

Taiwan Biodiversity Observation Network

臺灣生物多樣性觀測網

Information System Annual Report

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Issue 3



TaiBON Development and Information System Annual Report

Chilai Main North Prism.
Source: Photo by Su Yu

TaiBON, established in 2015 with FPA support, adopted the "Pressure-Status-Benefit-Response" framework for national biodiversity indicators. Projects in 2019-2020 and ongoing since 2021 have garnered international recognition for their dedicated efforts in biodiversity.

The TaiBON team can be categorized into three major structures: data, indicator, and system, according to the data collection, processing flow, and presentation. The information system team is responsible for storing the developed indicators/data in the cloud data warehouse in a format that is convenient for data exchange, so that it can be accessed by personnel from related fields and research units. In addition, the team is also responsible for the construction, maintenance, and updating of the TaiBON portal in order to improve the effectiveness of TaiBON and promote it to the domestic biodiversity community.

The TaiBON Portal prototype in 2016 led to the current website after user analysis. 2017 focused on data integration, testing, and dashboard development. 2018 saw the website launch with ongoing improvements. 2019 aims to enhance mobile browsing with a responsive design.

In 2020, we established data integration

mechanisms and biodiversity indicator exchange standards. By 2021, TaiBON's website had an English interface, standardized translations, and integrated GA tracking. In 2022, we upgraded site security and migrated servers for smooth user access.

Annually, the information team gathers new indicators and data to refresh the TaiBON website content. As the project advances, the website's outdated design and user experience necessitate an essential update. This year, the information system focused on revamping the TaiBON portal website. We completed redesigns for the homepage, indicator dashboard, and overall indicator overview, including style, layout, font, and international biodiversity framework updates.

To monitor website visits, we use Google Analytics (GA) tools continuously. This year, we had 22,137 total page views, a rise from previous years, with an increase of 4,751 compared to 2022. The user count reached 10,097, the highest since implementing GA, showing an increase of 2,398 users compared to last year.

In the future, we'll upgrade the visual aspects of indicator pages. We'll also maintain and update the website with the latest indicator data for relevant users.

Development

National Biodiversity Monitoring and Reporting System Planning

Taiwan actively preserves its ecology and practices sustainable resource management. In 2005, the Forestry and Nature Conservation Agency proposed 14 biodiversity monitoring indicators for the country.

To fulfill global biodiversity goals, the FPA launched the "National Biodiversity Monitoring and Reporting System Planning" in 2015. This integrated international biodiversity indicators, enhanced local research, and established the TaiBON, serving as a reference for future actions and international alignment.



Taiwan Biodiversity Observation Network (TaiBON) was established in 2015.



TaiBON Portal Website Maintenance, Updating and Frontend Revamping

This year, the website underwent substantial updates to align with global biodiversity standards.

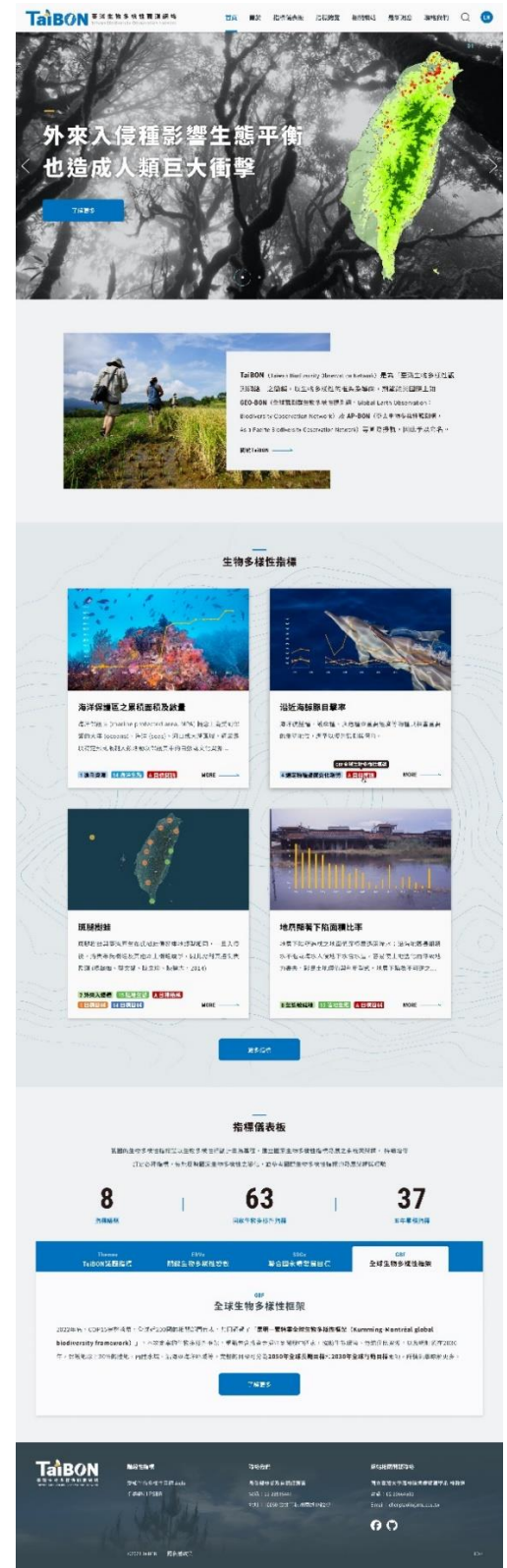
This year, TaiBON's portal will be revamped to adapt to evolving spatial and data content needs. The updated site will emphasize TaiBON's uniqueness, focusing on indicator trends that simplify complex data into actionable metrics for policymaking and effective management.

The updated website will prioritize graphical representation of indicators, aiding users in understanding biodiversity trends. It aims to offer more focused information beyond raw data, catering to both upstream/downstream biodiversity users and the public interested in global biodiversity dynamics.

The new TaiBON portal adopts a fresh

and simple visual style, utilizing lines and distinctive colors throughout the layout for a modern aesthetic. This design aims to captivate users' attention, ensuring a longer duration of user engagement. The team referenced international biodiversity websites to ensure global design consistency. Special emphasis was placed on selecting engaging biodiversity-related images, enriching the site's visual appeal, and breaking the monotony of information presentation. These images vividly showcase Taiwan's diverse ecology.

The interface integrates the Kunming-Montreal Global Biodiversity Framework released (GBF) by the Convention on Biological Diversity (CBD) in December 2022, along with the Essential Biodiversity Variables (EBVs) developed collaboratively by the international scientific community.



This year, TaiBON updated its homepage and dashboard to enhance global biodiversity indicators. Source: TaiBON Information Systems Team.

Essential Biodiversity Variables, EBVs

EBVs, Essential Biodiversity Variables, are the result of collaborative development by the global scientific



From top left, Genetic composition, Species populations, Species traits, Community composition, Ecosystem functioning, and Ecosystem structure. Source: GEO BON

community, including entities like the United Nations Environment Programme (UNEP), Biodiversity Information Platform (BIP), International Union for Conservation of Nature (IUCN), and United Nations Educational, Scientific and Cultural Organization (UNESCO). This concept emerged from global ecology and biodiversity research, a joint effort among numerous scientists, experts, and research institutions.

Global ecology and biodiversity studies merge ecology, biology, geographic information systems, and environmental science. EBVs stem from this collaboration to monitor global biodiversity, assessing its health and variability. This unified framework aids consistent biodiversity data

collection and analysis.

The EBVs concept and framework originated in 2013 to address the global necessity for standardized biodiversity variables. This framework aimed to enhance comprehension, monitoring, and response to biodiversity loss through unified and comparable measures.

As per the GEO BON website, EBVs are classified across 6 levels of biodiversity: Genetic composition, Species populations, Species traits, Community composition, Ecosystem functioning, and Ecosystem structure. These 6 EBV classes encompass various variables to monitor biological characteristics at different levels, totaling 21 EBVs.



The 4 long-term goals and 23 action-oriented global targets of the GBF. Source: TaiBON Information Systems Team.

The GBF strongly correlates with TaiBON's core concepts. Since the CBD's inception in 1993, Parties have been urged to submit National Reports on biodiversity status and actions taken. With 196 States Parties, compiling comprehensive national reports aids global biodiversity status. This data, analyzed at various scales, benefits scientific research, policy development, and environmental conservation.

The 6th edition (2018) of the National Report includes 7 sections: national objectives pursued, effectiveness assessment of measures taken, progress on objectives, contribution to Aichi Biodiversity Targets, Global Strategy for Plant Conservation (GSPC) targets progress, indigenous peoples/local communities' contributions to Aichi Targets, and updated biodiversity profiles.

The GBF follows a multi-tiered structure, comprising goals, indicator categories, and various indicators. It includes 4 long-term targets for 2050 and 23 action-oriented global targets for 2030. Indicators are grouped into Headline, Component, and Complementary categories, tailored for assessing global biodiversity changes.

The terrestrial team initially organized 122 indicators, with TaiBON's team integrating their existing indicators. Future plans involve presenting TaiBON indicators alongside the GBF.

Objectives, indicator types, and individual indicators are not exclusive; one indicator can fulfill multiple objectives, forming a versatile relationship. The website design centers on each indicator as a core unit, enhancing attributes through tags for streamlined filtering. Coding rules are planned for standardizing GBF indicators and accommodating future additions.

Unlike the current TaiBON indicators, numbered by themes and Roman numerals, the new indicators will be categorized differently and listed based on their creation order. Each indicator will have a dedicated webpage, like existing TaiBON ones, containing essential details. Any additions or modifications to indicators will follow the existing data quality assessment system.

Distinguishing Features: Old vs. New Website Versions Home, Dashboard, and Overview Page

TaiBON's revamped website features vibrant design changes for livelier visuals. It emphasizes a streamlined user experience by removing distracting animations. Font sizes are increased for improved readability on both web and mobile platforms. The layout enhancements include concise indicator descriptions on the homepage, visual charts, and a new card-based view.

The TaiBON website revamp aligns the project indicators dashboard with updated content, catering to increased complexity while ensuring better alignment with the GBF's structure and indicators.

Differences in the old and new Indicator Dashboards: Replaced Biodiversity Framework, removed Aichi Targets/PSBR, introduced GBF and EBVs. Added low-color blocks for distinction. Design for better indicator/content and changed from old lightbox to card-like display for improved usability.

For TaiBON website users frequently accessing indicator data, the Indicator Overview page acts as a convenient gateway. The update focuses on improving visuals and functionality guidance. Notable changes involve a revamped banner design, displaying text in lighter fonts, and introducing a scroll-down arrow. The page's aesthetics are aligned with the site's overall style, adjusting colors, buttons, and table formats. Columns are refined for better organization, and filters are enhanced to match the updated Indicator Dashboard, ensuring improved usability.

Revamping the TaiBON portal aims to boost visibility and use of developed indicators in biodiversity research and governance.

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Google Analytics 4 Annual Monitoring Data

Google Analytics (GA) stands as a widely-used web analysis tool. Embedded tracking codes within the website backend enable administrators to monitor user visits, sources, and behavior. This tool is employed by various international biodiversity websites, including FinBIF and IBP.

GA4 facilitates TaiBON's team in analyzing user traits such as access sources, geographic origin, device usage, user counts, and page visits. This data unveils popular pages, indicators, and browsing paths, offering insights to optimize the website's layout and enhance the user interface and experience (UI/UX).

Upon entering TaiBON's portal, the browser activates tracking code. Reports are available on GA's backend within 24-48 hours of server updates for admin review. GA4 tracks user events to monitor behaviors. The team embedded GA tracking code in August 2021, and from July 1, 2023, GA4 replaces GA service.

Annual page views hit 22,137, up by 4,751 from 2022. This year saw 10,097 users, the highest count since GA analysis began—an increase of 2,398 users from last year. Users access TaiBON's website through diverse sources: keyword searches, social media, or external links.

This year, the sources of website access ranked as follows: organic search (87.58% - 8,260 hits) was the highest, followed by direct traffic (9.86% - 930 hits), referral (2.07% - 195 hits), and social (0.49% - 46 hits). These figures provide insights into the diverse channels through which users accessed the website.

Based on browsing devices, desktops accounted for 69.63% (6,570 times), mobile phones for 28.67% (2,705 times), and tablets for 1.70% (160 times). In terms of language, users were primarily Chinese (92.03% - 8,644 times), followed by English (7.47% - 702 times), Japanese (0.35% - 33 times), and French (0.15% - 14 times). These data highlight device and language preferences among visitors.

GA, the widely used web analytics tool, allows comprehensive monitoring of user behavior on websites.

This year, the website garnered 211 page views, where the top 10 pages accumulated 11,160 views, representing 50.41% of total page views. The most frequented pages, in descending order, included the homepage, indicator overview, and Aichi Biodiversity Targets. Among these, five focused on website/TaiBON introduction, two addressed biodiversity targets/framework, two featured TaiBON indicators, and one presented the latest news.

In the latter part of this year, GA4 tracked 4 events: page_view, session_start, first_visit, and timing_complete, totaling 20,267 occurrences. On average, page_view occurred 2.32 times per user, session_start 1.33 times, first_visit once, and timing_complete 1.86 times.

This year, TaiBON's website saw a 27.33% rise in visits and a 31.15% increase in users compared to last year. The site's revisions prompted revisits for old information, influencing the GA4 tracking. The growing interest in biodiversity also drove up demand for related data and indicators.

Effects of Third-Party Cookie Elimination

Starting July 1, 2023, Google will stop processing new data in standard resources, replacing it with GA4 Analytics Resource service. Website administrators will adjust settings for a full transition to GA4. This change aligns with the GDPR's 2018 emphasis on user privacy regarding cookies, limiting third-party cookie use. Major companies and ad tech firms are exploring alternatives like UID 2.0 and privacy sandboxing due to these limitations.

A cookie, a tiny text file (.txt), stores user login details, historical data (like shopping cart items), and tracks browsing behavior on a website. By retaining this data, websites improve user experience, minimizing the need for repetitive information input.

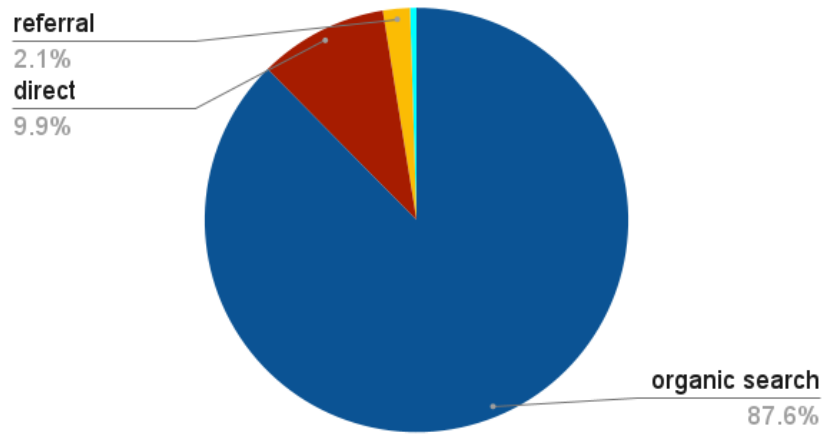
Website cookies are stored within a domain. When a user revisits the same domain, it's a first-party cookie. However, websites often host external ads. Clicking these ads changes the cookie's domain, turning it into a third-party cookie. These cookies collect browsing data from external links and track the user's history on the original site. As a result, this method has become crucial for gathering consumer information in the ad tech industry.

Since GDPR's enforcement in 2018, Google has announced a complete ban on third-party cookies by 2024, leading to significant adjustments in GA's tracking methods.

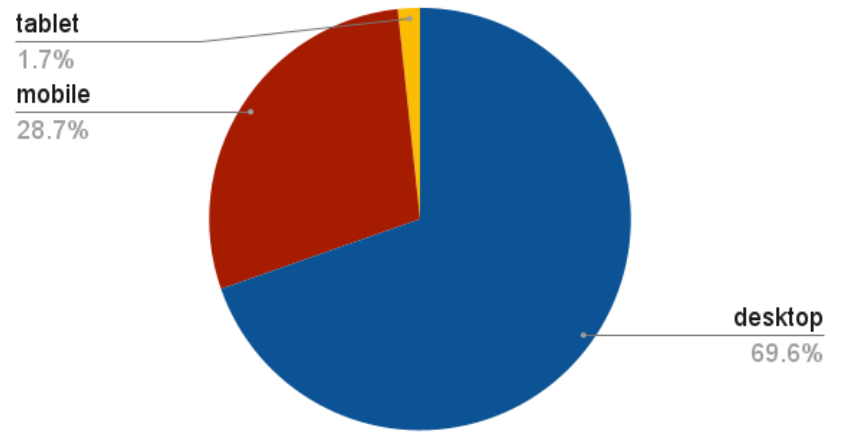


Following the 2018 EU GDPR policy, Google removed third-party cookies, prompting significant revisions to GA functionality.

TaiBON入口網站使用者入站來源比例圓餅圖

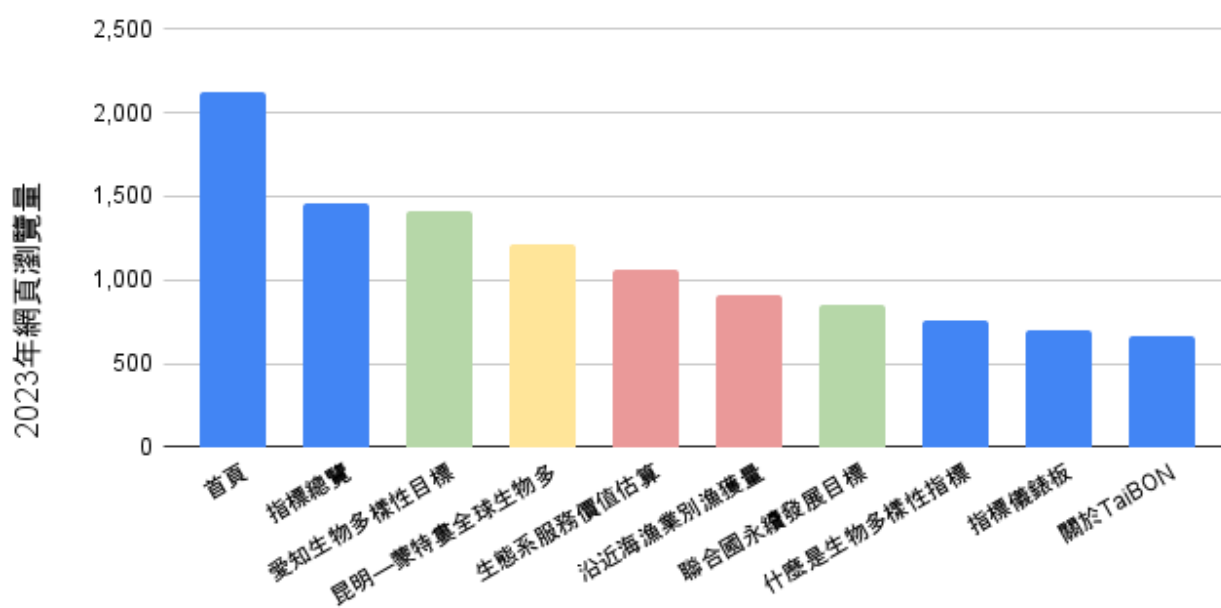


TaiBON入口網站裝置使用比例圓餅圖



Left: Users' inbound sources, blue is organic search, red is direct, yellow is referral, and cyan is community. Right: The device used is desktop in blue, mobile in red, and tablet in yellow. Source: TaiBON Information Systems Team.

2023年TaiBON入口網站前十名網頁瀏覽量長條圖



Blue for TaiBON intro, green for framework, red for indicators, and yellow for latest news. Source: TaiBON Information Systems Team.

Users' sources of access to a website reveal their visiting intent. Analyzing these sources aids in adjusting promotions and resource allocation. TaiBON portal receives 87.6% of its traffic from natural searches, showcasing robust SEO strategies. This high percentage suggests users trust TaiBON to deliver valuable information, demonstrating the site's effectiveness in providing relevant content.

To target eco professionals, boost direct traffic. For broader public outreach, leverage social media, external sites, or forums to drive community traffic to your website.

The top ten pages this year saw five

TaiBON introduction pages, notably the homepage, which received 2,128 views. This interest in the introduction pages suggests users seek a comprehensive understanding of TaiBON's network and positioning upon entering the site. Offering clear and complete information about TaiBON positively impacts both the website and its users.

The Aichi Targets (3rd) and SDGs (7th) are international biodiversity pages, both ranking among the top ten. The Kunming-Montreal Global Biodiversity Framework's Long-term Targets and 23 Action Objectives, the sole Latest News entry, ranked fourth, posted on May 21st, suggesting high attention. Future plans involve GA4 tracking for Framework-related pages to gauge user interest.

Future Prospects Empowering the Advancement of TaiBON through the Website

Throughout the year, our team revamped the portal, ensuring seamless functioning. We aligned the site with international trends by reviewing GBF and EBVs. Continuously monitoring user metrics, preferences, and site features, we regularly update content and metrics with input from the Land and Sea team.

The portal will update indicators, support team development, and advocate for biodiversity's importance.

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