

## What can citizen science do for you? Impact of the COLLECT project on ocean literacy and well-being within a North/West African and South-East Asian context

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The accumulation of plastic litter in the environment can have important negative impacts on ecosystem services and human well-being, and the issue of plastic pollution needs to be tackled at both individual and collective levels. Citizen science can promote action by addressing data gaps in marine litter distribution and abundance and by engaging the public to become more aware and to develop behaviors aimed at reducing plastic littering. However, knowledge on the educational, behavioral, and well-being impacts of citizen science projects focusing on marine litter remains limited.

The aim of our study was to investigate the impact of the citizen science project *Citizen Observation of Local Litter in coastal ECosysTems* (COLLECT) on the participants' ocean literacy, pro-environmental intentions and attitudes, and well-being. A total of 410 secondary school students (11 to 22 years old) from seven countries, in Africa (Benin, Cabo Verde, Côte d'Ivoire, Ghana, Morocco, Nigeria) and Asia (Malaysia) were trained to sample plastics on sandy beaches and to analyze their collection in the classroom. The impact of the COLLECT project on the participants was evaluated using a pretest-posttest design, wherein students completed a 15-minute survey before and after the project activities. The study's experimental design and data analysis plan were preregistered in the Open Science Framework registry prior to data collection (<https://osf.io/vb8tx>).

Non-parametric statistical tests ( $n = 239$  matched participants) demonstrate that the COLLECT project positively impacted ocean literacy (i.e., awareness and knowledge of marine litter, self-reported litter-reducing behaviors, attitudes towards beach litter removal). Participating in COLLECT also led to higher pro-environmental behavioral intentions (implying a positive spillover effect) for students in Benin and Ghana, and higher well-being and nature connectedness for students in Benin.

Results are interpreted in consideration of a high baseline in awareness and attitudes towards marine litter, a low internal consistency of pro-environmental attitudes, the cultural context of the participating countries, and the unique settings of the project's implementation. Our study highlights the importance of understanding perceptions and behaviors towards marine litter in local communities and the implications for management and policy decision-making.

### Keywords

Citizen Science; Plastic Pollution; Beach Sampling; Ocean Literacy; Pro-Environmental Intentions; Well-Being