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Citizen science for SDG delivery, data, and measurement

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CROPS

Curating, Replicating, Orchestrating and Propagating

Citizen Science across Europe

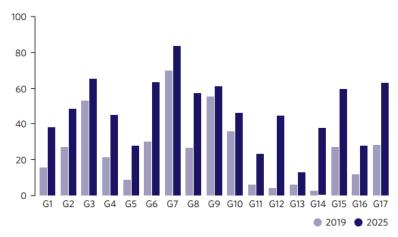January 2024 – December 2026

**Funded by
the European Union**

Proportion of countries or areas with trend data (at least two data points since 2015), comparing 2019 and 2025 databases, by Goal (percentage)
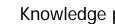

● 2019   ● 2025

Citizen science

Public Participation

Knowledge production

Voluntary contributions
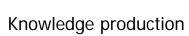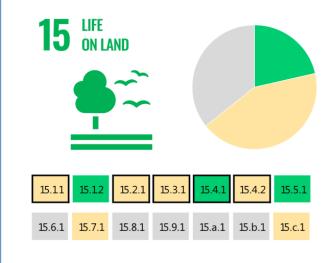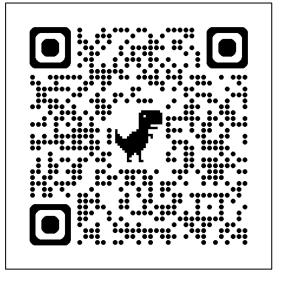
The SDG indicators where citizen science projects are "already contributing" (in green), "could contribute" (in yellow) or where there is "no alignment" (in grey). The overall citizen science contributions to each SDG are summarized as pie charts.

Fraisl, D., Campbell, J., See, L. *et al.* Mapping citizen science contributions to the UN sustainable development goals. *Sustain Sci* **15**, 1735–1751 (2020). https://doi.org/10.1007/s11625-020-00833-7

GLOBAL RECOGNITION AND IMPACT

@Smart Nature Freaks Youth Volunteers Foundation
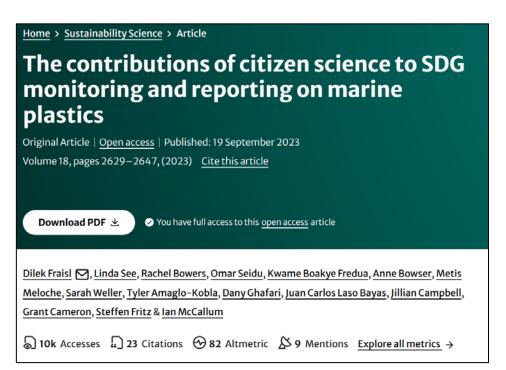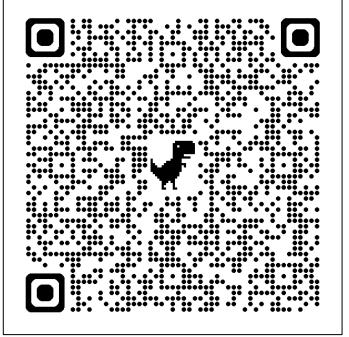
- Ghana has become the first country to integrate existing citizen science data on marine plastic litter into their official statistics, as well as SDG monitoring and reporting

- The results have been used in Ghana's Voluntary National Review of the SDGs, and reported on the UN SDG Global Database

- The results are also informing the integrated coastal and marine management policy in Ghana, currently under development

- The initiative has helped to bridge local data collection efforts with global monitoring processes and policy agendas by leveraging the SDG framework

- Partnerships with citizen science networks that are gathering these data in Ghana have been built to ensure sustainability of data and the approach, led by the NSO

- Other countries, such as Siera Leone and Colombia, are also adopting the approach and have engaged in knowledge exchange workshops with Ghana aimed at replicating the model and process
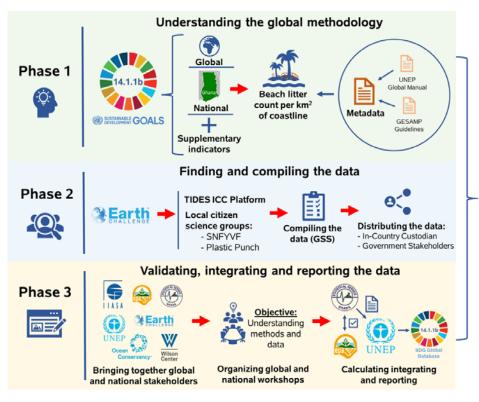
GLOBAL RECOGNITION AND IMPACT

- Recognized in the UN SDG Reports published by the UN Statistics Division (UNSD) (both in 2023 & 2024 editions)

- Showcased on the UNSD website as a best practice model

- Highlighted in the UN Statistical Commission - Secretary General's Report (Statistical Commission Fifty-sixth session, 2025)

- Influenced other UN agencies (e.g., UNDP's work on SDG 16 citizen satisfaction indicator, UN-HABITAT Quality of Life Indicator Framework)

- Won the Group on Earth Observations (GEO) SDG Award, including its second phase (drones, citizen science and AI integration to produce litter density maps)

- Featured by the UNSD Citizen Data Collaborative across sessions, publications, and best practice platforms

- Featured in a recent Nature Sustainability perspective piece, which was then highlighted in a Nature editorial

- Presented at the UN World Data Forum, UN Statistical Commission, UN Environment Assembly, UN Big Data and Data Science for Official Statistics Conference, and other major UN events, and scientific conferences; published on the Worl Bank blog

@Smart Nature Freaks Youth Volunteers Foundation

The process of integrating citizen science data on marine litter for SDG indicator 14.1.1b reporting in Ghana

Table S2: Checklist for the process of leveraging existing citizen science data for 14.1.1b reporting

Phase 1: Understanding the global methodology for indicator 14.1.1b on *plastic debris density*
▯ Examine the global methodology for SDG indicator 14.1.1b with a focus on beach litter - average count of plastic items per km^2;
▯ Review the SDG Indicator 14.1.1b Metadata (UN 2021);
▯ Review the Global Manual on Measuring SDG 14.1.1, SDG 14.2.1 and SDG 14.5.1. (UNEP 2021);
▯ Review the GESAMP Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean (GESAMP 2019);
▯ Identify additional aims beyond SDG monitoring, if applicable. Examples include:
▯ Policy formulation;
▯ Education and awareness raising;
▯ Supporting citizen science initiatives for future data collection activities.
Phase 2: Finding and compiling the data
▯ Create a list of key stakeholders for in-country, as well as global engagement, e.g., NSO, line ministries, CSOs, academia, UNEP, ICC, etc.;
▯ Explore if there are existing citizen science projects, local citizen scientist networks or citizen science data available in the country. Examples of data platforms include:
▯ Global Earth Challenge Marine Litter Data Integration Platform (Earth Day Network 2021);
▯ ICC TIDES database (Ocean Conservancy 2022).
▯ If data are available, investigate issues, such as:
▯ The number of beach litter collections per year;
▯ The dispersion of the locations of the data collection activities;
▯ The classification of litter into plastics and non-plastics as per the global methodology;
▯ Completeness of the data; whether area covered is captured or needs to be approximated;
▯ Any outlier values available in the data set.
Phase 3: Validating, integrating, and reporting the data
▯ Bring key stakeholders together and ensure their engagement by providing a platform to communicate needs, motivations, and concerns;
▯ Ensure both national and global level coordination and collaboration that goes beyond the data validation activity;
▯ Organize several workshops with clear goals, such as:
▯ Understanding the methodologies developed by the citizen science projects;
▯ Determining how these methodologies were implemented by local citizen scientist networks and CSOs;
▯ Understanding the eligibility of coastal sites:
▯ Identifying any geographic areas of policy interest and any existing litter prevention interventions;
▯ Discerning between sites with land- or ocean-sourced litter flows.
▯ Clarifying any open issues with the data set;
▯ Identifying areas of future improvements of the methodologies or their implementation;
▯ Understanding the limitations and challenges of citizen science data and how to overcome them or minimize their effect;
▯ Ensuring that the data produced are of sufficient quality for informing the SDG indicator 14.1.1b, as well as policy action;
▯ Ensuring that the ethical principles are followed while developing and using the methodology, e.g., data privacy, etc.
▯ Determining whether citizen science methodologies could be integrated into future policy monitoring.
▯ Gather a small team of statisticians and thematic experts for data validation;
▯ Identify any shortcomings related to the data set. Some of the questions that can be asked here include:
▯ Does the citizen science methodology align with the global 14.1.1b methodology?
▯ Was the area covered captured during data collection?
▯ Were the data collection sites selected using a sampling method or opportunistically (with no sampling design)?
▯ If opportunistically, could the data be representative of the overall country?
▯ Calculate the indicator, with support from UNEP and other partners if needed;
▯ Follow the in-country structures and regulations to communicate the results, e.g., official communique between government agencies;
▯ Consider reporting the results to the UN SDG Global Database and in the Voluntary National Review, once approved;
▯ Use the results for policy development or improvement.

SDG 16.6.2
Citizen Satisfaction with Public Services

Perspective

Leveraging the collaborative power of AI and citizen science for sustainable development

Dilek Fraisl [1,2][✉], Linda See [1], Steffen Fritz [1,2], Mordechai Haklay (Muki)[3,4] & Ian McCallum [1]
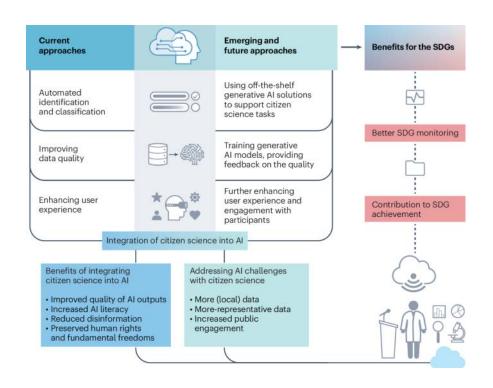
Both artificial intelligence (AI) and citizen science hold immense potential for addressing major sustainability challenges from health to climate change. Alongside their individual benefits, when combined, they offer considerable synergies that can aid in both better monitoring of, and achieving, sustainable development. While AI has already been integrated into citizen science projects such as through automated classification and identification, the integration of citizen science approaches into AI is lacking. This integration has, however, the potential to address some of the major challenges associated with AI such as social bias, which could accelerate progress towards achieving sustainable development.

Combined power of citizen science and AI for better monitoring and achieving sustainable development

Current approaches		Emerging and future approaches	Benefits for the SDGs
Automated identification and classification		Using off-the-shelf generative AI solutions to support citizen science tasks	
Improving data quality		Training generative AI models, providing feedback on the quality	Better SDG monitoring
Enhancing user experience		Further enhancing user experience and engagement with participants	Contribution to SDG achievement

Integration of citizen science into AI

Benefits of integrating citizen science into AI

- Improved quality of AI outputs
- Increased AI literacy
- Reduced disinformation
- Preserved human rights and fundamental freedoms

Addressing AI challenges with citizen science

- More (local) data
- More-representative data
- Increased public engagement

The current and future applications of AI in citizen science projects, benefits of combining AI and citizen science to address AI challenges, and ultimate benefits for the SDGs and sustainable development.

Integrating citizen science approaches and data into AI: Addressing AI challenges through citizen science

Lack of (local) data: The lack of data can result in the use of algorithms that were trained using data that does not consider specific local circumstances.

Societal biases: AI, in all its forms, can exhibit and emphasize biases that exist in society, such as race, color, gender, disability and ethnic origin.

Lack of public engagement: AI typically lacks public engagement, which is important to ensure representativeness, reduce biases and enhance the quality of AI results.

THANK YOU.

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