual-tool analysis. *Discover Applied Sciences*, *7*(9). https://doi.org/10.1007/s42452-025-07653-3

Stefanovic, N., Radenkovic, M., Bogdanovic, Z., Plasic, J., & Gaborovic, A. (2025). Adaptive Cloud-Based Big Data Analytics Model for Sustainable Supply Chain Management. *Sustainability (Switzerland)*, *17*(1). https://doi.org/10.3390/su17010354

Stephen Kemmis. (2008). The SAGE Handbook of Action Research 8 Critical Theory and Participatory Action Research 8 Critical Theory and Participatory Action. *The SAGE Handbook of Action Research*.

Stinder, A. K., Schelte, N., & Severengiz, S. (2022). Application of Mixed Methods in Transdisciplinary Research Projects on Sustainable Mobility. *Sustainability (Switzerland)*, *14*(11). https://doi.org/10.3390/su14116867

Stoecker, R., & Falcón, A. (2022). Handbook on Participatory Action Research and Community Development. In *Handbook on Participatory Action Research and Community Development*. https://doi.org/10.4337/9781839100970

Sugiyono. (2021). Model Pendekatan Kualitatif: Telaah Dalam Metode Penelitian Ilmiah. In *Pengantar Metode Kualitatif*.

Sullivan, C. (2002). Calculating a Water Poverty Index. *World Development*, *30*(7). https://doi.org/10.1016/S0305-750X(02)00035-9

Sun, C., Bian, Y., Zhou, T., & Pan, J. (2019). Using of multi-source and multi-temporal remote sensing data improves crop-type mapping in the subtropical agriculture region. *Sensors (Switzerland)*, *19*(10). https://doi.org/10.3390/s19102401

Sun, D., Qi, P. P., Zhong, C. M., & Xu, C. (2023). Achieving resilience through knowledge management practices and risk management culture in agri-food supply chains. *Environmental Science and Pollution Research International*, *30*(56). https://doi.org/10.1007/s11356-023-30519-3

Surbhi, S. (2019). Difference between Descriptive and Inferential Statistics. *Regression Analysis: An Intuitive Guide*.

Swinton, V. (2016). Research to develop spiritual pedagogy, awareness and change. *British Journal of Guidance and Counselling*, *44*(3). https://doi.org/10.1080/03069885.2016.1174976

Tacchi, J., Slater, D., & Hearn, G. (2003). Ethnographic action research: A user's handbook. In *Research Methods in Psychology*.

Takona, J. P. (2024). Research design: qualitative, quantitative, and mixed methods approaches / sixth edition. In *Quality and Quantity* (Vol. 58, Issue 1). https://doi.org/10.1007/s11135-023-01798-2

Takwin, Ardimen, Jenderal Sudirman, J., Tanah Datar, K., & Barat, S. (2023). Metode Ilmiah dalam Tinjauan Filsafat. *Journal on Education*, *06*(01).

Talakua, S. M., & Nara, O. D. (2022). Hydrologic data base Management Analysis of Small Islands in the River Region of Maluku. *International Journal of Advanced Engineering Research and Science*, *9*(2). https://doi.org/10.22161/ijaers.92.14

Tang, S., & Zheng, Y. (2023). Implementation of an IoT system for environment monitoring and remote web control using ARM Mbed cloud and GUI. *International Journal of Computer Applications in Technology*, *71*(1). https://doi.org/10.1504/IJCAT.2023.131061

Tansar, H., Duan, H. F., & Mark, O. (2023). A multi-objective decision-making framework for implementing green-grey infrastructures to enhance urban drainage system resilience. *Journal of Hydrology*, *620*. https://doi.org/10.1016/j.jhydrol.2023.129381

Tasna Yunita. (2020). Peramalan Jumlah Penggunaan Kuota Internet Menggunakan Metode Autoregressive Integrated Moving Average (ARIMA). *Journal of Mathematics: Theory and Applications*. https://doi.org/10.31605/jomta.v2i1.777

Taye, T., & Teshome, G. (2025). The impact of extensive reading on academic writing proficiency in EFL undergraduate students. *Discover Education*, *4*(1). https://doi.org/10.1007/s44217-025-00679-0

Team, U. S. S. (2015). A Guide to APA Referencing Style: 6 th Edition Student Success A Guide to APA 6 th ed. Referencing Style. *N.A*, *November*.

Tecson-Mendoza, E. M. (2015). Scientific and academic journals in the Philippines: Status and challenges. *Science Editing*, *2*(2). https://doi.org/10.6087/kcse.47

Teja, S. G. S. S. (2018). Inferential Statistics for Data Science. *International Journal for Research in Applied Science and Engineering Technology*, *6*(7). https://doi.org/10.22214/ijraset.2018.7058

Temmink, R. J. M., Lång, K., Vroom, R. J. E., Leifeld, J., Fritz, C., Zeug, W., Thrän, D., Kleinspehn, C., Gaudig, G., Neubert, J., Kreyling, J., Rhymes, J. M., Evans, C. D., Kotowski, W., Nordt, A., & Tanneberger, F. (2026). Agriculture on wet peatlands: the sustainability potential of paludiculture. In *Agricultural Systems* (Vol. 231). https://doi.org/10.1016/j.agsy.2025.104561

Thaler, T. (2021). Social justice in socio-hydrology—how we can integrate the two different perspectives. *Hydrological Sciences Journal*, *66*(10). https://doi.org/10.1080/02626667.2021.1950916

Thayyib, P. V., Mamilla, R., Khan, M., Fatima, H., Asim, M., Anwar, I., Shamsudheen, M. K., & Khan, M. A. (2023). State-of-the-Art of Artificial Intelligence and Big Data Analytics Reviews in Five Different Domains: A Bibliometric Summary. In *Sustainability (Switzerland)* (Vol. 15, Issue 5). https://doi.org/10.3390/su15054026

The SAGE Handbook of Action Research. (2017). In *The SAGE Handbook of Action Research*. https://doi.org/10.4135/9781473921290

Thompson, B. S., & Friess, D. A. (2019). Stakeholder preferences for payments for ecosystem services (PES) versus other environmental management approaches for mangrove forests. *Journal of Environmental Management*, *233*. https://doi.org/10.1016/j.jenvman.2018.12.032

Thompson, M. A., Owen, S., Lindsay, J. M., Leonard, G. S., & Cronin, S. J. (2017). Scientist and stakeholder perspectives of transdisciplinary research: Early attitudes, expectations, and tensions. *Environmental Science and Policy*, *74*. https://doi.org/10.1016/j.envsci.2017.04.006

Thompson, R. M., Barbour, E. J., Bradshaw, C. J. A., Briggs, S., Byron, N., Grace, M., Hart, B. T., King, A. J., Likens, G. E., Pollino, C. A., Sheldon, F., Stewardson, M. J., Thoms, M., Watts, R. J., & Webb, J. A. (2022). Principles for scientists working at the river science-policy interface. *River Research and Applications*, *38*(5). https://doi.org/10.1002/rra.3951

Tito, R., Vasconcelos, H. L., & Feeley, K. J. (2020). Mountain Ecosystems as Natural Laboratories for Climate Change Experiments. *Frontiers in Forests and Global Change*, *3*. https://doi.org/10.3389/ffgc.2020.00038

Tomaszewski, R. (2023). Visibility, impact, and applications of bibliometric software tools through citation analysis. *Scientometrics*, *128*(7). https://doi.org/10.1007/s11192-023-04725-2

Tortajada, C., & Araral, E. (2021). Global Water Resources. In *Global Water Resources*. https://doi.org/10.4324/9781003179498

Tran, T. V., Reef, R., & Zhu, X. (2022). A Review of Spectral Indices for Mangrove Remote Sensing. In *Remote Sensing* (Vol. 14, Issue 19). https://doi.org/10.3390/rs14194868

Treadwell, D. (2014). Content Analysis: Understanding Text and Image in Numbers. *Introducing Communication Research: Paths of Inquiry*.

Trevethan, R., & Betta, M. (2017). Academic referencing on university library websites: A call for clear, coherent and correct categorisation. *Journal of the Australian Library and Information Association*, *66*(1). https://doi.org/10.1080/00049670.2017.1281371

Tripathi, N., Hietala, H., Xu, Y., & Liyanage, R. (2024). Stakeholders collaborations, challenges and emerging concepts in digital twin ecosystems. *Information and Software Technology*, *169*. https://doi.org/10.1016/j.infsof.2024.107424

Tucker, C. M., Hribar, M. Š., Urbanc, M., Bogataj, N., Gunya, A., Rodela, R., Sigura, M., & Piani, L. (2023). Governance of interdependent ecosystem services and common-pool resources. *Land Use Policy*, *127*. https://doi.org/10.1016/j.landusepol.2023.106575

Tuğaç, Ç. (2025). Climate change adaptation: The missing component in the local climate change action plans of Turkish metropolitan municipalities. *Urban Climate*, *61*. https://doi.org/10.1016/j.uclim.2025.102396

Tzanakakis, V. A., Capodaglio, A. G., & Angelakis, A. N. (2023). Insights into Global Water Reuse Opportunities. In *Sustainability (Switzerland)* (Vol. 15, Issue 17). https://doi.org/10.3390/su151713007

Tzeggai, F. (2024). Handbook on Participatory Action Research and Community Development. *Contemporary Sociology: A Journal of Reviews*, *53*(1). https://doi.org/10.1177/00943061231214609ii

Udokwu, C., Brandtner, P., Darbanian, F., & Falatouri, T. (2022). Proposals for Addressing Research Gaps at the Intersection of Data Analytics and Supply Chain Management. *Journal of Advances in Information Technology*, *13*(4). https://doi.org/10.12720/jait.13.4.338-346

Ülker, P., Ülker, M., & Karamustafa, K. (2023). Bibliometric analysis of bibliometric studies in the field of tourism and hospitality. *Journal of Hospitality and Tourism Insights*, *6*(2). https://doi.org/10.1108/JHTI-10-2021-0291

Ullah, R., Asghar, I., & Griffiths, M. G. (2023). An Integrated Methodology for Bibliometric Analysis: A Case Study of Internet of Things in Healthcare Applications. *Sensors*, *23*(1). https://doi.org/10.3390/s23010067

UNCC. (2017). Climate Action Pathway: Climate Resilience. In *Encyclopedia of GIS*.

UNEP. (2022). For people and planet. The United Nations Environment Programme strategy for tackling climate change, biodiversity and nature loss, and pollution and waste from 2022—2025. *Midterm Strategy (MTS)*, *7*.

UNESCO. (2019). UN World Water development report - summary. *Division of Water Sciences, UNESCO*, *88*(5).

United Nations. (2022). United Nations Environment Assembly of the United Nations Environment Programme - Third session. *United Nations Environment Programme*.

Utami, R. A., Hamdani, U., & Winarno, A. (2024). Korelasi Ilmu Pengetahuan, Metode Ilmiah Dan Penelitian. *Sinar Dunia: Jurnal Riset Sosial Humaniora Dan Ilmu Pendidikan*, *3*(4). https://doi.org/10.58192/sidu.v3i4.2783

Utami, S. P. T., Andayani, Winarni, R., & Sumarwati. (2023). Utilization of artificial intelligence technology in an academic writing class: How do Indonesian students perceive? *Contemporary Educational Technology*, *15*(4). https://doi.org/10.30935/cedtech/13419

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. In *Nursing and Health Sciences* (Vol. 15, Issue 3). https://doi.org/10.1111/nhs.12048

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2). https://doi.org/10.1007/s11192-009-0146-3

van Hulst, M., Metze, T., Dewulf, A., de Vries, J., van Bommel, S., & van Ostaijen, M. (2025). Discourse, framing and narrative: three ways of doing critical, interpretive policy analysis. *Critical Policy Studies*, *19*(1). https://doi.org/10.1080/19460171.2024.2326936

VanDyke, M. S., & King, A. J. (2018). Using the CAUSE Model to Understand Public Communication about Water Risks: Perspectives from Texas Groundwater District Officials on Drought and Availability. *Risk Analysis*, *38*(7). https://doi.org/10.1111/risa.12950

Vásquez, A. P., Larrañaga, K. Á., Sánchez, T. D. P. L., Trigoso-García, C., Rojas-Vela, J., & Rengifo-Amasifen, R. R. (2025). Profiling the disciplinary foundation of telework research: A journal co-citation analysis. *Iberoamerican Journal of Science Measurement and Communication*, *5*(1). https://doi.org/10.47909/ijsmc.179

Vieira, D. C., Paula, F. S., Yaginuma, L. E., & Fonseca, G. (2025). iMESc – an interactive machine learning app for environmental sciences. *Frontiers in Environmental Science*, *13*. https://doi.org/10.3389/fenvs.2025.1533292

Vieira, R. F., De Lima, R. C., & Mizubuti, E. S. G. (2019). How to write the discussion section of a scientific article. *Acta Scientiarum - Agronomy*, *41*(1). https://doi.org/10.4025/actasciagron.v41i1.42621

Villamuelas, M., Fernández, N., Albanell, E., Gálvez-Cerón, A., Bartolomé, J., Mentaberre, G., López-Olvera, J. R., Fernández-Aguilar, X., Colom-Cadena, A., López-Martín, J. M., Pérez-Barbería, J., Garel, M., Marco, I., & Serrano, E. (2016). The Enhanced Vegetation Index (EVI) as a proxy for diet quality and composition in a mountain ungulate. *Ecological Indicators*, *61*. https://doi.org/10.1016/j.ecolind.2015.10.017

Villani, V., Picone, M., Mamei, M., & Sabattini, L. (2025). A Digital Twin Driven Human-Centric Ecosystem for Industry 5.0. *IEEE Transactions on Automation Science and Engineering*, *22*. https://doi.org/10.1109/TASE.2024.3410703

Vizzarri, M., Tognetti, R., & Marchetti, M. (2015). Forest ecosystem services: Issues and challenges for biodiversity, conservation, and management in Italy. *Forests*, *6*(6). https://doi.org/10.3390/f6061810

Vogt, L. (2008). The unfalsifiability of cladograms and its consequences. In *Cladistics* (Vol. 24, Issue 1). https://doi.org/10.1111/j.1096-0031.2007.00169.x

Vrachioli, M., Mellios, N., Alp, E., Borchard, N., Calheiros, C. S. C., Castelli, G., Coletta, V. R., Carvalho, P. N., Domínguez-Soberanes, J., Fader, M., Giordano, R., Madrid-López, C., Oral, H. V., Papadopoulou, C.-A., Papadopoulou, M., Pereira, S. I. A., Pineda-Martos, R., StepisnikPerdih, T., Vamvakeridou-Lyroudia, L., … Laspidou, C. (2025). WEFE nexus unveiled: a comprehensive review of monitoring and modelling methods in the water-energy-food-ecosystems nexus. *Environmental Research Letters*, *20*(11). https://doi.org/10.1088/1748-9326/ae0da3

Wagner, N., Sarkki, S., & Dietz, T. (2024). More than policy neutral: Justifying the power of science-policy interfaces through legitimacy. In *Earth System Governance* (Vol. 21). https://doi.org/10.1016/j.esg.2024.100219

Wagner, P. D., Kumar, S., & Fohrer, N. (2023). Integrated modeling of global change impacts on land and water resources. *Science of the Total Environment*, *892*. https://doi.org/10.1016/j.scitotenv.2023.164673

Wang, H. C., Wang, Y. Q., Wang, X., Yin, W. X., Yu, T. C., Xue, C. H., & Wang, A. J. (2024). Multimodal Machine Learning Guides Low Carbon Aeration Strategies in Urban Wastewater Treatment. *Engineering*, *36*. https://doi.org/10.1016/j.eng.2023.11.020

Wang, N., Liang, H., Jia, Y., Ge, S., Xue, Y., & Wang, Z. (2016). Cloud computing research in the IS discipline: A citation/co-citation analysis. *Decision Support Systems*, *86*. https://doi.org/10.1016/j.dss.2016.03.006

Wang, Y. A., & Rhemtulla, M. (2021). Power Analysis for Parameter Estimation in Structural Equation Modeling: A Discussion and Tutorial. *Advances in Methods and Practices in Psychological Science*, *4*(1). https://doi.org/10.1177/2515245920918253

Wardani, K. D. K. A., Ningtara, M. D. R., & Gorda, A. A. N. E. S. (2025). Empowering Narratives: Critical Discourse Analysis of Gender Resistance in “Enola Holmes” Movie. *RETORIKA: Jurnal Ilmu Bahasa*, *11*(1).

Watkins, F. (2023). Do institutional or subject referencing style choices create barriers for students with specific learning disability? *Journal of Learning Development in Higher Education*, *29*. https://doi.org/10.47408/jldhe.vi29.1094

Wee, S. Y., & Aris, A. Z. (2019). Occurrence and public-perceived risk of endocrine disrupting compounds in drinking water. In *npj Clean Water* (Vol. 2, Issue 1). https://doi.org/10.1038/s41545-018-0029-3

Wesselink, A., Kooy, M., & Warner, J. (2017). Socio-hydrology and hydrosocial analysis: toward dialogues across disciplines. In *Wiley Interdisciplinary Reviews: Water* (Vol. 4, Issue 2). https://doi.org/10.1002/WAT2.1196

Weyant, E. (2022). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 5th Edition. *Journal of Electronic Resources in Medical Libraries*, *19*(1–2). https://doi.org/10.1080/15424065.2022.2046231

White, D. D., Jones, J. L., Maciejewski, R., Aggarwal, R., & Mascaro, G. (2017). Stakeholder analysis for the food-energy-water nexus in Phoenix, Arizona: Implications for nexus governance. *Sustainability (Switzerland)*, *9*(12). https://doi.org/10.3390/su9122204

Widarjono, A. (2005). Ekonometrika : Teori dan Aplikasi Untuk Ekonomi dan Bisnis. In *Buku scan*.

Wiefek, J., Nagy, E., & Schäfer, M. (2024). Formative evaluation of transdisciplinary research for systematic impact orientation in real-world laboratories. *GAIA - Ecological Perspectives for Science and Society*, *33*. https://doi.org/10.14512/gaia.33.S1.14

Wiegleb, V., & Bruns, A. (2018). What is driving the water-energy-food nexus? Discourses, knowledge, and politics of an emerging resource governance concept. In *Frontiers in Environmental Science* (Vol. 6, Issue OCT). https://doi.org/10.3389/fenvs.2018.00128

Wijanto, M. C., Widiastuti, I., & Yong, H. S. (2024). Topic Modeling for Scientific Articles: Exploring Optimal Hyperparameter Tuning in BERT. *International Journal on Advanced Science, Engineering and Information Technology*, *14*(3). https://doi.org/10.18517/ijaseit.14.3.19347

Wilby, R. L., Orr, H., Watts, G., Battarbee, R. W., Berry, P. M., Chadd, R., Dugdale, S. J., Dunbar, M. J., Elliott, J. A., Extence, C., Hannah, D. M., Holmes, N., Johnson, A. C., Knights, B., Milner, N. J., Ormerod, S. J., Solomon, D., Timlett, R., Whitehead, P. J., & Wood, P. J. (2010). Evidence needed to manage freshwater ecosystems in a changing climate: Turning adaptation principles into practice. *Science of the Total Environment*, *408*(19). https://doi.org/10.1016/j.scitotenv.2010.05.014

Willis, L. D. (2023). How to Present Your Research Findings at a Scientific Meeting. *Respiratory Care*, *68*(11). https://doi.org/10.4187/respcare.11226

Wills, W. (2022). The Results and Discussion an A Scientific Article: A Vision on its Structural Organization, Short Communication. *Clinical and Medical Research and Studies*, *1*(1). https://doi.org/10.59468/2836-8525/004

Wilson, N. J., Harris, L. M., Nelson, J., & Shah, S. H. (2019). Re-theorizing politics in water governance. *Water (Switzerland)*, *11*(7). https://doi.org/10.3390/w11071470

Wong, E. C., Maher, A. R., Motala, A., Ross, R., Akinniranye, O., Larkin, J., & Hempel, S. (2022). Methods for Identifying Health Research Gaps, Needs, and Priorities: a Scoping Review. In *Journal of General Internal Medicine* (Vol. 37, Issue 1). https://doi.org/10.1007/s11606-021-07064-1

Wu, X., Zhou, Q., Mu, L., & Hu, X. (2022). Machine learning in the identification, prediction and exploration of environmental toxicology: Challenges and perspectives. *Journal of Hazardous Materials*, *438*. https://doi.org/10.1016/j.jhazmat.2022.129487

Xenarios, S., Assubayeva, A., Xie, L., Sehring, J., Amirkhanov, D., Sultanov, A., & Fazli, S. (2020). A bibliometric review of the water security concept in Central Asia. In *Environmental Research Letters* (Vol. 16, Issue 1). https://doi.org/10.1088/1748-9326/abc717

Xu, D., Wu, W., Ma, Y., & Feng, D. (2025). Research on Wetland Fine Classification Based on Remote Sensing Images with Multi-Temporal and Feature Optimization. *Sustainability (Switzerland)*, *17*(24). https://doi.org/10.3390/su172410900

Yandell, B. S., & Anselin, L. (1990). Spatial Econometrics: Methods and Models. *Journal of the American Statistical Association*, *85*(411). https://doi.org/10.2307/2290042

Yu, D. J., Haeffner, M., Jeong, H., Pande, S., Dame, J., Di Baldassarre, G., Garcia-Santos, G., Hermans, L., Muneepeerakul, R., Nardi, F., Sanderson, M. R., Tian, F., Wei, Y., Wessels, J., & Sivapalan, M. (2022). On capturing human agency and methodological interdisciplinarity in socio-hydrology research. *Hydrological Sciences Journal*, *67*(13). https://doi.org/10.1080/02626667.2022.2114836

Yulianto, Yasin, A., Kuswondho, H., & Nasir, A. A. (2023). *Bridging the Gap Between Economics and Ecology in Peatland Restoration (Case Study: Paludiculture of Sago in Pulau Padang Peatland Hydrological Unit, Riau)*. https://doi.org/10.2991/978-94-6463-140-1_9

Yunita, T. (2019). Peramalan Jumlah Penggunaan Kuota Internet Menggunakan Metode Autoregressive Integrated Moving Average (ARIMA). *Journal of Mathematics: Theory and Applications*, *1*(2).

Yuvhendmindo, M. R., Wijayanti, E., Rendy, M., Azizi, F. N., & Hutabarat, W. F. T. (2026). Hydrosociality and Eco-Socialist Thought: Bibliometric Mapping of Research on Water Governance and Social Justice. *Capitalism Nature Socialism*. https://doi.org/10.1080/10455752.2026.2613214

Zha, Y., Gao, J., & Ni, S. (2003). Use of normalized difference built-up index in automatically mapping urban areas from TM imagery. *International Journal of Remote Sensing*, *24*(3). https://doi.org/10.1080/01431160304987

Zhang, Y., Fu, B., Feng, X., & Pan, N. (2022). Response of Ecohydrological Variables to Meteorological Drought under Climate Change. *Remote Sensing*, *14*(8). https://doi.org/10.3390/rs14081920

Zheltukhina, M. R., Sergeeva, O. V., Masalimova, A. R., Budkevich, R. L., Kosarenko, N. N., & Nesterov, G. V. (2024). A bibliometric analysis of publications on ChatGPT in education: Research patterns and topics. In *Online Journal of Communication and Media Technologies* (Vol. 14, Issue 1). https://doi.org/10.30935/ojcmt/14103

Zhong, C., Li, T., Bi, R., Sanganyado, E., Huang, J., Jiang, S., Zhang, Z., & Du, H. (2023). A systematic overview, trends and global perspectives on blue carbon: A bibliometric study (2003–2021). In *Ecological Indicators* (Vol. 148). https://doi.org/10.1016/j.ecolind.2023.110063

Zumitzavan, V. (2025). Research Methodologies and Designs. In *Social Science Methodologies for Management Research*. https://doi.org/10.1007/978-981-95-4318-2_3

PROFIL PENULIS

Dr. Bokiraiya Latuamury,S.Hut, M.Sc adalah akademisi, peneliti, dan pemikir lingkungan yang mendedikasikan karier intelektualnya pada penguatan metodologi penelitian sebagai fondasi transformasi keberlanjutan global. Dengan kepakaran yang mengintegrasikan ekologi, hidrologi, tata kelola sumber daya alam, serta analisis kebijakan berbasis sistem sosio-ekologis, ia memposisikan Ilmu Lingkungan bukan sekadar sebagai disiplin akademik, melainkan sebagai arena strategis untuk menjawab tantangan planet abad ke-21. Di tengah kompleksitas krisis iklim, degradasi hutan, dan ketimpangan akses sumber daya air, Dr. Latuamury menghadirkan pendekatan ilmiah yang menghubungkan ketelitian metodologis dengan keberanian intelektual. Baginya, penelitian bukan hanya aktivitas teknis, tetapi proses reflektif yang menuntut integritas, kedalaman analitis, serta tanggung jawab moral terhadap masyarakat dan bumi. Perspektif ini menjadikan setiap karyanya berdiri pada simpul antara sains, kebijakan, dan transformasi sosial.

Sebagai penulis dan pembina publikasi ilmiah yang aktif di tingkat nasional dan internasional, ia dikenal atas kemampuannya mengintegrasikan analisis spasial, pemodelan kuantitatif, pendekatan partisipatif, serta teknologi digital mutakhir seperti remote sensing, big data analytics, dan Artificial Intelligence. Integrasi ini tidak hanya memperkuat kualitas riset, tetapi juga membangun jembatan antara konteks lokal—khususnya wilayah kepulauan tropis—dengan diskursus akademik global. Komitmennya terhadap generasi ilmuwan muda tercermin dalam dedikasinya membangun kultur akademik yang produktif, etis, dan berdaya saing internasional. Melalui buku ajar ini, ia tidak sekadar menyampaikan teori metode penelitian, tetapi mentransformasikannya menjadi peta jalan strategis—dari perumusan masalah hingga publikasi bereputasi. Ia meyakini bahwa mahasiswa dan peneliti muda harus dipersiapkan bukan hanya untuk lulus, melainkan untuk berkontribusi pada percakapan ilmiah dunia.

Dalam kepemimpinan akademiknya, Dr. Latuamury secara konsisten mendorong praktik open science, transparansi metodologis, dan reproducibility sebagai pilar reputasi ilmiah jangka panjang. Ia menegaskan bahwa kredibilitas seorang ilmuwan dibangun melalui konsistensi, keberanian intelektual, dan komitmen terhadap solusi berbasis bukti. Prinsip-prinsip ini menjadikan pendekatannya relevan bagi komunitas akademik lintas negara dan lintas disiplin. Melalui karya ini, Dr. Latuamury menghadirkan visi tentang ilmuwan lingkungan masa depan: kritis dalam berpikir, presisi dalam metodologi, adaptif terhadap transformasi teknologi, dan berorientasi pada dampak keberlanjutan global. Profilnya merepresentasikan perpaduan antara kedalaman intelektual dan daya pengaruh edukatif—sebuah fondasi yang menjadikan buku ini tidak hanya sebagai referensi akademik, tetapi sebagai inspirasi bagi pembaca global yang ingin berperan aktif dalam membangun masa depan bumi yang lebih adil dan berkelanjutan.

Di era ketika krisis iklim, degradasi hutan, ketahanan air, dan ketimpangan sosial-ekologis semakin saling terkait, penelitian lingkungan tidak lagi dapat diposisikan sebagai aktivitas akademik rutin. Ia harus menjadi instrumen perubahan. Buku ajar ini lahir dari kesadaran bahwa masa depan keberlanjutan global bergantung pada kualitas cara kita merumuskan masalah, membangun argumen ilmiah, dan memproduksi pengetahuan yang dapat diuji. Dengan visi tersebut, buku ini menghadirkan metodologi penelitian sebagai fondasi transformasi—bukan sekadar prosedur teknis, melainkan arsitektur intelektual untuk membangun solusi yang berdampak. Berbeda dari buku metode penelitian konvensional yang cenderung fragmentaris, karya ini menyusun penelitian sebagai sistem berpikir yang utuh.

Ilmu Lingkungan diposisikan sebagai disiplin interdisipliner yang menuntut integrasi kuantitatif, kualitatif, dan spasial secara simultan. Pembaca diajak melampaui penyusunan proposal administratif menuju konstruksi kerangka konseptual yang tajam, inferensi analitis yang presisi, serta argumentasi yang mampu berdialog dengan komunitas ilmiah global. Di sini, metodologi bukan hanya alat—ia adalah strategi intelektual. Setiap bab dirancang sebagai tahapan evolusi kompetensi: dari menemukan research gap yang otentik, membangun model konseptual yang kuat, memilih metode yang relevan, hingga mengelola data secara transparan dan etis. Buku ini tidak hanya menjawab pertanyaan "bagaimana meneliti", tetapi juga "mengapa meneliti dengan cara tertentu". Dengan pendekatan yang koheren dan terintegrasi, pembaca dibimbing untuk memahami bahwa kualitas penelitian ditentukan oleh konsistensi logika berpikir dan ketelitian metodologis.

Di tengah transformasi digital global, buku ini secara progresif mengintegrasikan pemanfaatan Geographic Information Systems (GIS), remote sensing, big data analytics, serta Artificial Intelligence dalam riset lingkungan. Integrasi teknologi tersebut bukan sekadar tambahan teknis, melainkan strategi peningkatan daya saing akademik. Pembaca dipersiapkan untuk menghadapi standar publikasi internasional yang semakin menuntut reproducibility, transparansi data, dan ketajaman analitis berbasis sistem kompleks. Namun lebih dari itu, buku ini menempatkan etika penelitian dan integritas ilmiah sebagai jantung reputasi akademik jangka panjang. Dalam lanskap akademik global yang kompetitif, kredibilitas dibangun melalui konsistensi, keberanian intelektual, dan tanggung jawab terhadap dampak sosial-ekologis penelitian. Perspektif ini menjadikan penelitian sebagai kontribusi nyata bagi keberlanjutan bumi, bukan sekadar capaian akademik individual.

Ditulis oleh Dr. Latuamury, seorang akademisi dan peneliti yang secara konsisten menjembatani konteks tropis kepulauan dengan percakapan ilmiah internasional, buku ini memadukan kedalaman teoritis dan pengalaman empiris lapangan. Perspektif sistem sosio-ekologis yang diusungnya memperluas cakrawala pembaca untuk melihat isu lokal sebagai bagian dari dinamika global yang saling terhubung. Dengan demikian, buku ini berbicara kepada mahasiswa, peneliti muda, dan akademisi lintas negara yang ingin menempatkan risetnya dalam arena internasional.

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