Citizen science for monitoring the health and well-being related Sustainable Development Goals and the World Health Organization's Triple Billion Targets

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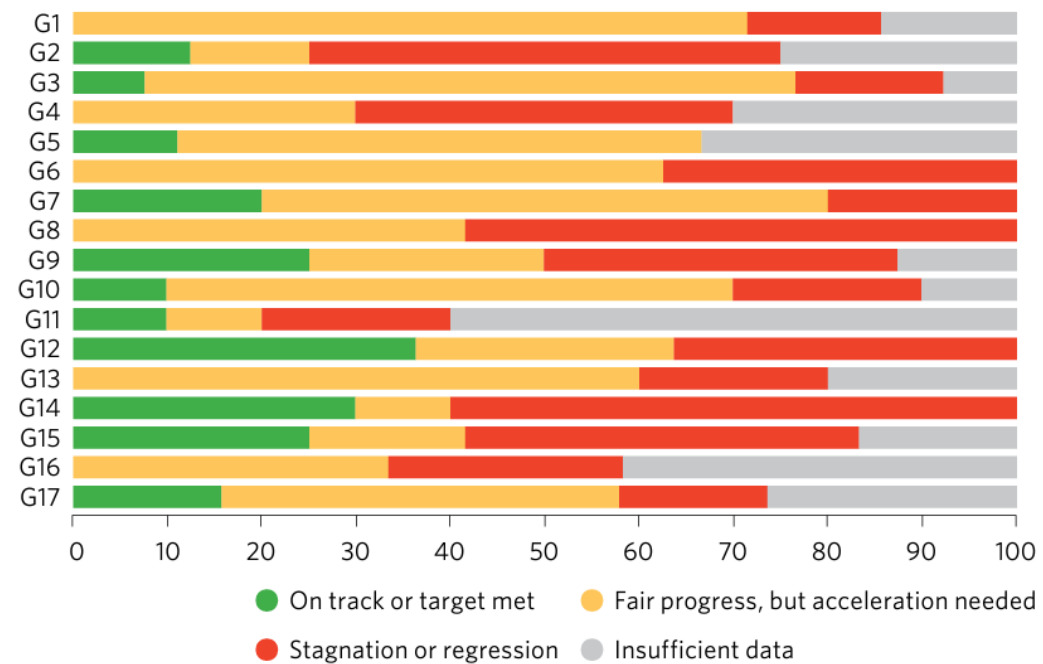
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Progress assessment for the 17 Goals based on assessed targets, 2023 or latest data (percentage)

- ● On track or target met
- ● Fair progress, but acceleration needed
- ● Stagnation or regression
- ● Insufficient data

UN SDG Report, 2023

Triple Billion Targets

Health Emergencies indicators from the WHO's Triple Billion Targets and the SDG framework. Dark red indicates that data are missing for all countries for the mentioned year while bright green on the opposite end of the spectrum shows that there are no missing values reported for all countries, which is 194 in total. Shades in between show partial data availability.

Fraisl D, See L, Estevez D, Tomaska N and MacFeely S (2023) Citizen science for monitoring the health and well-being related Sustainable Development Goals and the World Health Organization's Triple Billion Targets. Front. Public Health 11:1202188. doi: 10.3389/fpubh.2023.1202188

The SDG indicators where citizen science *projects* are 'already contributing', 'could contribute' or where there is 'no alignment'

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

The greatest contribution of citizen science data to SDG monitoring would be in:

Methodology

Fraisl D, See L, Estevez D, Tomaska N and MacFeely S (2023) Citizen science for monitoring the health and well-being related Sustainable Development Goals and the World Health Organization's Triple Billion Targets. Front. Public Health 11:1202188. doi: 10.3389/fpubh.2023.1202188
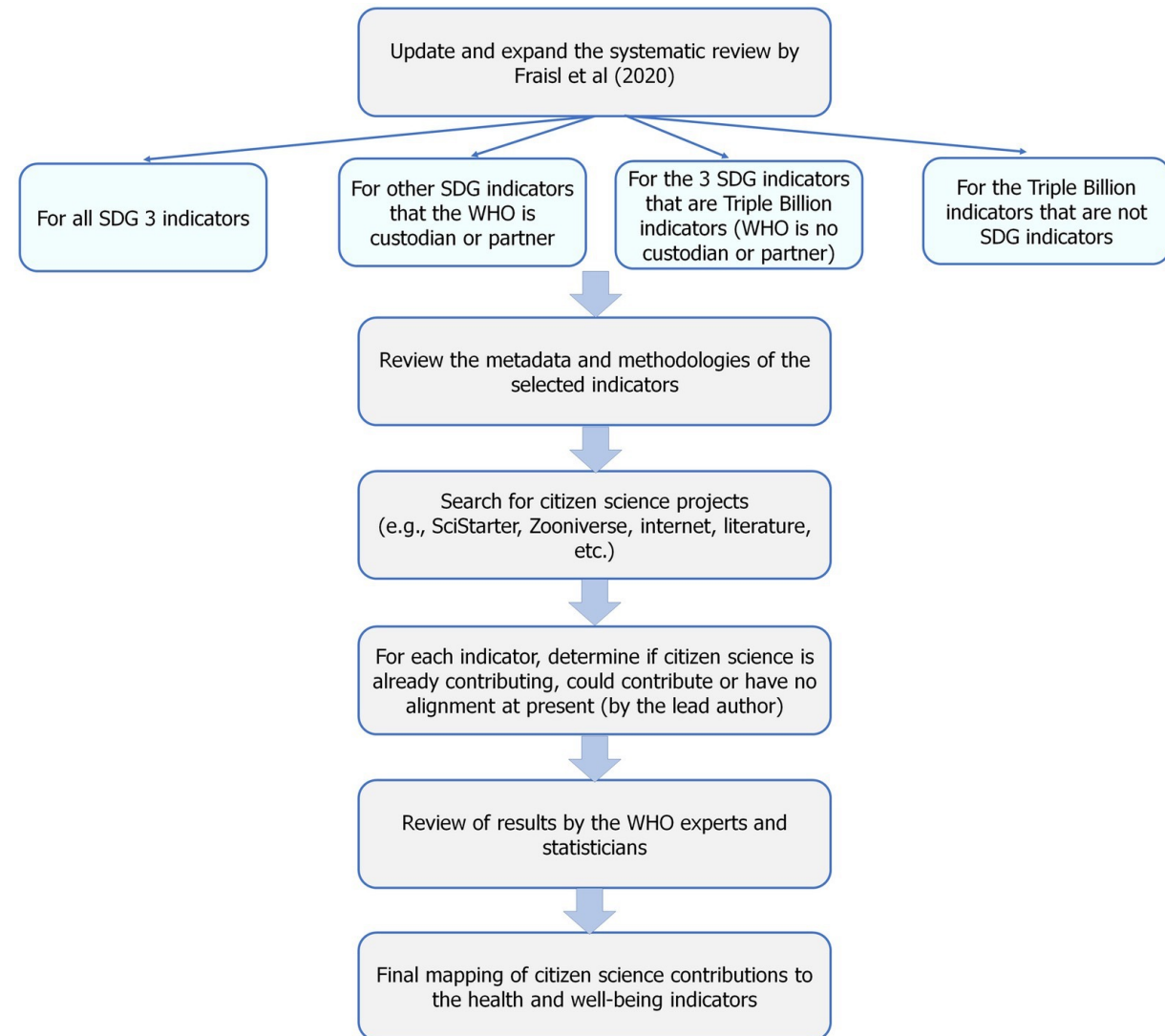
The health and well-being related SDG indicators and Triple Billion Targets covered in this study. Indicators where citizen science projects are "already contributing" are in dark blue, "could contribute" are in light blue or where there is "no alignment" are in grey. The values within each box are the indicator numbers or titles.

Snakebite Information and Data Platform

Indicator 3.3.5

Number of people requiring interventions against neglected tropical diseases
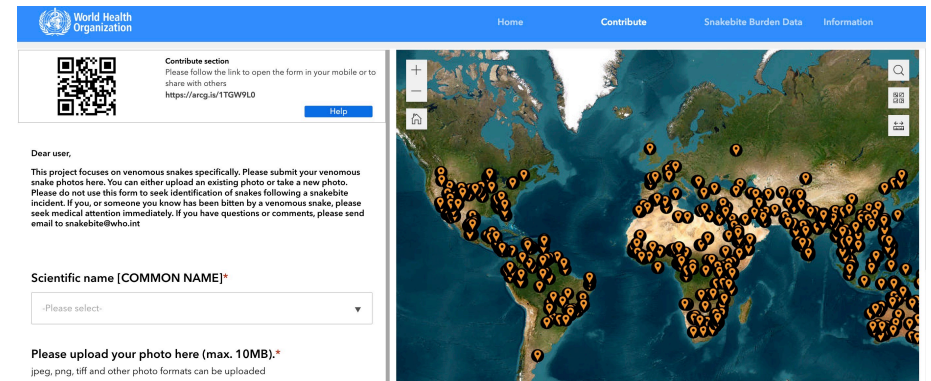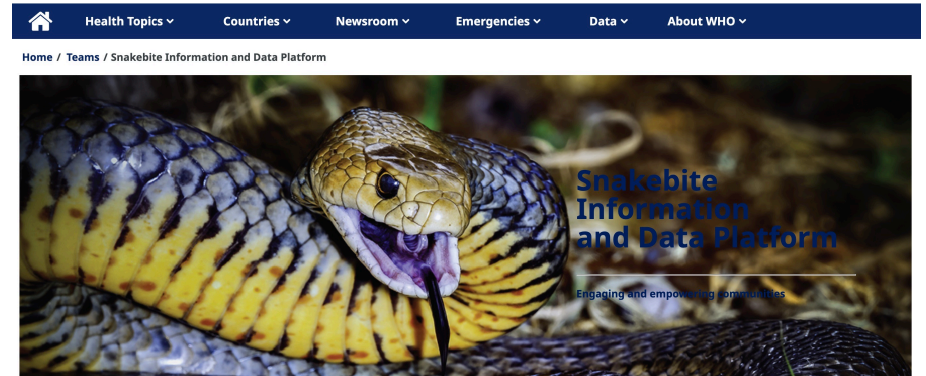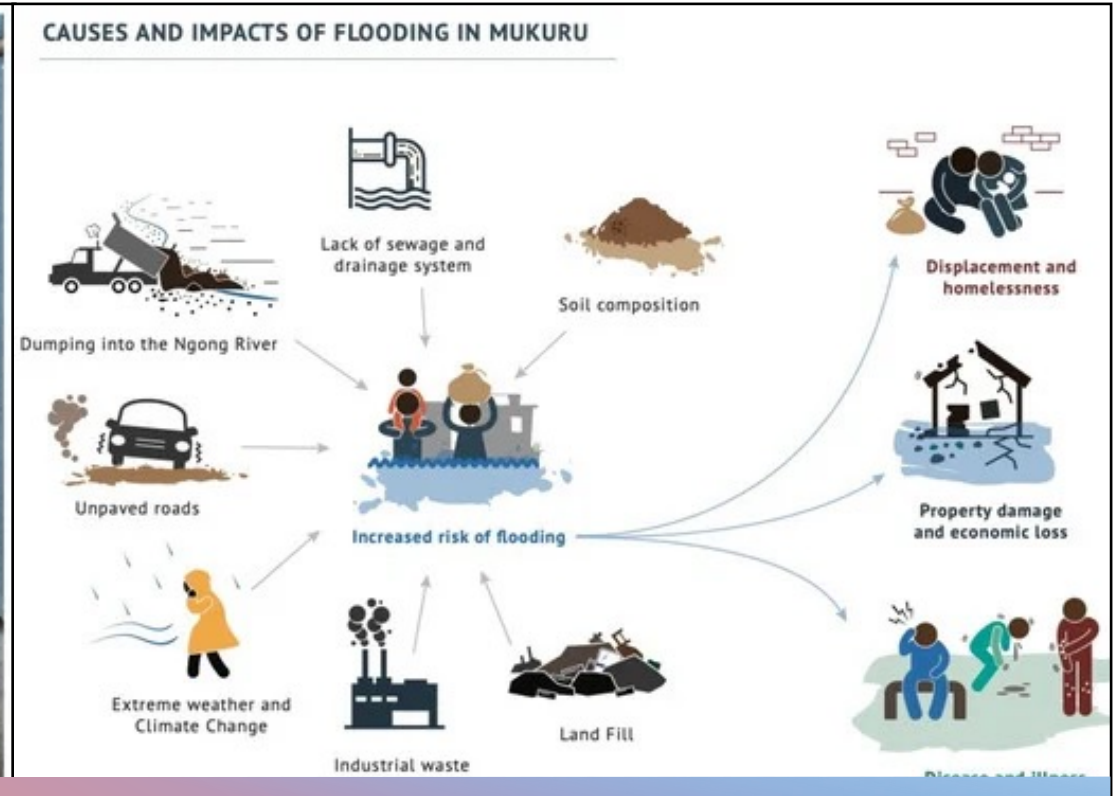
Indicator 6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water

Supplementary Material

SUPPLEMENTARY TABLE: FULL REVIEW PRESENTING THE POTENTIAL OF CITIZEN SCIENCE FOR MONITORING THE HEALTH AND WELL-BEING RELATED INDICATORS

INDICATOR		2020 SYSTEMATIC REVIEW RESULTS		UPDATED REVIEW RESULTS FOR THE HEALTH AND WELL-BEING RELATED INDICATORS			
Target	Indicator	2020 Systematic Review Results	Rationale for Mapping	Additional Projects to 2020 Review	Links to References	Updated Rationale	Contribution Type
Goal 1. End poverty in all its forms everywhere							
1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	1.4.1 Proportion of population living in households with access to basic services	**Could Contribute:** Aqua, Action Research for Learning Bangladesh, Action Research for Learning Bangladesh	Among different aspects of poverty, this indicator focuses on 'access to basic services'. Providing access to basic services such as safe drinking water, sanitation facilities, sustainable energy and mobility, housing, education, healthcare, etc., helps to improve the quality of life. Indicator 6.1.1 (Proportion of population using safely managed drinking water services) is about drinking water. Hence, the projects mapped in 6.1.1 (Aqua and Freshness of Water) could also contribute to the monitoring of this indicator. Aqua (Spain) aimed to control the quality of drinking water. Thousands of Spanish participants, particularly students, created a map with the measurements they made on water quality (chlorine, pH, flavor, smell). Freshness of Water (NL), on the microbiological stability of drinking water, enabled citizens to analyze samples from their own kitchen tap and test the water quality using test strips. In addition, Action Research for Learning Bangladesh, which was mapped as "could be used" for indicator 6.2.1 (Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water), could also support this indicator, as it included monitoring activities through a community-based monitoring (CBM) system, where women volunteers in five selected villages in Bangladesh visited 60 neighbours each month to ask where they collected drinking water, looked at the condition of the toilet, checked that all household members were using it and asked about handwashing facilities. These aforementioned projects could provide information on the functioning of basic services so they could be used to inform some of the underlying aspects of this indicator (e.g., water, etc.).	**Could Contribute:** WHO Snakebite Information and Data Platform, CSIRO Energise	https://www.who.int/teams/control-of-neglected-tropical-diseases/snakebite-envenoming/snakebite-information-and-data-platform https://blog.csiro.au/lighting-up-australias-energy-future-the-csiro-energise-app-needs-you/	In addition to the projects highlighted in the 2020 systematic review, particularly related to the healthcare aspect of this indicator, the WHO initiative "Snakebite Information and Data Platform" can contribute to the monitoring of this indicator. Among different aspects of poverty, this indicator focuses on 'access to basic services'. Providing access to basic services such as safe drinking water, sanitation facilities, sustainable energy and mobility, housing, education, healthcare, etc., helps to improve the quality of life. WHO's Snakebite Information and Data Platform aims to stimulate work towards achieving the related global target to "halve the number of deaths and disability due to snakebite envenoming by 2030". Additionally, the platform seeks to advance surveillance and contribute to related epidemiological documentation and data, which countries can use to compile statistics for SDG monitoring and beyond. This can allow for more effective sharing of resources and coordination of prevention efforts while also improving antivenom distribution and mapping. The platform allows the public to participate and contribute by sharing photos of what they think are venomous snakes along with their location data. These data can assist WHO experts to refine and enhance the distribution maps and provide communities with more reliable and accurate information as a source of real-time data through citizen science. The portal also shows the locations of antivenom treatment facilities, enabling prompt patient access. Hence, the project provides an example of how citizen science data along with other information can enable access to healthcare. Additionally, because the indicator has a component related to "access to clean fuels and technology" (also covered as part of indicator 7.1.2), CSIRO Energise can also contribute to the health related aspect of this indicator. CSIRO Energise, implemented in Australia, has helped scientists to better understand how households across the country use, generate and interact with energy. The data provided by citizen scientists has been crucial in order to conduct research towards a more secure, reliable and sustainable energy future for Australia. The app produced data on household energy use including on appliance usage and energy bills, through to the emergence of new technologies.	Supplementary

What's next?
How to integrate citizen science data into SDG monitoring and reporting processes?

IR3S / IGES
Institute for Global Environmental Strategies

ORIGINAL ARTICLE

The contributions of citizen science to SDG monitoring and reporting on marine plastics

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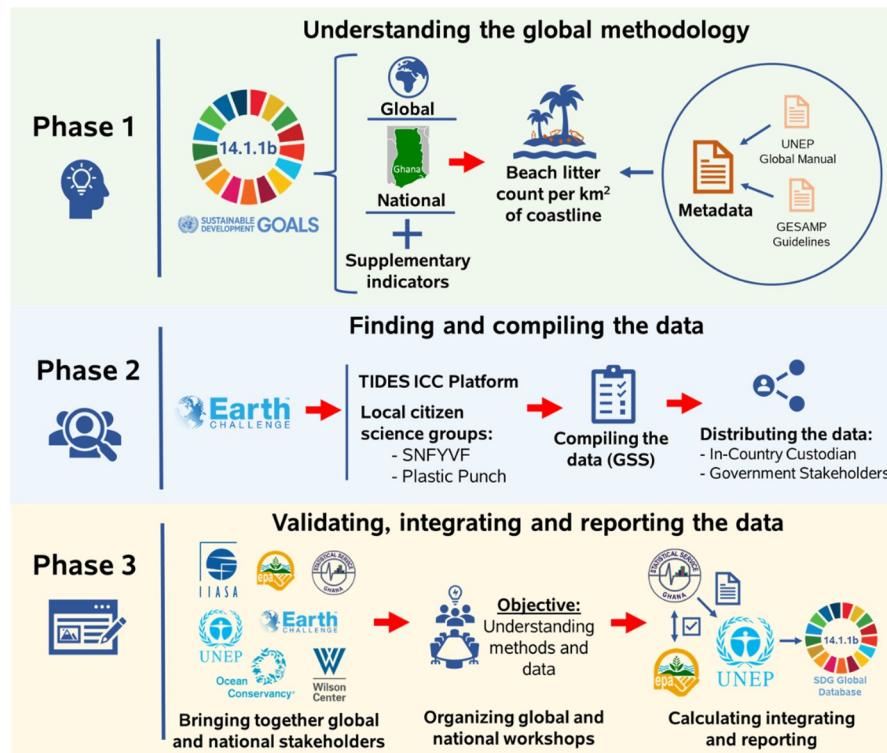
Abstract
The accumulation of plastic litter in marine environments is a major environmental challenge along with the difficulties in their measurement because of the massive size of the oceans and vast circulation of plastic litter, which is being addressed as part of the United Nations (UN) Sustainable Development Goals (SDGs). Citizen science, public participation in scientific research and knowledge production, represents a potential source of data for SDG monitoring and reporting of marine plastic litter, yet there has been no evidence of its use to date. Here, we show how Ghana has become the first country to integrate existing citizen science data on marine plastic litter in their official monitoring and reporting of SDG indicator 14.1.1b for the years 2016–2020, which has also helped to bridge local data collection efforts with global monitoring processes and policy agendas by leveraging the SDG framework. The results have been used in Ghana's 2022 Voluntary National Review of the SDGs, and reported on the UN SDG Global Database, as well as helping to inform relevant policies in Ghana. In addition, here, we present a pathway that can be adopted by the relevant government authorities in other countries that have an interest in following a similar citizen science data validation and reporting process for this indicator and potentially others.

Fraisl, D., See, L., Bowers, R. *et al.* The contributions of citizen science to SDG monitoring and reporting on marine plastics. *Sustain Sci* (2023). https://doi.org/10.1007/s11625-023-01402-4

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

Understanding the global methodology

Phase 1

Global

National

+

Supplementary indicators

14.1.1b

Beach litter count per km² of coastline

Metadata

UNEP Global Manual

GESAMP Guidelines

Align the ICC **methodology** with the global 14.1.1b indicator methodology

Finding and compiling the data

Phase 2

Earth CHALLENGE

TIDES ICC Platform

Local citizen science groups:
- SNFYVF
- Plastic Punch

Compiling the data (GSS)

Distributing the data:
- In-Country Custodian
- Government Stakeholders

Facilitate support to the local citizen science groups for future data collection activities

Validating, integrating and reporting the data

Phase 3

IIASA

Earth Challenge

UNEP

Ocean Conservancy

Wilson Center

Objective: Understanding methods and data

14.1.1b

SDG Global Database

Bringing together global and national stakeholders

Organizing global and national workshops

Calculating integrating and reporting

Ensure policy uptake and impact

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 km²;
  - ☐ 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.

Thank you!

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