Closing the gap: Citizen science for monitoring sustainable development

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Citizen science could help track progress towards all 17 UN Sustainable Development Goals (SDGs). An IIASA-led study, for the first time, comprehensively analyzed the current and potential contribution of

citizen science data to monitor the SDGs at the indicator level.

Huge amounts of accurate, timely, and comprehensive data are required to track progress towards the SDGs. The 17 goals set by the UN in 2015 currently include 169 targets and 231 unique indicators that are defined in an evolving framework. However, many of these indicators lack sufficient data to regularly track progress. Citizen science can help to close this data gap. According to new research published in *Sustainability Science*, citizen science has the potential to provide data to track one third of all SDG indicators. The study included a systematic review of all SDG indicators and mapped past and ongoing citizen science initiatives that could directly or indirectly provide data for SDG monitoring.

Most citizen science initiatives engage members of the public to contribute observations of nature at global, regional, national or local levels, so unsurprisingly, the greatest potential for input was shown to be for the environmental SDG indicators. This is particularly encouraging as, according to the United Nations Environment Programme (UNEP), 68% of environment-related indicators lack data.

"Without new ways of monitoring, such as citizen science, we will never be able to achieve global monitoring of the SDG framework, as traditional means of data collection are too expensive to cover all 231 indicators on a regular, geospatially representative basis," explains UNEP Statistician, Jillian Campbell.

Indicators that were shown to align well with citizen science approaches included those that could be supported by spatial data, such as monitoring of water or air quality, disease threats, post disaster damage assessment, and open spaces in cities.

"The most remarkable finding from this review process is that citizen science has the potential to contribute to all 17 SDGs, since it is already

directly or indirectly contributing, or could contribute to at least one indicator per goal. For example, indicators that could be supported by self-reporting such as sexual violence or perceptions of safety, align well with data already being collected by some citizen science initiatives. These findings are generating interest and our results have been presented to the Inter-agency and Expert Group on SDG Indicators that is responsible for developing and implementing the global indicator framework for the SDGs and targets," says IIASA researcher and study lead author, Dilek Fraisl.

The researchers demonstrate that while citizen science data cannot replace, nor compensate for all the limitations of traditional data sources, there is great potential for new data sources to complement the traditional sources, such as the census, household surveys, and administrative records that are currently used to monitor progress on the SDGs. In many cases, citizen science initiatives are already established and only require varying degrees of modification, opening out, and collaboration to bring their approaches and tools to the table.

Examples from the study of how citizen science could contribute to SDG monitoring are the Picture Pile tool developed at IIASA and the Humanitarian OpenStreetMap for the SDG indicator on 'direct economic loss attributed to a disaster.' Picture Pile requires volunteers to classify satellite images to identify damaged buildings after a disaster. It is designed as a flexible tool that can also be used for monitoring SDG indicators related to poverty, food security, ecosystem health, and deforestation, among others. In the Humanitarian OpenStreetMap application, participants digitize the areas affected by disasters, which includes identifying damaged roads for disaster responders to reach those in need. Researchers can then apply maximum damage functions to the mapped areas to calculate some of the direct economic losses due to a disaster.

The study also showed that citizen science was introduced successfully as part of the reporting and monitoring process for the indicator on marine litter that initially had no established methodology and standards available to support it. The methodology of this indicator currently suggests citizen science as a primary source of data for monitoring marine litter.

The researchers highlight that realizing the full potential of citizen science will require demonstrating its value in the global data ecosystem, building partnerships around citizen science data to accelerate SDG progress, and encouraging investment to enhance its use and impact.

More information: Dilek Fraisl et al, Mapping citizen science contributions to the UN sustainable development goals, *Sustainability Science* (2020). DOI: 10.1007/s11625-020-00833-7

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