



# Why citizen science is now essential for official statistics

Dilek Fraisl, Linda See, Steve MacFeely, Inian Moorthy, Georges-Simon Ulrich, Omar Seidu, François Grey, Samuel Schütz & Ian McCallum



The loss of major health surveys once backed by the United States Agency for International Development and proposed cuts to environmental programs threaten the tracking of sustainable development. Citizen science can and should be central to building stronger, more resilient data systems.

The termination in February 2025 of the Demographic and Health Surveys, a critical source of data on population, health, HIV, and nutrition in over 90 countries, supported by the United States Agency for International Development, constitutes a crisis for official statistics. This is particularly true for low- and middle-income countries that lack their own survey infrastructure<sup>1</sup>. At a national level, in the United States, proposed cuts to the Environmental Protection Agency by the current administration further threaten the capacity to monitor and achieve environmental sustainability and implement the SDGs<sup>2,3</sup>. Citizen science—data collected through voluntary public contributions—now can and must step up to fill the gap and play a more central role in official statistics.

Demographic and Health Surveys contribute directly to the calculation of around 30 of the indicators that underpin the Sustainable Development Goals (SDGs)<sup>4</sup>. More generally, a third of SDG indicators rely on household surveys data<sup>5</sup>.

Recent political changes, particularly in the United States, have exposed the risks of relying too heavily on a single country or institution to run global surveys and placing minimal responsibility on individual countries for their own data collection.

Many high-income countries, particularly European ones, are experiencing similar challenges and financial pressures on their statistical systems as their national budgets are increasingly prioritizing defense spending<sup>6</sup>. Along with these budget cuts comes a risk that perceived efficiency gains from artificial intelligence are increasingly viewed as a pretense to put further budgetary pressure on official statistical agencies<sup>7</sup>.

In this evolving environment, we argue that citizen science can become an essential part of national data gathering efforts. To date, policymakers, researchers, and agencies have viewed it as supplementary to official statistics. Although self-selected participation can introduce bias, citizen science provides fine-scale, timely, cost-efficient, and flexible data that can fill gaps and help validate official statistics. We contend that, rather than an optional complement, citizen science data should be systematically integrated into national and global data ecosystems.

## Citizen science and official statistics

Citizen science is often associated with environmental and biodiversity research, but its applications extend to diverse disciplines from health and well-being to the social sciences<sup>8</sup>. Official statistics and policy communities

have recently recognized that data generated by the public can address data gaps more cost-effectively<sup>9</sup>. International agencies even recently provided guidelines to incorporate citizen science into official reporting<sup>10</sup>.

Citizen science can play a role in monitoring environmental SDGs<sup>11,12</sup>. For example, data from eBird, a platform that allows birdwatchers around the world to record and share their bird observations online, and similar initiatives, are informing indicators for areas set aside to protect nature and wildlife under SDG 15 *Life on Land*<sup>11</sup>.

The potential of citizen science extends far beyond environmental indicators, covering socioeconomic and governance indicators. This is particularly true for indicators that require self-reported data on citizen experiences, such as feeling safe walking home and experiencing physical, sexual, or psychological violence. More specifically, a pilot initiative used citizen science to measure satisfaction with public services in Ghana<sup>13</sup>, informing SDG indicators related to peace, justice, and strong institutions (SDG 16). These projects show the ability of citizen science to reach underserved groups, tailor approaches to local contexts, and collect feedback-driven data.

We find that citizen science data could potentially support 48 (or 60%) of the indicators that currently rely on household surveys<sup>5</sup>, across 13 SDGs (Fig. 1, Table S1). Our findings are based on analyses from 2020<sup>11</sup> and 2023<sup>14</sup>; the Ghana initiative<sup>13</sup> has since shown even greater potential for citizen science to support SDG monitoring.

SDG 3 *Good Health and Wellbeing* stands out with the greatest potential from this analysis: 17 indicators out of the 19 that are currently supported by household surveys could be informed by citizen science data.

As such, citizen science is already positioned to address data gaps left by the end of the Demographic and Health Surveys. The critical challenge is to scale up these efforts to cover the globe.

## The transition from optional to essential

We need a fundamental shift in how we view citizen science. Official statistics and policy communities have long seen it as a secondary data source, with concerns over data quality and limited awareness of its potential. They must recognize data generated by the public voluntarily as an essential contribution to official statistics (Fig. 2).

A crucial first step is the formal integration of citizen science into national statistical systems through official acknowledgment, such as via statistical acts, regulations and frameworks and standardized protocols. While citizen science offers flexibility and bottom-up engagement, ensuring data quality, comparability and privacy requires structured frameworks. Agencies should develop standards specifically tailored to citizen science that carefully balance methodological rigor with the participatory and adaptive nature of citizen science. For example, the existing UN National Quality Assurance Framework and the UN Statistical Quality Assurance Framework could be revised to recognize citizen science data sets ranging from biodiversity observations to the monitoring of public service quality. In practice, this would involve setting explicit criteria for citizen science,



practices that can be adapted to these different settings, such as offering micro-payment incentives for participants in need or employing low-tech solutions. Examples include paper-based methods for data collection or using Unstructured Supplementary Service Data, a basic phone feature similar to text messaging, to engage participants without smartphones or reliable internet access<sup>13</sup>.

Initial investments will be required to adapt citizen science methods for household surveys and official environmental monitoring. Once these systems are in place and communities are engaged, citizen science can be more cost-efficient in comparison to official survey methods. There is precedent for changing institutional mindsets to embrace new methods: during the COVID-19 pandemic, government and statistical institutions began adopting alternative data collection approaches like phone-based surveys, social media monitoring, and citizen science to meet urgent needs<sup>16</sup>.



National statistical agencies should also take an active role in the design and implementation of citizen science initiatives for household surveys and for environmental monitoring. This goes beyond merely using existing data from citizen science projects, as previously suggested<sup>11</sup>. It involves launching and managing their own initiatives in partnership with citizen science experts, ensuring that data collection aligns with official standards, methodological rigor, ethical guidelines and policy needs.

What we propose here will likely face resistance and spark debates around issues of data quality, feasibility, and the complexity of coordination. We acknowledge these challenges but believe that they can be addressed through clear protocols that ensure consistent and high-quality data collection, tailored strategies that adapt to local contexts and participant capacities, and strong management structures to organize and guide collaboration involving a diverse set of actors.

Embracing citizen science requires shifting perspectives and rethinking established practices to build more inclusive, resilient and sustainable statistical systems. This means continuing to fund official surveys and environmental monitoring while also investing in citizen science to create more adaptive and flexible ways of collecting data, especially in turbulent times.

## Data availability

All data are available in the main text and supplementary information.

**Dilek Fraisl** <sup>1,2</sup> , **Linda See**<sup>1</sup>, **Steve MacFeely**<sup>3,4</sup>, **Inian Moorthy**<sup>1</sup>, **Georges-Simon Ulrich**<sup>5</sup>, **Omar Seidu**<sup>6</sup>, **François Grey**<sup>7</sup>, **Samuel Schütz**<sup>5</sup> & **Ian McCallum**<sup>1</sup>

<sup>1</sup>International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria. <sup>2</sup>Citizen Science Global Partnership (CSGP), Laxenburg, Austria. <sup>3</sup>Organisation for Economic Co-operation and Development (OECD), Paris, France. <sup>4</sup>University College Cork, Cork, Ireland. <sup>5</sup>Federal Statistical Office of Switzerland, Neuchâtel, Switzerland. <sup>6</sup>Ghana Statistical Service, GP, Accra, Ghana. <sup>7</sup>University of Geneva, Geneva, Switzerland.  e-mail: [fraisl@iiasa.ac.at](mailto:fraisl@iiasa.ac.at)

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## Author contributions

Conceptualization: D.F., L.S., S.M., G.S.U., O.S., S.S. Methodology: D.F., L.S., I.M. Investigation: D.F. Visualization: D.F., L.S., I.M. Funding acquisition: D.F., L.S. Project administration: D.F. Supervision: D.F. Writing—original draft: D.F. Writing—review & editing: D.F., L.S., S.M., I.M., G.S.U., O.S., F.G., S.S., I.M.C.

## Competing interests

The authors declare no competing interests.

## Additional information

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**Correspondence** and requests for materials should be addressed to Dilek Fraisl.

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