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**BIG DATA**  
& Data Science for Official Statistics

**BILBAO 2024**

Informing Climate Change and  
Sustainable Development Policies  
with Integrated Data

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# The use of citizen science data for biodiversity monitoring and informing the GBF indicators

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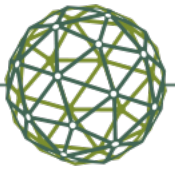


# Role of citizen science and participatory approaches in GBF

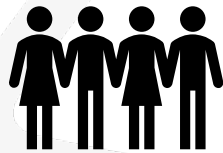
The GBF Framework is “...*a framework for all - for the whole of government and the whole of society. Its success requires political will and recognition at the highest level of government and relies on action and cooperation by all levels of government and by all actors of society*”

The GBF Monitoring Framework “...*invites Parties and relevant organizations to support community-based monitoring and information systems and citizen science and their contributions to the implementation of the monitoring framework for the Kunming-Montreal Global Biodiversity Framework*”

## HOW?



# Citizen science



Public Participation

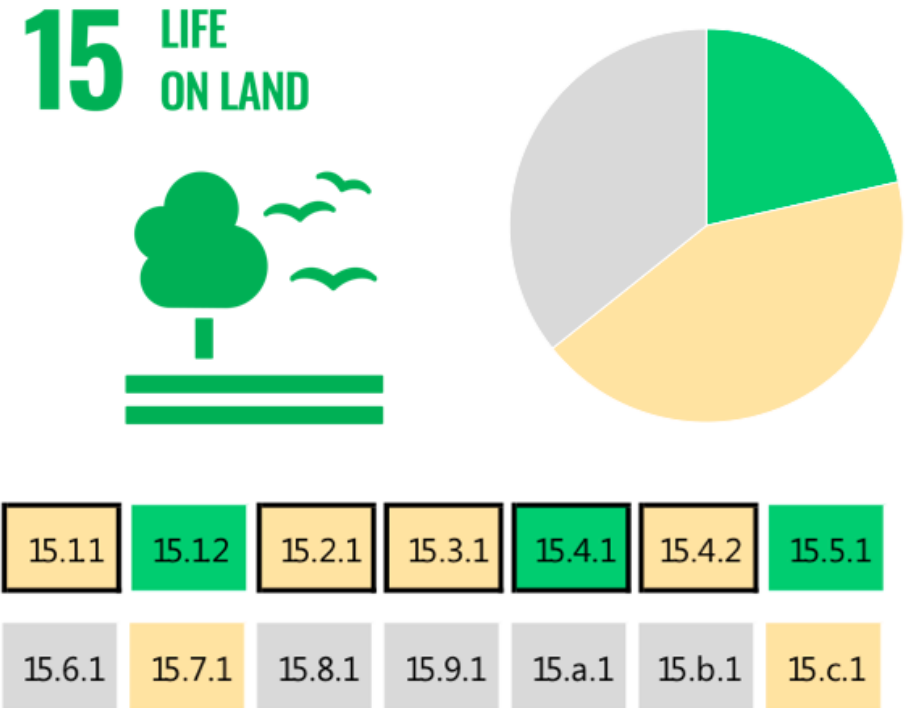
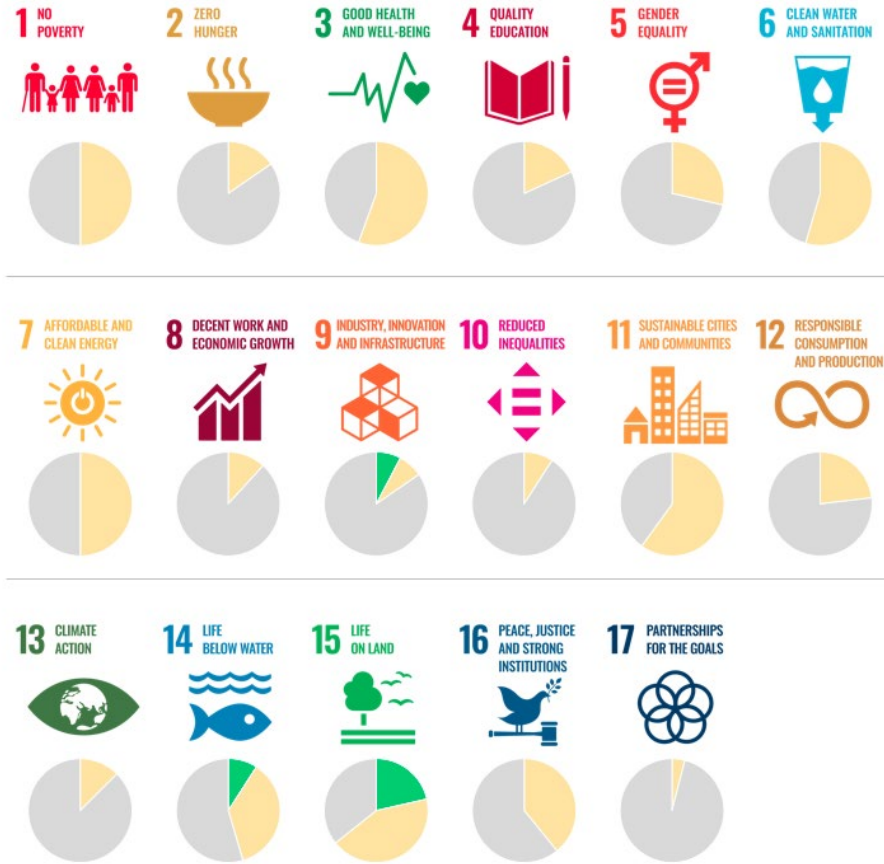


Knowledge production



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.





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



GBF Headline Indicator	Citizen Science Projects
A.3 Red List Index	iNaturalist, eBird, Bird Track, Natura Alert, Seabirds, PanEuropean Common Bird Monitoring Scheme, International Waterbird Census, Maritime Breeding Bird Atlas, North American Breeding Bird Survey, and many others
7.1 Index of coastal eutrophication potential	CITCLOPS, MONOCLE, Secchi Dip-In
10.1 Proportion of agricultural area under productive and sustainable agriculture	FotoQuest Go, Cropland Capture, Grow, Open Tenure, Picture Pile, AgroTutor
10.2 Progress towards sustainable forest management	Relasphone, Amazon Aerobotany, Moabi DRC, Logging Roads, FotoQuest Go, Forest Eyes, Forest Watchers, Picture Pile, GeoWiki Human Impact on Forests
12.1 Average share of the built-up area of cities that is green/blue space for public use for all	OpenStreetMap, UrbanGems, GeoKey, CommunityMaps, CommonSpace, LandMark, Frei. Raum.Netz, Mijn Park, CAP4Access, CityOases

GBF Component or Complementary Indicator	Citizen Science Projects
Plastic debris density	Ocean Conservancy International Coastal Cleanup, Litter Intelligence, Australian Marine Debris Initiative, OpenLitterMap, Litterati, Marine Debris Tracker, Marine Litter Watch
Proportion of land that is degraded over total land area	Geo-Wiki, Forest Watcher, LandMark, Moabi DRC, Logging Roads, Forest Eyes, Open Trash Lab - Landfills, GROW
Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities	AirCasting, AirVisual, SmartCitizen, iSCAPE, HackAir, Curious Noses
Proportion of population using safely managed drinking water services	Using Citizen Science Approach to monitor water, sanitation and hygiene Related Risks in Karonga Town of Malawi, Sanitary Inspections (SI) in Malawi, Crowd the Tap
Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	Picture Pile, Humanitarian OpenStreetMap, Missing Maps, University of Oxford-Zooniverse-Rescue Global partnership for Hurricane Irma

# eBird

- One of the world's largest biodiversity-related science projects, with more than 100 million bird sightings contributed annually around the world
- An average participation growth rate of 20% year over year
- Documents bird distribution, abundance, habitat use, and trends through checklist data collected within a simple, scientific framework. Birders enter when, where, and how they went birding, and then fill out a checklist of all the birds seen and heard
  - SDG indicators 15.1.2 Proportion of important sites *for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type* and 15.4.1 *Coverage by protected areas of important sites for mountain biodiversity*
  - GBF Headline indicator Red List Index, Red List of Ecosystems and others...





Source: Earthwatch Institute

SDG 6.3.2 Proportion of bodies of water with good ambient water quality

GBF Target 11 Complementary indicator



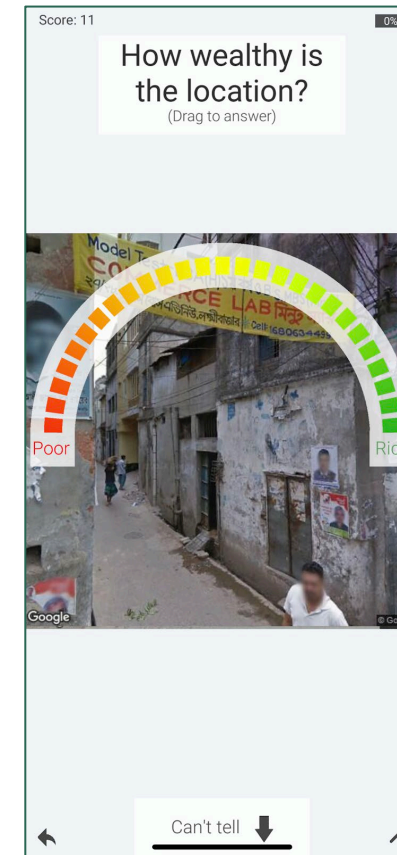
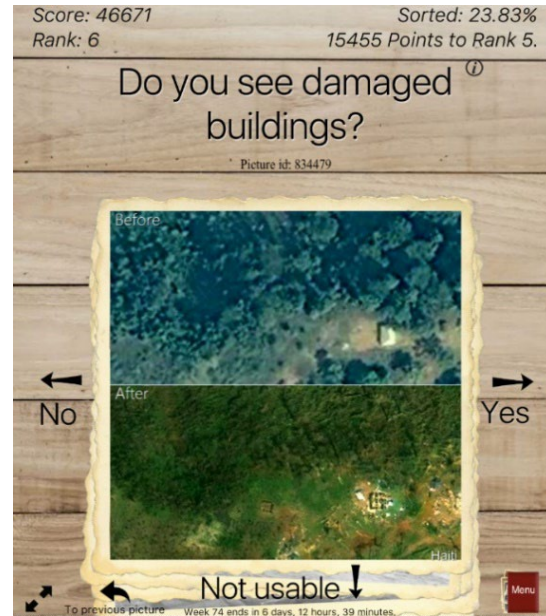
### FreshWaterWatch

Thousands of volunteers from around the world .



# Picture Pile

- Pairs of images for change detection
- Wilderness, deforestation, building damage assessment
- Yes/No/Maybe mechanic
- Yes/No/Maybe mechanic modified for categorical and continuous variable data collection
- Could contribute to the monitoring of 15 SDG indicators (SDGs 1, 2, 11, 13, 14, 15)



# Challenges of using citizen science in the context of official monitoring & official statistics

- Data Quality
- Local vs Global
- Representativeness/inclusivity (digital divide);
- Various methodologies used in similar projects
- Recruitment and retainment
- Overburdening the public especially those whose daily lives are a struggle;
- Lack of understanding
- Lack of guidance
- Lack of funding



# CROPS

Curating, Replicating, Orchestrating and Propagating  
Citizen Science across Europe

January 2024 – December 2026



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# To achieve impact at scale with citizen science

- An urgent dialogue and action among citizen science practitioners and researchers, the official statistics community, citizens, and other actors to build partnerships and to work together;
- Citizen Science Global Partnership, a network of networks that aims to advance citizen science to achieve sustainability at scale, to bridge the gap between these communities and actors;
- The official statistics community to reflect on the inclusiveness and relevance of their practices to individuals, communities, and to society, to keep an open mind for a more constructive discussion and not to get lost in an unproductive debate about citizen science data quality with a biased perception;
- Funders to rethink their strategies, to go beyond short-term pilot studies and provide genuine financial support to citizen science initiatives.

# THANK YOU!



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