

Citizen Science, the Sustainable Development Goals, and the Urban Monitoring Framework: Linking Local Action to Global Impact

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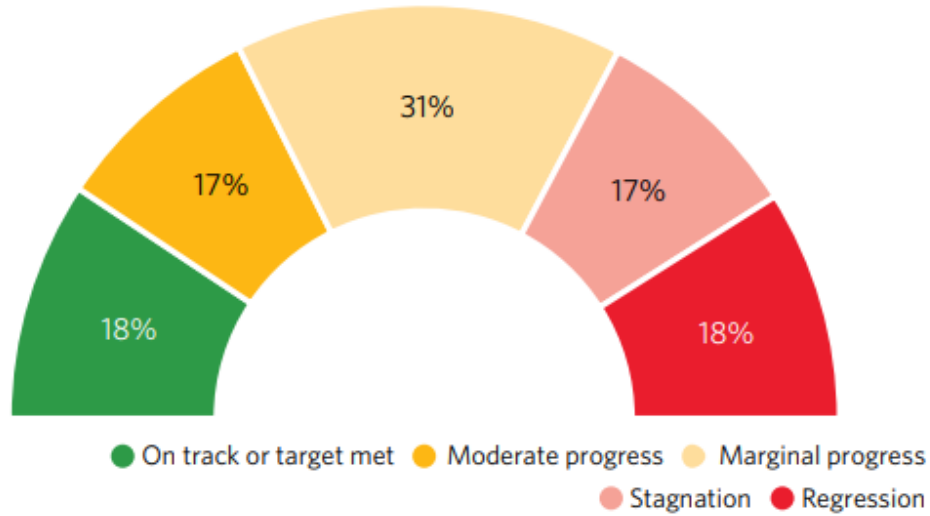
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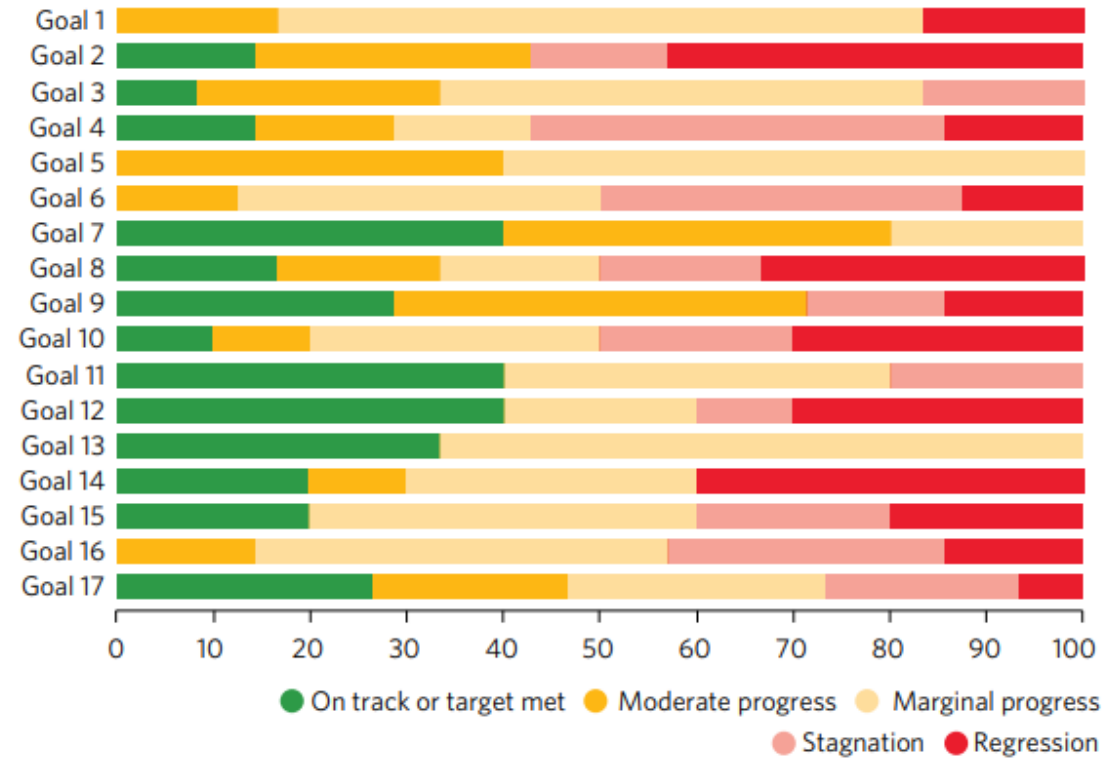


Overall progress across targets based on 2015–2025 global aggregate data

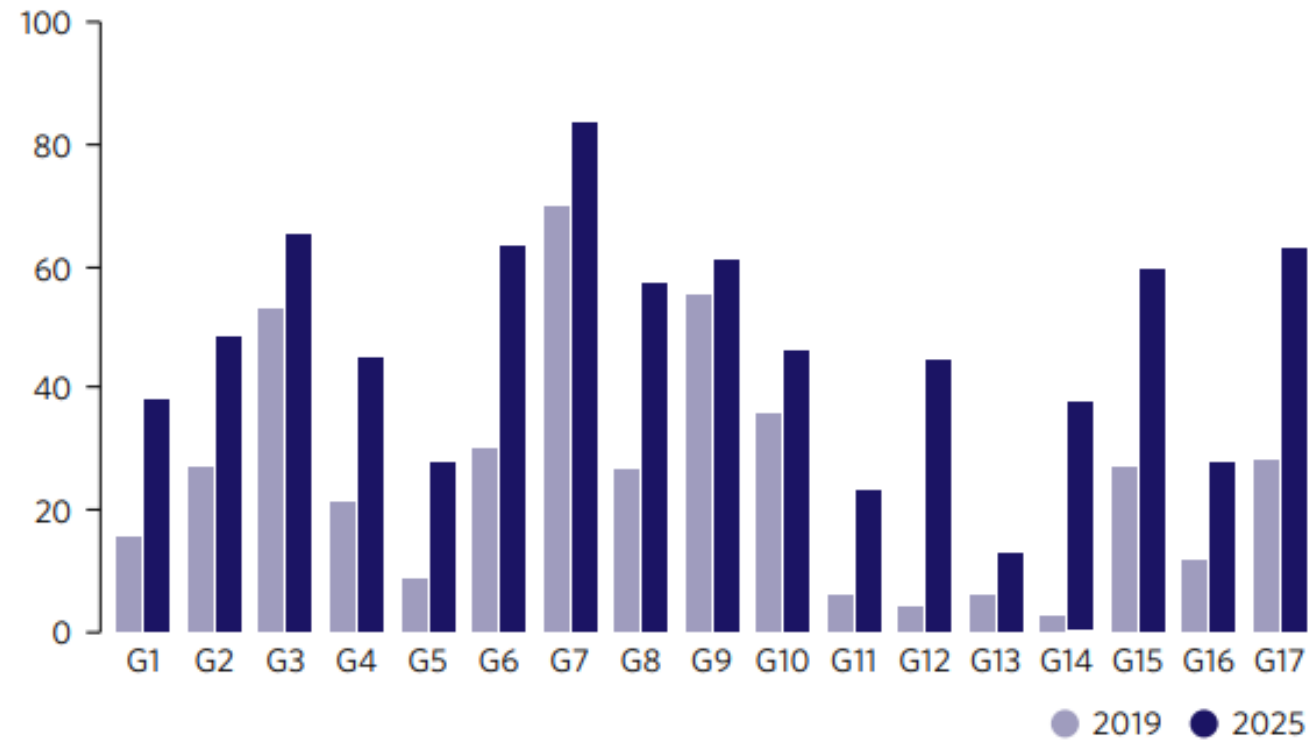


Note: Percentages do not add up to 100 per cent due to rounding.

Progress assessment for the 17 Goals based on assessed targets, by Goal (percentage)



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



UN SDG Report, 2025

Almost half of the 92 environmental SDG indicators lack data

We cannot improve what we cannot measure...



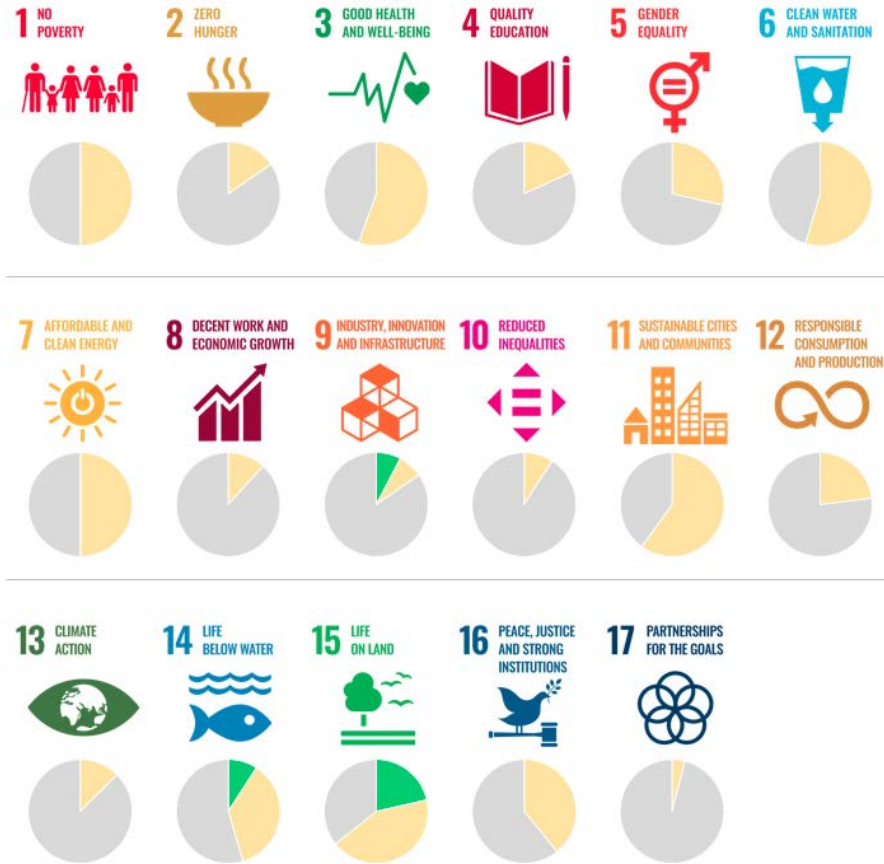


Citizen Science

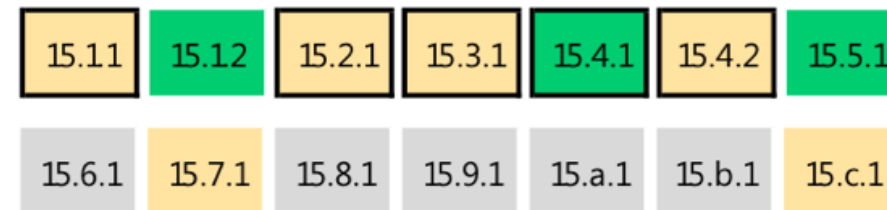
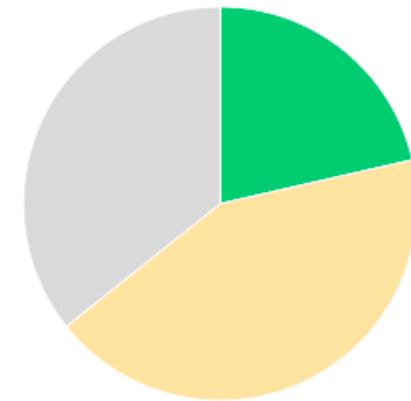
- Sharing biodiversity related observations, measuring water or air quality, reporting on safety or violence, identifying slums and poverty, etc.
- From hypothesis driven research led by scientists and volunteers contribute data, to initiatives volunteers and scientists identify the research question together and work together in many aspects of research.



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.



15 LIFE ON LAND

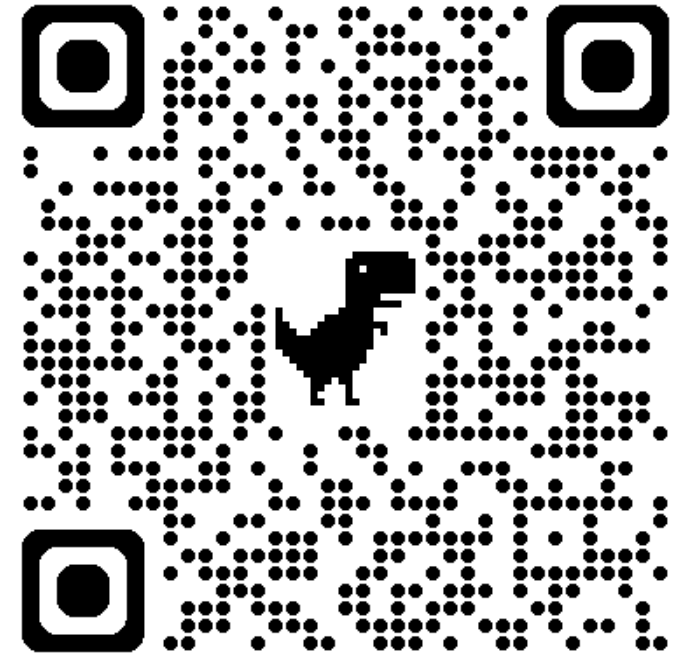


The greatest contribution of citizen science data to SDG monitoring would be in:



Opportunities for citizen science within the Global Urban Monitoring Framework (UMF)

- UMF tracks 77 urban sustainability indicators.
- 5 domains: Society, Economy, Culture, Environment and Governance & Implementation.
- 4 objectives: Safe and peaceful, Resilient, Inclusive and Sustainable Cities.
- Major data gaps in timeliness and disaggregation.
- CS & EO can help address these gaps.



Citizen science contributions to UMF

- Citizen science supports 3 UMF indicators (or around 4%) and it can support 49 more
- Total potential: 52 of 77 (68%)

	Safe & Peaceful				Inclusive				Resilient				Sustainable		
Society	1	2	3	4	9	10	11	12	17	18	19	20	23	24	
	5	6	7	8	13	14	15	16	21	22					
Economy	25	26			27	28	29	30	31	32	33	34	38	39	
									35	36	37				
Environment	40	41	42	43	44	45			46	47	48	49	50	51	52
Culture	53	54			55	56			57	58			59	60	61
Governance & Implementation	62	63	64	65	67	68	69	70	72	73	74		75	76	77
	66				71										

■ Already contributing
 ■ Could contribute
 ■ No alignment

Citizen science contributions to UMF domains

- **Environment: Strongest alignment with 85% potential**
 - Already contributing to one indicator (protected natural areas) and could support 10 additional indicators such as air quality and access to open public spaces.
- **Society: 83% potential**
 - Neighborhood safety, access to safe drinking water and basic services.
- **Culture: 56% potential**
 - Can support indicators on heritage & access to cultural spaces.
- **Economy: 53% potential**
 - Relevant for employment rate & public transport.
- **Governance & Implementation: 50% potential**
 - Supports 2 indicators and could contribute to 6 more, including violence public participation in city planning.

Most citizen science initiatives are conducted at a local and community level.

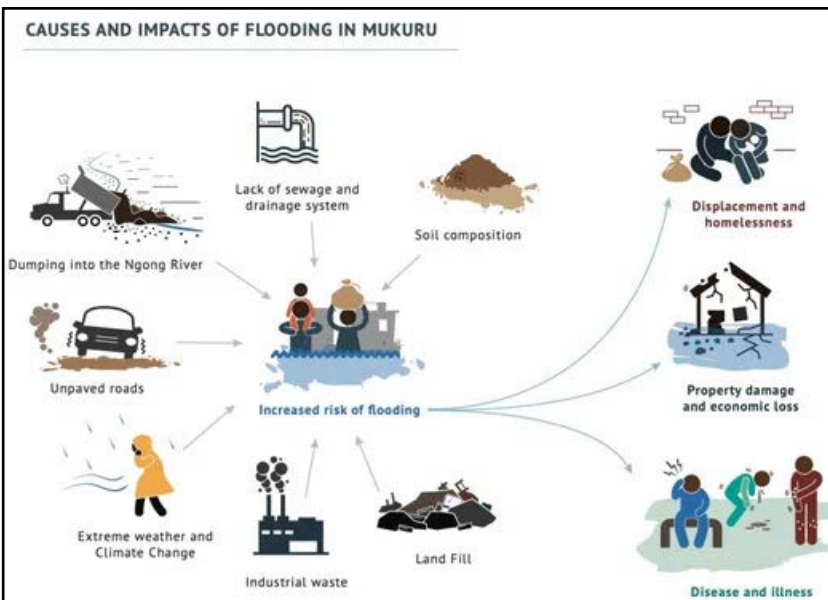
Any ideas on how these local level issues, engagement practices, and data can help monitor and achieve the SDGs that have a global nature?



- **SDG 6.2.1a & UMF 1.1.3 Safely managed sanitation services**

- **SDG 6.2.1b & UMF 1.1.4 a hand-washing facility with soap and water**

- In Mukuru, a citizen-science, climate justice planning process was implemented, and a data-gathering process with citizens was co-created.
- Results: Less than 1% of residents had access to a private in-home toilet, and 37% lacked regular access to safe and affordable drinking water.
- Thousands of residents co-designed climate change adaptation strategies, such as flood mitigation, formalizing roads and pathways with drainage, and a water and sanitation infrastructure plan for all.
- Citizen scientists moved this evidence into action to protect and drafted a climate justice strategy.



SDG 11.7.1 & UMF 3.2.1 Built-up area of cities that is open space for public use



< Zurück

Bitte bewerten Sie die Qualität des Punktes für folgende Attribute:

Wohlfühlen
Nicht wohl ————— Sehr wohl

Ruhig
Nicht ruhig ————— Sehr ruhig

Sicher
Nicht sicher ————— Sehr sicher

Sauber
Nicht sauber ————— Sehr sauber

Attraktivität
Nicht attraktiv ————— Sehr attraktiv

Ausstattung
Nicht gut ————— Sehr gut

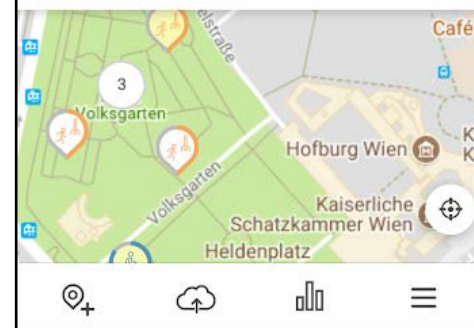
Weiter

< Wähle Aktivitäten

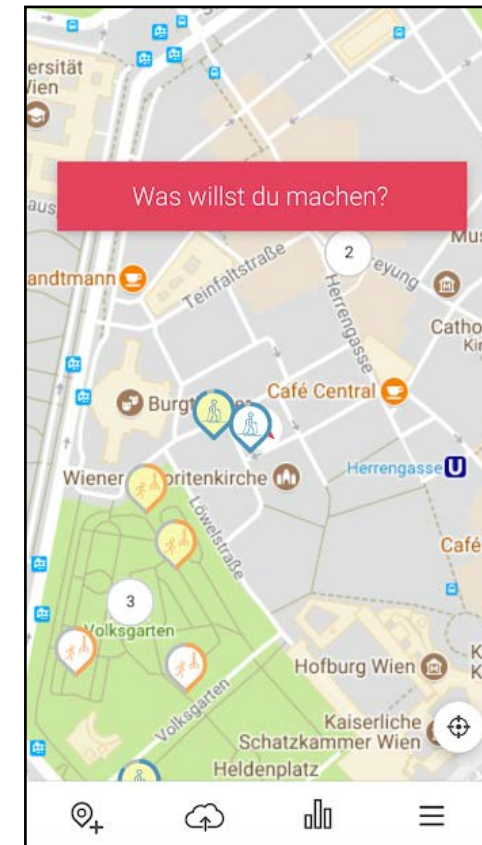
Radfahren Parcour Roller

Skaten Ballsport Joggen

Auf Karte anzeigen

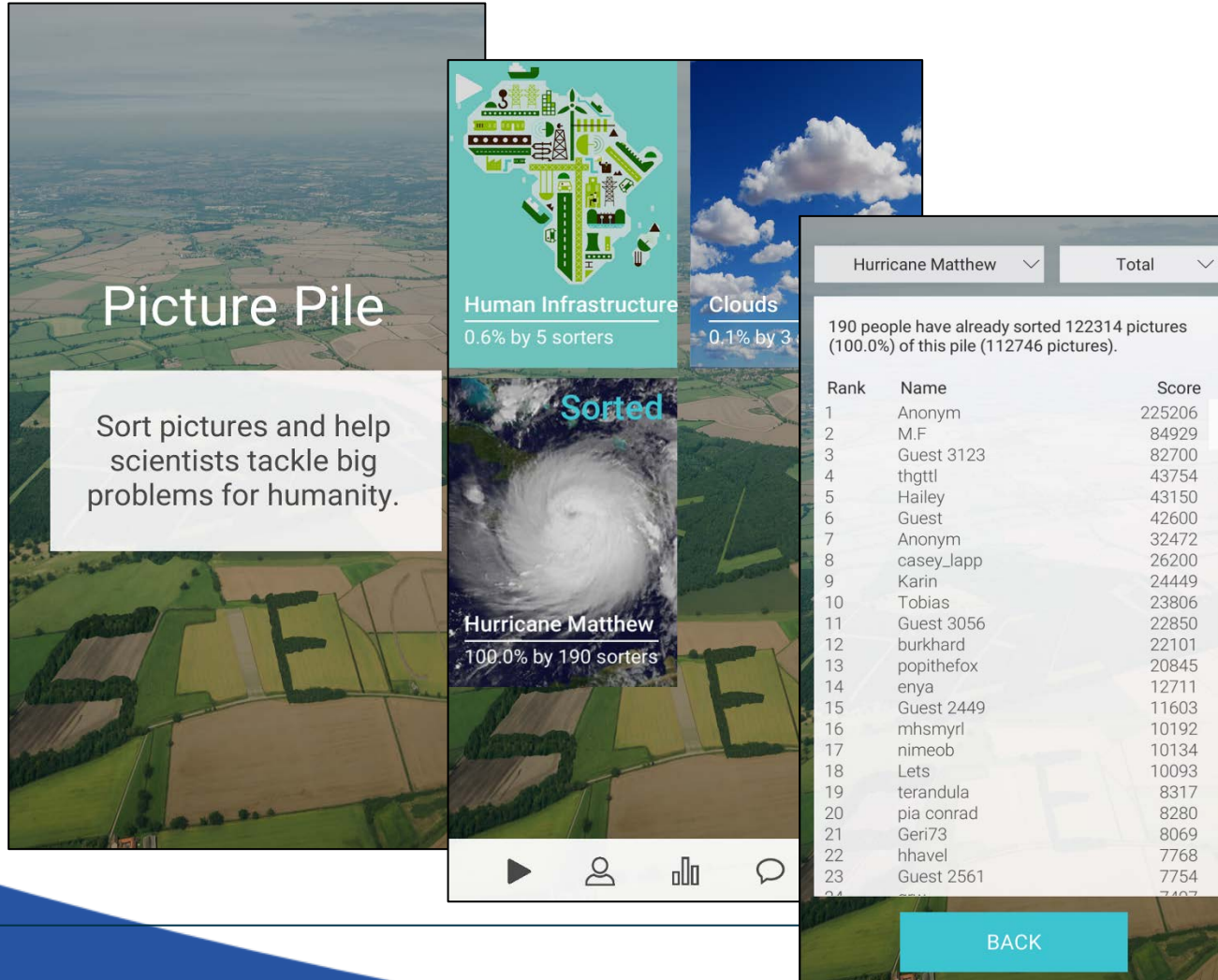


Was willst du machen?



Citizen science and Earth Observation for UMF: Top-down & bottom-up citizen science

- **Top-down: Picture Pile**



Picture Pile

Sort pictures and help scientists tackle big problems for humanity.

Human Infrastructure
0.6% by 5 sorters

Clouds
0.1% by 3

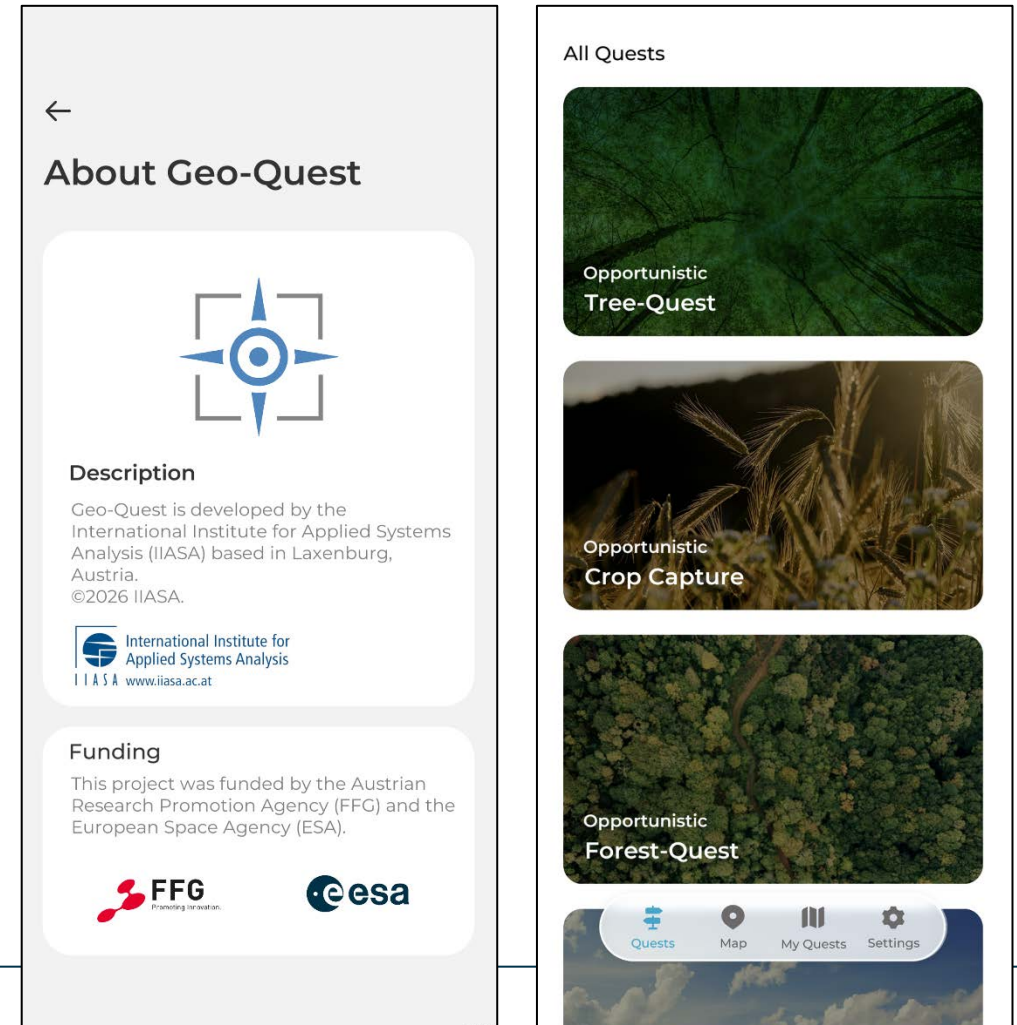
Sorted

Hurricane Matthew
100.0% by 190 sorters

Rank	Name	Score
1	Anonym	225206
2	M.F	84929
3	Guest 3123	82700
4	thgttl	43754
5	Hailey	43150
6	Guest	42600
7	Anonym	32472
8	casey_lapp	26200
9	Karin	24449
10	Tobias	23806
11	Guest 3056	22850
12	burkhard	22101
13	popithefox	20845
14	enya	12711
15	Guest 2449	11603
16	mhsmyrl	10192
17	nimeob	10134
18	Lets	10093
19	terandula	8317
20	pia conrad	8280
21	Gerl73	8069
22	hhavel	7768
23	Guest 2561	7754
24		7407


BACK

Complemented by bottom-up citizen science: Geo-Quest




←

About Geo-Quest





Description

Geo-Quest is developed by the International Institute for Applied Systems Analysis (IIASA) based in Laxenburg, Austria.
©2026 IIASA.



Funding

This project was funded by the Austrian Research Promotion Agency (FFG) and the European Space Agency (ESA).

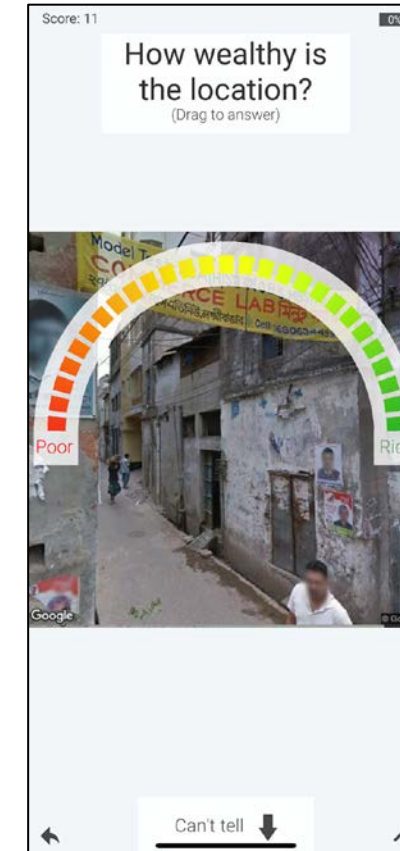
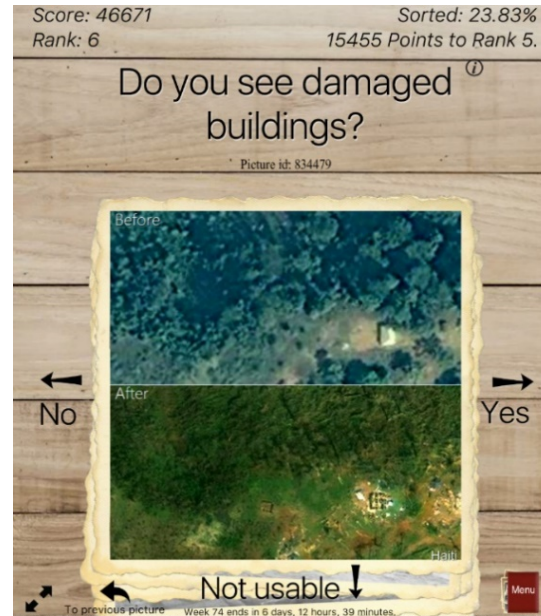
All Quests

- Opportunistic Tree-Quest
- Opportunistic Crop Capture
- Opportunistic Forest-Quest

Quests Map My Quests Settings

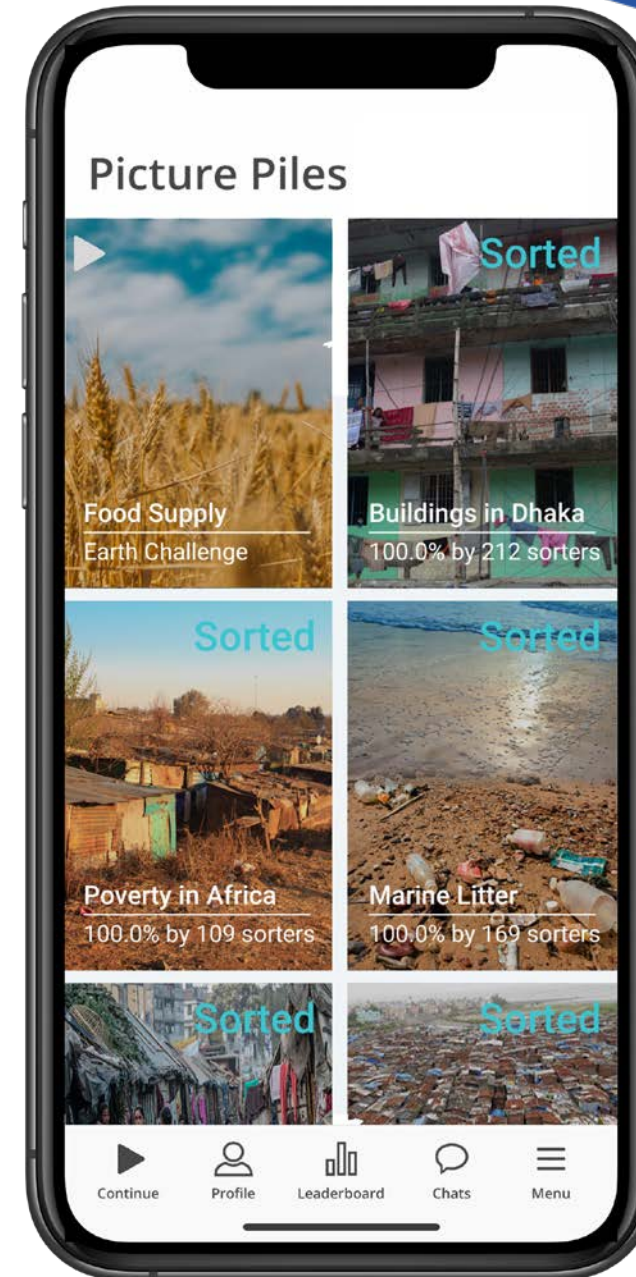
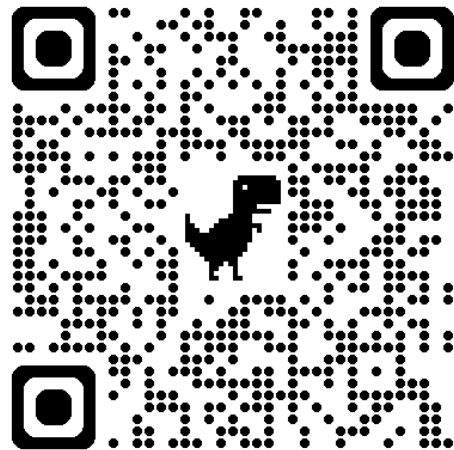
Picture Pile

- 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)



Picture Pile Campaigns

- Since 2014 we have run 16 different Picture Pile crowdsourcing campaigns
- More than 4000 volunteers participated
- More than 11.5 million pictures have been classified



Picture Pile Campaigns

Campaign	Location	# of participants	# of validations	# of images	Campaign start date	Campaign available for
Wild landscapes	Global	32	11,937	86,176	2014-12-15	6 months
Deforestation	Tanzania, Indonesia	1360	5,127,697	362,544	2015-07-25	Left open until 2018-09-04
Hurricane Matthew campaign 1	Haiti	344	224,214	37,582	2017-04-28	6 days
Hurricane Matthew campaign 2	Haiti	421	298,323	37,582	2017-05-03	12 days
Cloud detection	Global	149	276,068	27,021	2019-02-28	2 months
Nighttime lights	Global	217	160,338	13,966	2019-03-04	6 months
Urundata land cover campaigns	Indonesia	395	1,373,840	14,221	2019-04-01	4 months
Oil palm plantations	Global	78	56,212	1,649	2019-07-31	1 month
Oil palm plantations Asia	Asia	78	99,618	13,653	2019-08-20	2 months
Poverty (degree of wealth)	Dhaka, Bangladesh	176	60,382	11,300	2019-08-26	6 months
Slums	Dhaka, Bangladesh	74	13,636	30,028	2019-08-27	6 months
Urundata Change Campaigns	Indonesia	195	3,553,315	153,115	2019-08-27	3 months
Marine litter	One beach	105	14,374	1,215	2019-12-13	3 months
Poverty (degree of wealth)	Africa	63	7,888	1,398	2019-12-18	6 months
Poverty (building height)	Dhaka, Bangladesh	181	36,430	12,300	2020-02-06	6 months
Earth Challenge Food Insecurity (crop types) from present	France, Latvia, USA	1292	289,553	45377 out of 70,520	2020-07-28	Ongoing

Source: Fraisl et al. (2022) <https://www.sciencedirect.com/science/article/pii/S1462901121003208>

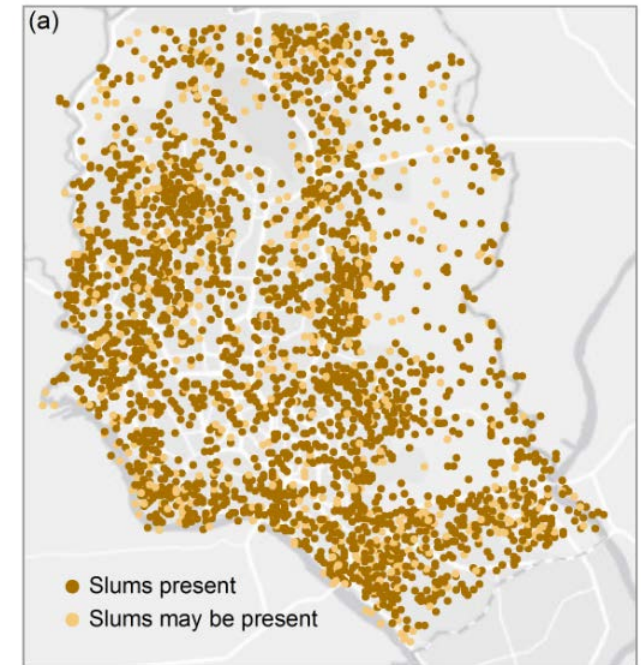
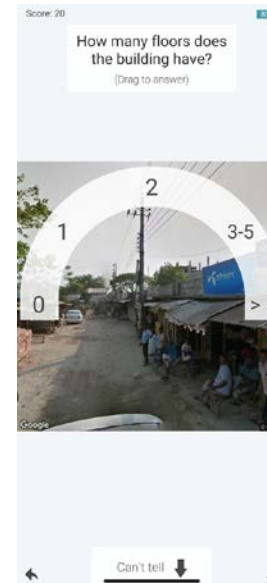
Picture Pile and the SDGs

- Found that Picture Pile could contribute to the monitoring of 15 SDG indicators (SDGs 1, 2, 11, 13, 14, 15)
- Direct = data from Picture Pile could contribute to the calculation of the SDG indicators
- Supplementary = data that are useful to contextualize an SDG indicator or target

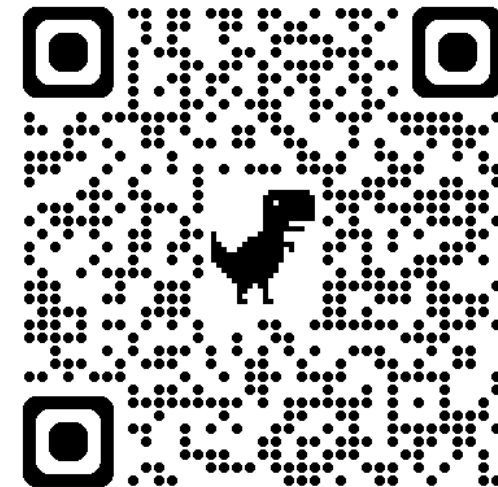
Campaign	SDG contribution by indicator	
	Direct	Supplementary
Wild landscapes	-	-
Deforestation	15.2.1	-
Hurricane Matthew campaign 1	1.5.2, 11.5.2	1.5.1, 11.5.1, 13.1.1
Hurricane Matthew campaign 2	1.5.2, 11.5.2	1.5.1, 11.5.1, 13.1.1
Cloud detection	-	-
Nighttime lights	11.3.1	1.1.1, 1.2.1, 1.2.2
Urundata land cover campaigns	15.1.1, 15.2.1, 15.4.2	-
Oil palm plantations	15.1.1, 15.2.1, 15.4.2	-
Oil palm plantations Asia	15.1.1, 15.2.1, 15.4.2	-
Poverty (degree of wealth)	11.1.1	1.1.1, 1.2.1, 1.2.2
Slums	11.1.1	-
Urundata Change Campaigns	15.1.1, 15.2.1, 15.4.2	-
Marine litter		14.1.1b
Poverty (degree of wealth)	11.1.1	1.1.1, 1.2.1, 1.2.2
Poverty (building height)	11.1.1	1.1.1, 1.2.1, 1.2.2
Earth Challenge Food Insecurity (crop types)	2.4.1	-

Picture Pile for SDG 11.1.1 & UMF 1.4.1

- SDG 11.1.1: Proportion of urban population living in slums, informal settlements or inadequate housing & UMF 1.4.1: Slum population
- Slums have multiple dimensions, but one is about housing durability
- Picture Pile was used to classify images in Dhaka for presence/absence of slums, number of floors, other variables that could be discerned from imagery
- Inputs were used (along with many other features including those from remote sensing) to produce a wall-to-wall map for the city with slum locations



Key steps for transitioning citizen science into an essential resource for official statistics



Standards & Quality Assurance

Align rigorous methods with the participatory and adaptive nature of citizen science



Government & Institutional Endorsement

Build trusted partnerships to co-develop methods that meet official standards and leverage public input



Global Data Governance

Engage citizen science communities in global data discussions via networks like the Citizen Science Global Partnership



Sustainable Financing

Incentivize National Statistical Offices and participants, especially in underserved communities, through context specific support

TIME TO PLAY FOR SCIENCE AND POLICY!



www.picturepile.org

Thank you! Questions?

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