THE TAXONOMY OF COMMUNITY-BASED MONITORING: An overview and analysis of models

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ABSTRACT

Community science, often defined as a research partnership between community people and professional scientists, is practiced using a variety of models in the U.S. These models can be roughly categorized along a multi-dimensional continuum, taking into account the geographic scope of the project, the role of the professional scientists and the community participants, and the outcomes of the project in terms of community empowerment, community action-taking, contribution to scientific knowledge, and scientific literacy education. To categorize the different models, we examine the relative levels of participation of the community members and scientists in regard to: 1) establishing the question(s) for investigation, 2) developing a study design, 3) collecting data, 4) analyzing and interpreting data, 5) understanding the results, and 6) data use.

At one end of the spectrum is the data collectors research model, which is characterized by a "top-down" approach in which scientists determine the questions to be answered and then choose a segment of the public to target as participants for data collection purposes. At the other end is the participatory action research model, characterized by a "bottom-up" approach, in which community groups formulate their own questions, design their own studies, and interpret their own data, with the assistance of the scientific community.

All models have shared challenges, such as recruiting and training volunteers, ensuring data quality, managing large data sets, and getting volunteer-collected data accepted and used by various audiences. Models may also share some goals, such as increasing scientific literacy of the public. But the models have clear differences in both goals and outcomes. The top-down approach typically focuses on problems of national or international scope and results in contributions to scientific research, while the bottom-up approach more often focuses on local issues of broad community concern and leads to action-taking by participants.

Through considering examples of community science activities ranging from water quality testing, habitat assessment, and stream walks to large-scale surveys of fish, plants, birds, and other organisms, we will identify special attributes of volunteer water monitoring that make it uniquely well-suited to a community-based approach.

KEYWORDS

Community science, volunteer monitoring, models, community-based research, science education