

Webinar on Contextualising CITIZEN SCIENCE Scape for Hydrological Science in India

What is Citizen Science?

Citizen Science is essentially about the 'active' participation of the general public in the creation of new scientific knowledge. Citizen Science has alternatively been referred to as civic science, community science, and public participation in scientific research. Philosophically citizen science is close to community-based monitoring, community-based management, and crowd-sourced data collection. Yet citizen science is different from other types of public participation in scientific data collection because of its emphasis on the active role which a citizen plays. This role that citizens play varies across initiatives and can encompass one or even all areas like methodology designing, data collection, data analysis, report writing, and sharing data at various platforms. Based on the extent of involvement of citizens the literature classifies citizen science initiatives as contributory, collaborative, and co-created. However, irrespective of the extent of involvement of citizens in the initiative, the role of professional scientists and researchers in ensuring that the quality of data collected is robust enough for further scientific deployment is a common feature across citizen science projects.

The citizen scientist benefits from an improved social capital cultivate a scientific acumen and has an improved understanding of the world around her/him. The scientific and research community benefit from the ability of citizens to provide precise data at finer resolutions and at lesser costs, hence allowing localized problems to be studied and for localized solutions to emerge. As an example, The Global Biodiversity Information Facility, a global citizen science project has about half a billion data points from citizen science and has supplied data to more than 7000 peer-reviewed papers in ten years (<https://www.gbif.org/>). Conservationists benefit from the inherent ability of citizen science to foster collective consciousness of sustainability and pro-environmental behaviour in the population. Democracy and society benefit by citizen science becoming an instrument in decentralizing knowledge, creating a space for bottom-up decision making, and promoting polycentric monitoring and governance of resources (Buytaert *et al.*, 2016).



While the phrase citizen science was coined in 1990, but the involvement of the public in data collection of various phenomena and areas of inquiry is believed to be as old as at least two millennia. But an increase in the involvement of citizen science initiatives in recent times is backed by improvements in sensing technologies (such as GIS and RS, cheap sensors, etc.), data processing and analysis, and knowledge communication (data visualization). Citizen science is gradually establishing a base as a data collection methodology for scientific inquiries across fields like ecology, astronomy, wildlife sciences, air quality, psychology, natural resource monitoring, disaster impacts, etc.

Citizen Science for Hydrology

As compared to other disciplines in natural sciences, citizen science is a much more recent and slow-rising phenomenon in hydrological sciences. Hydrological data by nature is complex to monitor and alters frequently in difficult to capture ways because of its interactions with humans and other natural resources. Understanding various components of the water cycle and the interaction of humans with the water cycle hence requires intensive and frequent data which will be a resource-intensive exercise, both in terms of time and monetary costs involved. But citizen science has been gradually rising to the challenge. Projects on measuring precipitation, monitoring water quality of surface and groundwater, measuring soil moisture, and monitoring fluctuations in surface and groundwater levels have been gaining popularity in ‘developed’ countries. (Buytaert *et al.*, 2014; Njue *et al.*, 2019). A few examples stand out: International initiatives like CoCoRaHS (Community Collaborative Rain, Hail and Snow Network) have collected and archived 31 million daily precipitation reports in 17 years from their network of 37,500 observers (Reges *et al.*, 2016) or like FreshWater Watch has more than 31,000 data points collected as of today from all the continents (<https://freshwaterwatch.thewaterhub.org/>). Developing countries, including India, have started opening their research and implementation doors to citizen science in various fields, including hydrology. But the number of people participating in such projects and publications coming out these remains very low, considering the size, diversity, and tech-savvy nature of India. (Namdeo and Koley, 2021). Additionally, the potential of new-age technologies like GIS, RS and interactive visual data platforms, etc. remains underexplored. Hence, a large potential area to promote data-driven sustainable management of water resources remains untapped.



Why this webinar?

April is designated in the international community as Citizen Science Month. This webinar is hence being planned for 29th April 2022. This webinar aims to bring together some thought leaders and those with experience in designing and executing citizen science projects for hydrology on a common platform to understand their experiences, and to discuss the scope for citizen science for hydrology in India. The increasing stress on water resources of the world because of climate change and anthropogenic factors has made data-driven governance increasingly important for the sustainable management of water resources. Since academic Institutes, think tanks, do-tanks, civil society spaces, and government departments play a leading role in natural resource governance, including water, they are the targeted audience for this webinar. By listening and then interacting with the speakers; the audience can leverage from experiences of the speakers in delivering citizen science projects, and in dissecting policy and implementation scope for citizen science in the country. The intent of this webinar is to bring to intelligentsia's basket of research and implementation tools the potential of citizen science by discussing with them the methodology employed, challenges faced (in maintaining citizen morale, ensuring regularity and quality of data collected, etc.), and outcomes achieved by those who have already worked in this space. By then opening the space for a panel discussion between thought leaders and the audience, the webinar will allow for a discussion around challenges in data handling in citizen science and in actions needed by different stakeholders to strengthen the policy landscape for allowing the full potential of citizen science to be employed in the country.

BIBLIOGRAPHY

- Buytaert, W. *et al.* (2014) 'Citizen science in hydrology and water resources : opportunities for knowledge generation, ecosystem service management, and sustainable development, *Frontiers in Earth Science*, 2(October), pp. 1–21. DOI: 10.3389/feart.2014.00026.
- Buytaert, W. *et al.* (2016) 'Citizen Science for Water Resources Management: Toward Polycentric Monitoring and Governance?', *Journal of Water Resources Planning and Management*, 142(4), p. 01816002. DOI: 10.1061/(ASCE)wr.1943-5452.0000641.
- Namdeo, S. K. and Koley, M. (2021) *Citizen Science in India : Introduction, Challenges and Way Forward*. Bangalore. DOI: 10.29195/DSSS.03.01.0031.
- Njue, N. *et al.* (2019) 'Citizen science in hydrological monitoring and ecosystem services management : State of the art and future prospects', *Science of the Total Environment*, 693. DOI: 10.1016/j.scitotenv.2019.07.337.
- Reges, H. W. *et al.* (2016) 'The Evolution and Accomplishments of a Volunteer Rain Gauge Network', *American Meteorological Society*, pp. 1831–1846. DOI: 10.1175/BAMS-D-14-00213.1.
- <https://freshwaterwatch.thewaterhub.org/>
- <https://povesham.wordpress.com/2018/10/05/how-many-citizen-scientists-in-the-world/>
- <https://www.gbif.org/>

