EU-Citizen.Science Moodle on Evaluation and Impact Assessment in Citizen Science Projects (https://moodle.eu-citizen.science/mod/url/view.php?id=547)

Transcript: Evaluation, what is it and why do we need it?

What do we mean when we speak about evaluation?
Evaluation can be understood as a systematic assessment of the operation and the outcomes of an activity or program. As we speak about a systematic assessment, we usually have a set of explicit or implicit standards and criteria that are applied. Generally, we can distinguish between formative evaluation and summative evaluation.

Formative evaluation is also considered as "process-based evaluation". With the formative evaluation we identify the strengths and weaknesses of an activity, project and program. This can be done continuously, and the feedback obtained by this evaluation can provide direct feedback, and even be used to improve the process while the project is still in progress. Formative evaluation can also be understood as an instrument of quality assurance with continuous feedback loops to improve the processes of a project.

Summative evaluation on the other hand, is "outcome-based evaluation" and is concerned with assessing the overall goals of the activities or programs, as well as its potential impacts and benefits. This impact assessment is providing evidence for change triggered by the initiatives and projects and is mostly used for showing impact to external stakeholders.

A widely used model for defining the success of a project or change process is the **logic model of evaluation**. It has been widely adopted and used for evaluating scientific programs and technology deployment program. More and more it is also used for individual projects, including citizen science projects during their planning and execution. The logic model provides a structured approach for the project design and evaluation. It systematically relates the project's inputs, activities, outputs, outcomes and impacts.
By **input** we mean the resources available for the project are for the activities. The **activities** themselves refer to the actions that are planned and implemented to achieve the desired outputs. **Outputs** are products or services resulting from these activities. In a citizen science project, outputs could be for example, the data points that are collected, the workshops that are conducted etc. **Outcomes** are the effects of the outputs on the target group, such as a behaviour change, an increase in knowledge or skills. And the **impact** is a long-term changes brought about on a societal or policy level; they constitute the progress made towards higher-level goals. So these are typically achieved beyond the lifetime of the project or program, which makes it also difficult for us to assess within the project timeframe. There are many variations of this model and you may come across more complex or more simplified versions. Some model variations, for example, consider also the context, the assumptions, risks and preconditions for certain activities.

In the evaluation processes the **outputs** are usually easy to document and to measure. This is mostly done with **quantitative measures**. An example could be the number of workshops conducted, the number of participants that you engaged and the resources that you may have available. It could also include **qualitative feedback** from

participants and stakeholders collected for example via interviews. Recording the outcomes is already quite complex, and **measuring the impact** of a project is even more challenging. Often it is difficult to causally attribute changes directly and inclusively to the project. So, if a participant in a citizen science project changes their behaviour and converts to more sustainable lifestyle, this could be due to knowledge and attitudes acquired during the project, but it could also be because of their new partner who's environmentalist activist
Impact usually refers to broader effects than outcomes and thus, measuring impact is even more of a challenge. So it often spans beyond the project lifetime, including long term effects and aspects of sustainability. Also we are faced with the difficulties of **causal attribution of certain changes** and this goes for both directions of causal attribution. For example, a project may cause multiple effects, and an observed effect such as societal change usually has not one but many different causes. And due to these difficulties in causal attribution, outcome and impact assessment often include **qualitative assessment** and case studies and impact, for example, in citizen science project is can be attributed to changes in policy, social innovation, or social societal change.

But why do we need evaluation? Evaluations of research projects and programs have historically been associated with the research outputs. As we can see here as part of the research cycle, validating and testing your data is an important part of your research activities. And this is still a very common approach in many disciplines, and especially in natural sciences. This validation is also often done via disciplinary peer review systems.

However, nowadays, research funders more and more requests evidence for the economic and societal outcomes and impact of research. So alongside the scientific quality of your data, it is important to show that research projects are contributing to global societal challenges, and mission oriented policies, such as the restoring of our oceans and borders, conquering cancer, or the establishing of Climate Neutral cities. And we see this depicted in this visualisation in the impact part on the change processes. Today's research policies tend to have a great focus on outcomes and impact assessment asking projects to measure not only research quality, but also broader impact and use. And this shift towards impact assessment and research falls in line with the general historical development of redefining the relationship between science and society. We can observe this at many levels, such as the increasing institutionalization of public engagement, the development of practices of technology assessment, and the wide support for the concept **of responsible research and innovation, short RRI**, which has defined along six policy agendas by the European Commission. Typically, citizen science would be mostly established within the public engagement policy agenda, but it also touches upon most of the other science policy agendas. Citizen Science falls within the principles of RRI and at the same time has strong resonance with the characteristics of transdisciplinary research. Thus, when dealing with evaluation of citizen science, we have to consider its socio ecological relevance, its multi stakeholder engagement and its societal embeddedness which are also core elements of an RRI value evaluation.