



The Potential of Citizen Science to Address Environmental Issues

As technology advances make it easier for ordinary citizens to participate in environmental monitoring wherever they are, citizens' participation has been expanding in research projects that used to be considered exclusively for scientists. People who do not have professional training or education voluntarily participate in and contribute to scientific research are called as citizen scientist. Citizen science has been recognized for its various values and potentials, such as enhancing citizens' scientific literacy of the environment, producing scientific knowledge through publications, and contributing to policy change and problem solving. In particular, it is expected that the citizen science will take more roles in the future, due to the large proportion of citizen science in ecological and environmental field, the increasing demand for environmental services, and the rapid development of data collection and analysis technologies using low-cost sensors and technologies.

Korea still has low awareness of citizen science, and its policy use is in the initial stage. This study explored the possibility and meaning of applying citizen science in terms of a means for evidence-based policy and improvement of effectiveness of citizen participation. By conducting surveys and interviews with project managers, organizing and analyzing focus group meetings, and analyzing national and

international cases, we classified types of citizen science projects, and deducted achievements and limitations of citizen science regarding to environmental issues in Korea, and suggested ways to promote citizen science.

According to the result of analyzing the types of citizen science based on the degree of citizen participation, majority of the cases were close to ‘collaborative’ model rather than the simple contributory model whose participants only involve in the data collection stage. This is different from the result of overseas studies. Except for Principle 9 (the assessment of citizen science), domestic citizen science projects were found to be generally in line with the Ten Principles of Citizen Science proposed by the European Citizen Science Association. Furthermore, it was indicated that citizen science has positive effects in three aspects: the advancement of science through the production of new scientific knowledge, the scientific literacy and knowledge enhancement of citizens, and the social and ecological and policy impacts through citizen participation. However, there are many obstacles in spreading citizen science such as the lack of infrastructure and financial resources for citizen science, scientists’ low awareness, low participation rate of citizens, data collection methodology, short duration of citizen participation, lack of citizens’ expertise, and lack of policy makers’ understanding of the value of citizen science, and intricacies of integrating citizen science into policy.

Based on the results of the analysis, we suggested the ways to develop citizen science as below. First, build an institutional basis for citizen science. Establish a comprehensive vision and strategy for citizen science, and consider legislation of (tentatively named) ‘the Citizen Science Support Act’. In addition, formulate a base for policy integration to utilize citizen science. Second, investment is needed to

strengthen citizen science capacity. In reference to the case of the OPAL(Open Air Laboratories) program in the UK, nation-wide pilot programs of citizen science should be implemented to establish a citizen science network, build a broad base of citizen participation, a citizen science platform and technology infrastructure. In addition, in order to raise scientists' awareness and participation in citizen science, it is necessary to support research and development in consideration of features of citizen science and to improve evaluation criteria for research achievements. More communication training for scientists is also needed, Since Gyeonggi-do has relatively excellent capacity for citizen science and infrastructure, we suggested to institutionalize and support citizen science by enacting an ordinance, organizing a citizen science stakeholders' forum, and developing guidelines and toolkit, and supporting financially for citizen science partnerships and projects, using environmental conservation funds. The Environmental Education Plan should incorporate citizen science in developing the programs both for citizens and schools. Gyongggi-do shall support projects linked to the citizen monitoring indicators of Gyeonggi-do Sustainable Development Goals. Lastly, various local organizations such as environmental education centers and museums should be utilized to increase citizens' accessibility to citizen science.

This study is differentiated in terms of its implications in a macroscopic aspect, based on the quantitative and qualitative analysis of the types and characteristics of domestic citizen sciences projects to address environmental issues, whereas the existing studies focused on individual cases. Nevertheless, the study has a possibility that subjective opinions of project managers may be contained in evaluation of the citizen science and is limited for generalization due to insufficient numbers of cases compared to the overseas studies. Thus, a platform

for citizen science cases, and criteria for systematic evaluation should be formed in the future. In addition, for further research on factors affecting the sustainability of citizen participation, the survey should include citizens of various groups. Since citizen science is not an all-round solution, it is important to match citizen science themes and methods that are appropriate for policy objectives. In this regard, citizen science needs to be utilized not only as an evidence-based decision-making but also as a tool with various aspects.

Key Word

citizen science, environmental issues, citizen science type, evidence-based decision making, citizen participation governance