**Bürger schaffen Wissen**

Die Citizen-Science-Plattform

Green Paper

# Citizen Science Strategy 2020 for Germany

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# Imprint

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## Disclaimer

# Foreword

Civic engagement plays an increasingly important role, not only in society but also in research, as one avenue for different actors to actively participate in our strongly science-based society. Currently, citizen participation in scientific processes is discussed widely under the heading of "Citizen Science". Beyond advancing scientific findings and large scale data provision, Citizen Science can generate significant added value for society: people can enhance their scientific literacy in fields such as nature, technology and history – and learn how science works. They are better equipped to assess scientific data and results and to understand the limitations of scientific methods and findings. The overarching focus for all Citizen Science projects is the gaining of scientific knowledge for both science and society.

This Green Paper Citizen Science Strategy 2020 for Germany presents the understanding, the requirements and the potential of Citizen Science in Germany. It reflects on the multiple benefits of Citizen Science for different sectors of society and on options and opportunities to develop the methodology and approach. In order to realise this potential, the Green Paper develops 10 potential fields of action to strengthen Citizen Science in Germany and to build capacities for the successful implementation of Citizen Science programmes.

During the GEWISS events, and through the online and written consultation on the Citizen Science Strategy 2020 for Germany, many participants with different backgrounds joined the discussions on the significance of Citizen Science, the challenges as well as opportunities. We are extremely grateful for all their supportive, critical and inspiring contributions.

We hope to maintain an open and transparent dialogue with all stakeholders, also in the future. This should focus on demonstrating and evaluating citizen science experiences in practice and developing success criteria to support the initiators and promoters of Citizen Science. Specific action plans with agreed targets for the application and implementation of measures can help to firmly establish Citizen Science as an integral part of different organisations in science and society.

For a vibrant Citizen Science landscape in Germany, we hope that the visions and recommendations for action proposed in this Green Paper will help to strengthen Citizen Science in Germany and stimulate future discourse.

Leipzig and Berlin, May 2016

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Citizen Science makes it possible for citizens to explore their own environment. Photo: Andre Künzelmann / Tagfalter Monitoring Deutschland

# Contents

# Executive Summary

This Green Paper presents the aims, potential value and challenges of Citizen Science in Germany and lays out recommendations for developing a national strategy for engaging citizens in science. Citizen Science describes the process of generating knowledge through various participatory formats. Participation can range from the short-term collection of data to the intensive use of leisure time to delve deeper into a research topic together with scientists and/or other volunteers, to ask questions, and to get involved in some or all phases of the research process. To promote the national development of Citizen Science, six visions of Citizen Science in 2020 in Germany are framed:

## In 2020, Citizen Science in Germany is …

- an integral part of societal and scientific debates as well as an approach with multiple benefits for science, politics and society. The various forms of participation – from collaboration to the active co-design and co-production of research – are valued, recognised and alive in science, society and politics.

- an established form of participation in society to jointly determine and address questions of societal relevance, with and without links to scientific institutions.

- an important part of citizens' lives that facilitates individual formal and informal learning, empowers citizens to participate in research processes and enables active engagement in science.

- a scientifically accepted, established and practised research approach that puts both participatory and transdisciplinary research into practice. This unleashes innovation potential in research processes by including a wide range of knowledge domains and opportunities for participation.

- a politically accepted process of citizen participation for the generation, quality assurance and dissemination of knowledge and the active interaction between science and society that is supported and fostered by policy.

- a participation format characterised by the use of web-based infrastructures that provide trustworthy environments in compliance with data protection regulations to promote active knowledge exchange and collaboration in Citizen Science projects.

To implement these visions, three core fields of action are identified as essential to the development of Citizen Science in Germany. These include the strengthening, creation and integration of Citizen Science into science, society and policy. Within the core fields, ten potential recommendations for action emerge, that can be translated into action plans, not only by scientists, government, or private funding organisations and politicians, but also by civil society, non-governmental organisations and individual citizens (Figure 1).
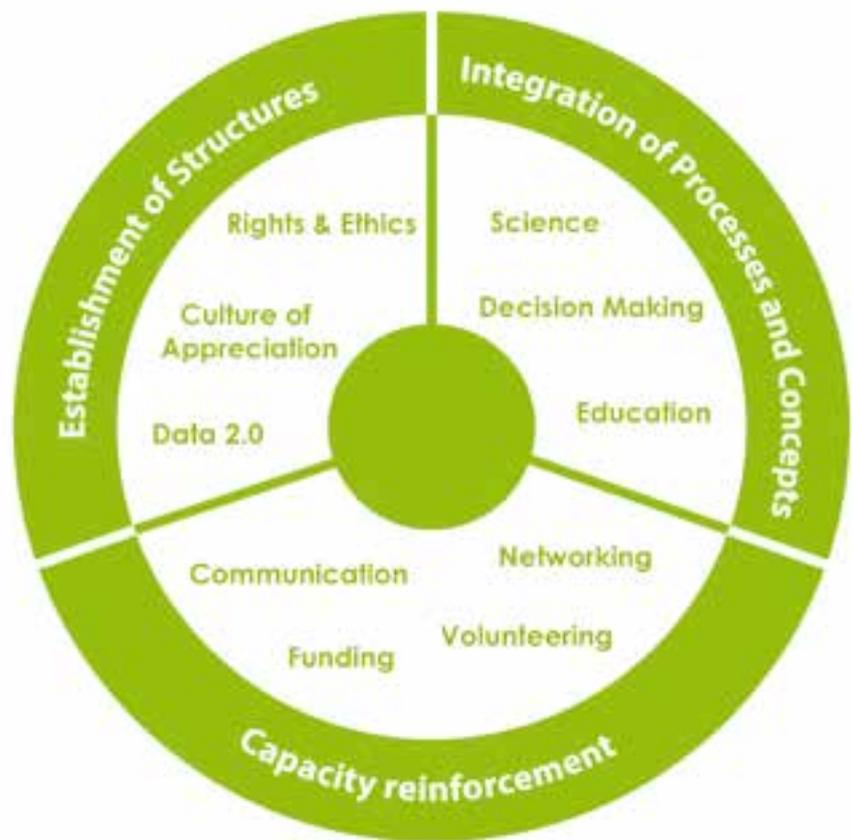


Figure 1: Core fields and recommendations for action to strengthen, establish and integrate Citizen Science in Germany (illustration by A. Richter, S. Wedekind UFZ/iDiv)

## Strengthening Existing Structures

For the long-term development of Citizen Science in Germany, existing structures need to be strengthened. The Green Paper identifies four recommendations for action to support established and successful participation structures that already facilitate Citizen Science in Germany.

**Strengthening Networking and Exchange**
Citizen Science comes alive through networking and the exchange of information between science and society. Networking and the

fostering of regular communications between actors should be encouraged. In particular, this should facilitate the passing on of experience and knowledge about the coordination and implementation of Citizen Science projects and the creation of mutual support networks.

## Expanding and Establishing Funding Instruments

Citizen Science, with its variety of formats, demands innovative financing models that guarantee support in the short-, medium- and long-term to meet the needs of a range of different actors. Funding should build on existing funding structures and be targeted towards the special requirements of Citizen Science projects. The establishment of new funding schemes directly addressing citizen science activities are needed, too.

## Strengthening Citizen Science Training and Volunteer Management

Essentially, Citizen Science is sustained by civic engagement and characterised by collaboration between partners from civil society. To ensure a high standard and quality of these collaborations, initial and expert training is needed for both volunteers and researchers. Education tools and training measures will need to be continually evaluated and adapted through adaptive management and re-

Volunteers collect data.
Photo: Oliver Röller/ Artenfinder

sponse to lessons learned. In particular, the role of coordinators as important facilitators between academia and volunteers should be recognised and supported.

**Developing Synergies with Science Communication**
Citizen Science promotes key objectives in participation-oriented science communications. Here, the Citizen Science community should make use of already well-established structures within the science, policy and voluntary sectors to improve and expand upon knowledge exchange and communication between participants, the public and other audiences.

## Developing New Structures

To enable the continuous development of Citizen Science in Germany, an enhanced culture of valuing Citizen Science next to improved framework conditions for ensuring data quality as well as legal aspects are needed. The Green Paper identifies three recommendations for action that should be considered in the strategic planning of Citizen Science in Germany.

**Creating a Culture of Valuing Citizen Science in Society, Science and Policy**
Citizen Science needs to be integrated into society, science and policy as an independent format. This requires a culture of Valuing Citizen Science, that appreciates, rewards and brings to life the various formats of Citizen Science.

**Developing Structures for Ensuring Data Quality and Data Management**
Citizen Science can create spatially and temporally very complex, and in part, completely new and novel data sets that require both web-based and analogue infrastructures. Here, trustworthy environments that are compliant with data protection requirements need to support the respective projects and activities. To reach this goal, new methods and framework conditions for validating, processing and storing Citizen Science data need to be developed and implemented.

**Clarifying the Legal and Ethical Framework Conditions**
Citizen Science touches upon legal questions such as copyright and insurance coverage, as well as ethical issues, when implementing scientific projects. In order to enable successful Citizen Science, existing legal structures that regulate data analysis and archiving as well as data accessibility need to be adapted. In addition, efforts should be made to foster an ongoing discourse on the legal and ethical issues pertaining to Citizen Science.

# Integrating Citizen Science into Existing Concepts

Citizen Science provides opportunities to tie in with existing concepts in science and education and thereby has the potential to create mutual gains. The Green Paper identifies three fields of action where integrating Citizen Science into existing processes can create interfaces for scientific, educational and socio-political innovation.

### Integrating Citizen Science into Scientific Processes

Citizen Science reflects a contemporary understanding of science that allows societal engagement through participatory methods. Therefore, in society as well as in science, there is a need to anchor awareness and acceptance of the value added by Citizen Science – for example the introduction of new perspectives – in the process of generating knowledge.

### Integrating Citizen Science into Education Concepts for Sustainable Development

Citizen Science provides the possibility to move towards educational concepts for society as a whole, that aim at strengthening key competences for a successful life and a functioning society. Integrating Citizen Science activities into formal and informal learning environments creates new formats for achieving the goals of education for sustainable development.

### Incorporating Citizen Science Results into Decision-Making Processes

Scientific results from Citizen Science projects can contribute to decision-making in political and planning processes. Solutions for day-to-day problems can be developed in a realistic manner. Involving interest groups in active research into topics that are relevant to society at an early stage can lead to a higher acceptance of the scientific results and improve the public's understanding of decisions derived on the basis of those results.
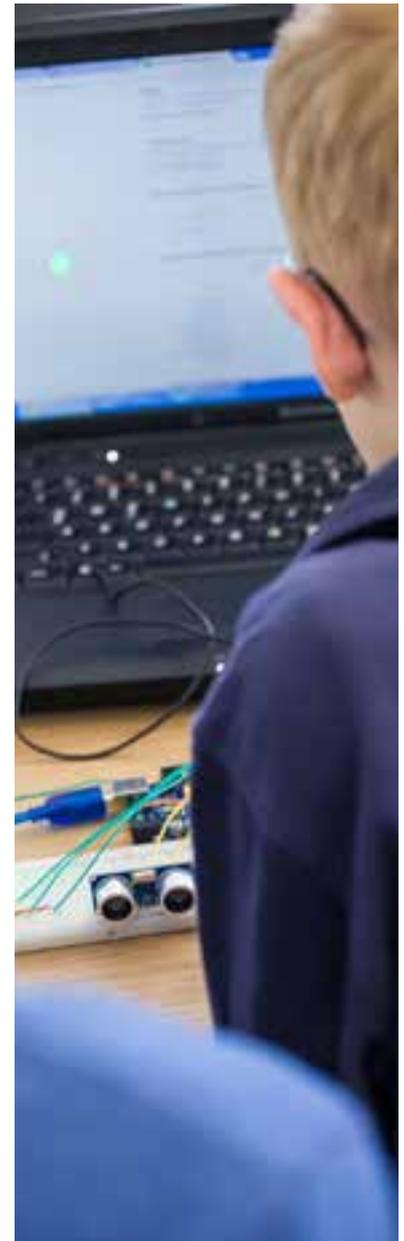
Citizen Science sets a precedent.
Photo: Thomas Bartoschek / Sensebox

# 1. Introduction

A wide range of interest groups, both in Germany and internationally, are increasingly calling for greater public participation in science. Especially when moving towards a society that operates in a globally sustainable manner, formats for sharing the generation of knowledge are crucial to successful implementation. Citizen Science is one participative option - understood here as involvement in scientific processes – especially at the project level – of actors whose main occupation is not in the science sector. For many civil society associations and learned societies, this form of shared research is not new. Indeed, research by volunteers – both interested lay people and experts in their fields – has been carried out in numerous fields in Germany for centuries. The scientific community is also recognising more and more the potential of Citizen Science. Science can gain, for instance, from citizens' participation through new motivations, the increased societal relevance of research, enhanced options for collecting and analysing large-scale data sets, as well as from advanced forms of science communication. In policy, Citizen Science represents a new form of public involvement. Many stakeholders from civil society have an active interest in conducting research – either through their own involvement in workspaces such as FabLabs, through voluntary participation in specific projects, or through civic associations and learned scientific societies.

However, if promising Citizen Science initiatives are to succeed, appropriate framework conditions have to be set. Different interest groups require different framework conditions and structures in order to successfully and sustainably conduct Citizen Science activities in Germany. A Citizen Science Strategy for Germany is required to anchor Citizen Science firmly in the social, scientific and political spheres.

The present document was drafted as a Green Paper for a Citizen Science Strategy 2020 for Germany. Its content is developed through the participation of over 700 individuals interested in Citizen Science from more than 350 organisations, scientific institutions, specialist organisations, associations and societies, foundations and individuals. In the context of the Citizens Create Knowledge – Knowledge Creates Citizens (GEWISS) project, Citizen Science in Germany was discussed in ten dialogue forums with a think tank, a kick-off event, five workshops and two webinars, as well as in numerous contributions to other events. This culminated in the development of visions and recommendations for action for the Green Paper. A nation-wide moderated online consultation process was conducted in the autumn of 2015. More than 1,000 website visitors viewed the green paper and provided over 400 comments on the draft. Further, 53 position papers were submitted by various organisations from science and society (see section 4.3). All comments and views were reviewed and accordingly incorporated in the final Green Paper.

The process of developing the Green Paper on a 2020 Citizen Science Strategy for Germany was guided and supported by the GEWISS consortium and the GEWISS advisory board, who enabled and promoted the dialogue between society, science and policy. The GEWISS advisory board and the GEWISS consortium consist of experts from the natural, social and political sciences, the humanities and the media, as well as from specialist organisations and associations (see also section 4.1).

The Green Paper primarily adresses the scientific system, including research institutes and funding organisations, with the aim of strengthening and expanding Citizen Science. This includes both universities and other scientific institutions, such as institutes from the Helmholtz and Leibniz Associations, the Max Planck and Fraunhofer Society, as well as public and private funding bodies. Furthermore, scientific associations, learned societies and civic organisations are addressed that can take on a central role in Citizen Science. Moreover, the importance of the media and science communicators as well as the education sector are taken into consideration in the Green Paper.

The Green Paper reflects the current debate on Citizen Science in Germany that was facilitated in the context of the GEWISS project. The research landscape and its embeddedness in society is going through a continuous and iterative change process by creating and taking up new perspectives and impulses. Thus, the Green Paper serves as a foundation and as a starting point for the further development of action plans by different actors with specific road maps for their implementation and a planned White Paper.

Looking into and learning from the past.
Photo: Oliver Röller / Artenfinder

# 2. Citizen Science – Perspectives for Germany

## 2.1 GEWISS Definition of Citizen Science

### Definition of Citizen Science

Citizen science describes the engagement of people in scientific processes who are not tied to institutions in that field of science. Participation can range from the short-term collection of data to the intensive use of leisure time in order to delve deeper into a research topic together with scientists and/or other volunteers. Although many volunteer scientists do have a university degree, this is not a prerequisite for participating in research projects. However, it is important that scientific standards are adhered to. This pertains especially to transparency with regard to the data collection methodology and the open discussion of the results.

In Germany, the term "Citizen Science" is increasingly used to describe both the long tradition of civic commitment to and engagement with science, as well as the numerous new formats for participating in research. While the Anglo-American approach to Citizen Science usually emphasises public participation in data collection for environmental research, there is a broader understanding of the term in Germany.

Citizen science encompasses the active participation by citizens in the various phases of the research process in the natural and social sciences and in the humanities. Participation ranges from generating research questions and developing a research project, to the collection and scientific analysis of data, right through to communicating the research results. In the process, collaborative efforts between the research institutions and independent individuals who are not connected to those institutions can be structured in quite different ways. This can range from projects developed completely independently within individual volunteer initiatives, to collaborative transdisciplinary work, to formalised instructions and guidance provided by scientific facilities. Over all, the common aim of all Citizen Science projects is to generate new knowledge. Research projects result in knowledge gains for science and often answer questions of very practical or socio-political relevance. Citizen science represents an approach in which scientists and voluntary experts are able to create mutual learning opportunities in a partnership of respect and at eye level. In the process, framework conditions are established from which all of the participants benefit.

Through the collaborative efforts of society, science and policy a range of formats of Citizen Science can be developed.

Features of Citizen Science include:

- The uptake of societally relevant questions in the science sector and fostering the empowerment of participants to act as a community and to be able to respond collectively to future challenges
- A focus on problem-oriented approaches to solutions on the basis of connected scientific and social knowledge at local, regional, national and international levels
- The opportunity to generate and consolidate large-scale qualitative and quantitative data sets and findings over large areas and/or across longer time periods
- An assessment of information across different scientific disciplines

- The enhancement of scientific literacy, and the public's understanding of science and research

- The opportunity for civic engagement and commitment to gain a greater say in scientific and research matters

- Access to knowledge and the active exchange of knowledge between scientific and social communities

- The strengthening of a sense of community

## 2.2 Citizen Science in Germany Today

In Germany, there is a long tradition of collaboration between citizens conducting research on a voluntary basis, and academic scientists. In the past and today, specialist organisations, associations, museums and archives play a key role. At the same time, approaches in transdisciplinary research on sustainable development have become established, that study these collaborative activities. Here, existing volunteering structures form a foundation for the scientific activities that are complemented with new participative forms and formats. In this way, added value for science and society can emerge from the collaboration. The position papers submitted during the consultation process confirmed this view. There are already numerous Citizen Science projects that the science sector initiated together with civic stakeholders. Voluntary participation in science is increasingly being recognised as a central element in research, and this is reflected in many cross-cutting research programme announcements and calls for proposals at national, European and international level. Internationally, overarching Citizen Science networks and alliances have been formed in Europe (the European Citizen Science Association, ECSA), in Australia (the Australian Citizen Science Association, ACSA) and in the USA (the Citizen Science Association, CSA). At the same time, the need to carry out Citizen Science activities independently of scientific institutions is demonstrated by the many new Citizen Science projects that are organised by citizens themselves.

It is evident in Germany that new target groups are interested in conducting voluntary activities with science. The internet and social networks have established a network of interested volunteers and researchers at scientific institutes. New communications technologies permit the transmission of data and citizens' participation in science at almost every conceivable location. Smartphone apps, QR codes and mobile sensors facilitate the fast digital recording and forwarding of volunteered knowledge to central databases. Moreover, formats such as citizen labs also exist, that allow participants to organise the research themselves. These aim to explore further forms of participation in scientific systems and to

Portal Beee is officially recognised as a project of the UN Decade on Biodiversity on 24 October 2015: Dr. Koch-Unterseher (Berlin Senate Department for Economics, Technology and Research, left) and the award winners, the IFV Biodiversity Team. Photo: IZW

establish participative innovation as a basis for sustainable development strategies.

One expression of the new forms of science collaboration is seen in the current debate on open access, i.e. the option to use, further process and change works protected by copyright. Citizen Science can provide members of the public with an opportunity to tap into follow-up analyses of the data for further research. Automated and manual validation, as well as plausibility checks, ensure that the submitted Citizen Science data meet high quality standards. The information collected is swiftly visualised on Internet platforms, ensuring rapid feedback of the results to the participants. These digital developments are making an important contribution to the growing enthusiasm for Citizen Science among increasing numbers of people, especially the younger participants. At the same time, Citizen Science also provides opportunities for retired people to engage in science and society.

## Citizen Science Projects in Germany

Numerous Citizen Science projects with a variety of themes are already underway in Germany. An overview of the various projects can be found on the website **www.buergerschaffenwissen. de**. Currently, more than 60 projects are registered on the platform. The number of participants involved varies from some few to several thousand ranging in age from 8 to 80. The following projects are representative examples of the various research areas:

- Ecosystems research: expertise from society and new data on regional or large-scale biodiversity distribution patterns and spatio-temporal environmental parameters is integrated (Mosquito Atlas – **www.mueckenatlas.de**; Butterfly Monitoring Germany – **www. tagfalter-monitoring.de**; Diving for Conservation – **www.nabu-naturschutztauchen.de**; DDA Bird Monitoring – **www.ornitho.de**; as well as the web portals **www.artenfinder.de**, **www.naturgucker.de**)

- Health research: research questions and also study proposals are developed by affected patients (**www.migraene-radar.de**, **www.ifp.bayern.de/projekte/monitoring/meilensteine.php**)

- Humanities research (history and archaeology, music, art): extensive classification of images, sounds and texts can be conducted by volunteers (**www.artigo.de**, **www.gov. genealogy.net**, **www.altes-leipzig.de**)

- Urban planning: citizens can feed in information they have collected on patterns of environmental pollution or biodiversity, such as noise, light, dust, as well as accident hotspots (**www.envirocar.org**, **www.verlustdernacht.de**, **www.portal-beee.de/fuechse-in-der-stadt.html**, **www.expedition-muensterland.de**)

- Distributed computing, computational science or so-called @home projects: project operators from different disciplines are supported by citizens' resources (computers), as for example in the case of Einstein@home (AEI Hannover), SIMAP (formerly University of Vienna), POEM@home, Spinhenge@home and yoyo@home (**www.Rechenkraft.net**)

## 2.3 Citizen Science – A Contribution to the Debate on Participation in Science

The history of modern science is closely linked to the idea of scientific activity having a special role in society, i.e. as an enclave of "objective" research that is free from societal interests. This expresses the aspiration of seeking the "truth" in a manner protected from political or other influences. In that sense, the freedom of science is doubtlessly an essential condition for the success of modern science. On the other hand, the idea of science having a position outside or independent of society is and always has

been an illusion, too. Science is itself part of the society that it promotes and supports. Society places expectations upon science, and science also aims to develop and provide solutions to societal problems.

This social reference is contained and embodied in the term "responsible research". Consequently, through the increasing importance of scientific knowledge and findings and their (technical) products for areas of everyday life, public awareness is focussing more and more on the social function and responsibility of science. Scientific results are becoming an object of curiosity and interest, as well as subject to public scrutiny and reflection by "non-scientists".
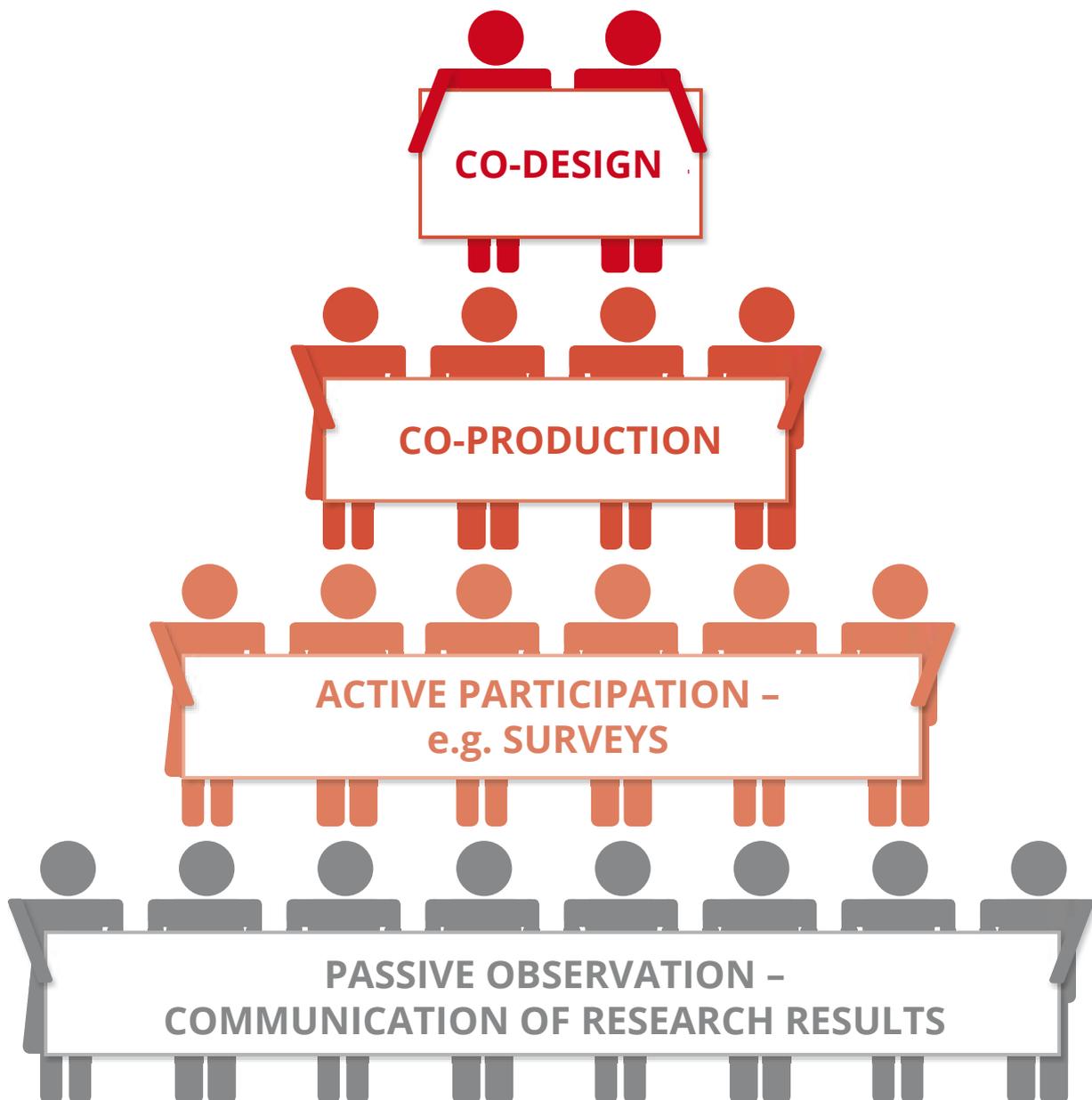


Figure 2: Participation pyramids. Citizen Scientists can get involved at different stages of research (illustration by Sonja Kreft, MfN).

Asking questions and working on problems. Photo: Thomas Bartoschek / Sensebox

In recent decades, aspirations to open up science to citizens, together with their participation in research, agenda setting and science funding policies, have grown on the part of the public as well as within the sciences. In this context, Citizen Science enables an opening up of science in the sense of having direct collaborative partnerships between specialist scientists and citizens in addressing scientific and social questions, issues and problems (Figure 2). This can be seen in the growing number of citizen conferences, open dialogues regarding research-policy issues, and the participation of civic organisations in research-policy advisory councils.

This collaborative work includes the following areas:
- Scientific collaborations between academic and voluntary scientists
- Scientific adoption and shared analysis of questions, issues and problems raised by citizens
- Engagement of interested citizens in the collection and analysis of scientific data

## 2.4 The Transformation Potential of Citizen Science

If Citizen Science is understood as the independent involvement of citizens in science, then there is great potential for innovation in terms of how civic society stakeholders participate in and influence scientific processes (Figure 2). Citizen science can also stimulate and inspire new science communications concepts, which in turn are essential for the successful implementation of Citizen Science projects and initiatives. It also provides an opportunity to address and include new participants who hitherto have shown only retained interest in social participation.

For science, the added value of Citizen Science is to be found in the integration of new knowledge and new impulses from society in the research process. The collaborative work with citizens also enables joint learning processes within science as well as gaining new or alternative knowledge, methods and perspectives. Unique potential for new research topics can unfold from this. These include, for instance, socio-ecological research that considers the reciprocal influence of natural, social and cultural phenomena. Here, Citizen Science provides important insights for science into the living environment of the citizens. In some cases, the participation by citizens in scientific investigations actually enables comprehensive research in the first place. This is the case, when not only local views and findings are included, but also large-scale data sets with temporal-spatial or qualitative aspects, e.g. from locations which scientists are not able to access, are achieved through

citizen science activities to answer scientific questions. Participation by citizens, however, is not suitable, practical or realistic for every scientific issue. The question of whether Citizen Science is suitable for a specific project depends on the research question, the experimental design, the extent of prior knowledge required, the know-how, skills and resources of the scientists, the capacities available for comprehensive communications, as well as personal safety aspects.

On a political level, Citizen Science can be an important building block in the national debate on developing solutions for urgent societal problems. Fundamentally, efficient and sustainable joint working of actors from science, policy and civil society is required. Involving citizens should occur as early as possible in the process and be fostered across the phases of the decision-making process. In this way, Citizen Science can provide opportunities to build and expand bridges between society, policy and science in response to local and global challenges. This can advance sustainable transformation of society.



Creating Knowledge

Personal Interest and Engagement

Societal Relevance

Figure 3: Citizen Science moves between the poles of personal interest and the wish to generate new knowledge, the motivation for which can be intrinsic or of societal relevance (illustration by L. Pettibone (MfN)).

# 3. Recommendations for Action for Citizen Science in Germany

Concerns about the potential of Citizen Science exist both among the scientific community and among citizens. The concerns expressed here range from "cheap research and scientific assistants" to "insufficient data quality" through to "a lack of knowledge about scientific standards". Dialogue is required in order to overcome these worries and to unravel opportunities, challenges and limitations of Citizen Science. It should include the actors from Citizen Science and interested parties from the realms of science, policy and society. In addition, increasing numbers of projects are needed to demonstrate how substantial and high-quality scientific and societal development is possible through Citizen Science.

Practical challenges, such as the expansion of existing structures, together with the creation and integration of new infrastructures and framework conditions for the implementation of Citizen Science in Germany, form the basis for developing recommendations for action. These emerged during a discourse held in the context of the GEWISS project and were subsequently formulated as general principles with accompanying recommendations for action.

These recommendations for action are primarily directed at scientific institutions, state and private funding organisations, authorities and ministries, public and private education providers, museums, civic organisations, federations, specialist societies and associations. Building on these recommendations, the different sectors of science, society and policy can now develop action plans and road maps with concrete measures to implement, advance and accomplish Citizen Science.

## 3.1 Strengthening Existing Structures and Framework Conditions

### 3.1.1 Strengthening Networking and Exchange

Currently, Citizen Science projects are frequently initiated by individual scientists or civil society stakeholders. Networking of these actors occurs sporadically only to date. As a result, there is a major need for greater exchange and training.

Recommendations for Action:

- Organise and conduct public events, dialogue fora, conferences, symposia, workshops, festivals and competitions to strengthen the exchange about, the awareness for and the networking of Citizen Science in science and society

**Guiding Principle 1**

Citizen Science comes alive through networking and the exchange of information between science and society. Networking and the fostering of regular communications between actors is encouraged. In particular, the passing on of experience and knowledge about the coordination and implementation of Citizen Science projects and the creation of mutual support networks is facilitated.

- Establish competence centres that provide advice and guidance on finding partners, projects, options for submitting applications and methods for implementing projects, as well as data quality assurance and management, etc.

- Promote websites for the publication and networking of Citizen Science activities

- Fund and establish Citizen Science coordinators in scientific organisations to enable active knowledge exchange between science and society

- Develop inter- and transdisciplinary structures such as open labs for Citizen Science initiatives

### 3.1.2 Expansion and Establishment of Funding Instruments

Citizen Science in Germany has been insufficiently funded to date. Currently, most of the Citizen Science projects are financially supported through hybrid funding from traditional third-party funding sources for science, through membership contributions in associations and societies, as well as from foundations. Comprehensive scientific projects are characterised by complex application processes and require enormous institutional knowledge, as well as major staffing capacities. By comparison, smaller projects have often insufficient funding options available. For its operationalisation, Citizen Science requires funding with a greater degree of flexibility compared to other scientific studies. This flexibility has not (yet) been integrated in the existing funding structures.

Recommendations for Action:

- Open up existing research programmes to Citizen Science approaches and establish interactive strands in existing research activities

- Promote and fund Citizen Science coordinators and communicators in learned societies, civil society organisations or scientific institutions

- Establish stand-alone, low-threshold funding formats that also enable the financing of citizen-led projects independently from traditional funding of scientific institutions

- Create options for start-up and follow-up financing for Citizen Science projects (e.g. scoping phases, establishment phases)

- Establish Citizen Science coordination and information offices to implement further training and education and to provide staff support for Citizen Science applications for scientists as well as for societal actors

## Guiding Principle 2

Various models are put in place for financing Citizen Science activities and projects. Financial conditions allow projects to involve a wide range of actors and the implementation of project over the short-, medium- or long-term. At the same time, funding models take the special requirements of Citizen Science projects in all their diverse formats into account. Institutional and private research funding programmes create opportunities for integrating different participation formats at different stages in the course of projects. Financial support is also available for research on Citizen Science.

## Guiding Principle 3

Education and further training of researchers and volunteers in NGOs, associations, scientific institutes and places of education is an integral part of Germany's Citizen Science culture. The educational materials developed for this purpose are used and continually updated. Education and further training measures are evaluated and improved on the basis of a regular exchange of information. In particular, the coordinators, as important facilitators between science staff and volunteers, are supported and recognised.

### 3.1.3 Strengthening Training in Citizen Science and Volunteer Management

Experienced scientists and coordinators are needed to establish Citizen Science projects and to organise the collaborative work with civil society partners. Yet, while the traditional education and training of scientists focuses on specific disciplines, Citizen Science – as an interdisciplinary and cross-cutting concept – has not yet been picked up in university teaching programmes. Volunteering is a fundamental component of Citizen Science. In order to gain long-term, sustainable civic commitment and engagement, volunteer management is required that, in addition to the planning, organisation and coordination of the Citizen Science projects, also supports and fosters the training and further education needs for volunteers. NGOs and learned societies can play an important role here.

Tracking light pollution. Photo: Christopher Kyba / Verlust der Nacht

- Implement the concept of Citizen Science in university teaching programs

- Design and implement "train the trainer" workshops for multipliers to pass on knowledge and exchange expertise gained in Citizen Science projects; develop coaching and mentoring programmes

- Design and implement further training options and courses for Citizen Science project coordinators in NGOs, learned societies and scientific organisations

- Design, implement and continuously update and evaluate the volunteer management process

### 3.1.4 Developing Synergies with Science Communications

Citizen science supports important aims in participation-oriented science communication. However, the wide variety of points of contact between the mass media (internet, print, radio and television), Citizen Science and the public are not yet explored to the full extent. Neither have the impacts on Citizen Science been comprehensively studied nor scientifically assessed. Experiences gained within Citizen Science activities, as well as the presentation of research processes, are rarely documented by the media. In future, a broadening of the capacities and qualifications of science communicators is required, paired with a growing awareness for the diverse range of tasks and roles that journalists, citizens and institutional representatives have. At the same time, communication of scientific activities is clearly distinct from science communication. Also, Citizen Science is not an instrument for achieving the aim of public relations.

Recommendations for Action:

- Support media representatives and science communicators in their efforts to motivate participants, structure communication between the initiators and participants and communicate results

- Draft guidelines for "good science communication" for Citizen Science projects, and design, implement and evaluate communication workshops for initiators of Citizen Science projects in collaboration with science communicators

- Establish clear structures and responsibilities with regard to communication in the project organisation of Citizen Science programmes

- Intensify science communication from and for Citizen Science through digital and analogue media

## Guiding Principle 4

Citizen Science as a concept receives media coverage and individual projects are advertised and followed. Different media channels such as the internet, print media, radio and television promote public engagement and the scientific topics and methods applied. This way the understanding of and appreciation for science in society is enhanced. Science communication processes are scientifically guided. Existing structures in science, politics and the voluntary sector are available and in place for the Citizen Science community to exchange information and communicate with the public, the participants, and other interest groups.

- Establish a media service for the dissemination of results as well as for networking in Citizen Science projects

- Provide resources for high-quality, continuous and open project communication

- Set up measurements to better monitor and study the impacts of science communication

## 3.2 Establishing New Structures and Framework Conditions

### 3.2.1 Establishing a Culture of Valuing Citizen Science in Society, Science and Policy

Societal actors as well as scientists who take part in Citizen Science (participants, coordinators, initiators) are not sufficiently appreciated. Appropriate recognition mechanisms for Citizen Science projects and the people behind the projects have been lacking to date. Scientists continue to be primarily assessed against their publication output in scientific journals and their success in acquiring grant funding. When valuing scientific achievements, factors such as the societal relevance, the engagement of different interest groups, the inclusion of new forms of knowledge and the communication of results via non-scientific channels are rarely taken into consideration. Citizen Science put into practise requires significant staffing and financial resources. Without additional resources this is often beyond the means of individual scientists. Thus, researchers who integrate citizens into scientific knowledge generation are investing in activities which are most often not recognised in the current evaluation system for science, and which may even be to their detriment. Moreover, at present, scientists can rarely count the specialist and social qualifications acquired to enhance career options.

Citizens initiate their own projects, too, or participate in projects that have been developed by scientists or in mutual collaborations with civic organisations. Broadly speaking, their commitment to science is often honoured only to a minimal extent. Volunteers' contributions to scientific studies are frequently not visible and are less valued within society.

Recommendations for Action:

- Discuss the added value of developing and applying evaluation methods for Citizen Science activities in science

- Foster visibility and appreciation for the results of Citizen Science projects in society, science and policy

**Guiding Principle 5**

Citizen science is an integral and accepted part of society, science and policy. The different Citizen Science formats – from the collection of data to the active co-design and active co-production of research – are valued, recognised and lived in science and society. There are different gradations and forms of Citizen Science with defined criteria that vary depending on the specific objective and disciplinary orientation.

- Promote dialogue between actors from society, science and policy to allow exchange of experiences and the establishment of a community network

- Integrate Citizen Science skills development into project and science funding programmes

- Develop creative ideas for enhanced recognition formats, including, among other things, monetary support (e.g. for coordination etc)

- Set up indicators of societal impact of Citizen Science

### 3.2.2 Developing Structures for Data Quality and Data Management

From a scientific perspective, involving interested members of the public in the generation of large, spatially and temporally highly complex data sets is one of the greatest benefits of Citizen Science in terms of innovation potential. The challenges faced here include ensuring adequate tracking of data sources, data validation, and harmonisation of data from various sources, as well as processing, archiving and making the data available for further analyses. In numerous Citizen Science projects data have been archived either insufficiently or not at all due to a lack of resources or knowledge. Only through proper data management and the accessibility of these data can other (secondary) research questions be addressed and answered. Many data sets derived from Citizen Science projects are currently stored in diverse formats and are described insufficiently, if at all, by means of metadata. This is hampering data accessibility and thus also the potential of Citizen Science. For society in particular, there is often only very restricted access to scientific data and results.

Recommendations for Action:

- Establish framework conditions for securing data quality:
  » (Further) develop automated data validation and statistical methods to analyse Citizen Science data

- Establish framework conditions for adaptive data management:
  » Enable an open-science policy (open access and open source) for Citizen Science data

  » Establish and implement the use of a standardised citation format for Citizen Science data

  » Establish and implement guidelines for quotable metadata

  » Develop guidelines for harmonising different data sources without loss of information content or data source traceability

**Guiding Principle 6**

Methods for validating, processing and storing Citizen Science data exist. There are criteria and infrastructures for handling Citizen Science data that make it possible to trace the source and access the data. There are binding standards for providing information on the characteristics of the data (metadata) and on data handling. Citizen science projects use established web-based and analogue infrastructures – as trustworthy environments that are in compliance with data protection requirements – to support the respective projects and activities and the participating actors. To do justice to the claim of a real knowledge exchange between science and society, the public also has access to data and results from the science sector.

» Develop long-term repositories for Citizen Science project data

» Provide support for such repositories in the long term

» Integrate and support established structures for implementing data management, e.g. in scientific archives, libraries and collections

» Develop a legal framework for handling intellectual property rights to enable the recognition of new inventions as communal goods

» Establish coordination and data information offices to assist with data issues when designing and analysing Citizen Science project results

Active discussions during the project design phase. Photo: Stefan Bernhardt / iDiv

### 3.2.3 Clarifying the Legal and Ethical Framework Conditions for Citizen Science

In many Citizen Science projects, aspects of copyright are not properly taken into account. Safety issues and questions of insurance coverage, too, often remain unclear when carrying out research projects with volunteers. In Germany, a discussion of ethical concerns relating to the opportunities and limitations of Citizen Science has not yet taken place. Nevertheless, in almost all project phases, there is a need to clarify the protection of privacy, the handling of protected biological species or the entering of restricted zones in protected areas.

#### Recommendations for action:

- Develop proposals for dealing with intellectual property rights, data protection and monitoring of compliance with regulations

- Draft action guidelines on the topics "data openness", "intellectual property" and "data protection" for Citizen Science project initiators and participants

- Develop standards for collaboration agreements between institutionally-affiliated and independent Citizen Science partners

- Set up extended insurance coverage for volunteers actively participating in Citizen Science programmes

- Clarify and review ethical issues relating to all aspects of Citizen Science

### Guiding Principle 7

Legal structures are established and in place for the management of Citizen Science data that regulate the evaluation and storage of data and their accessibility. Binding standards relating to the handling of data rights also exist. Co-ordination and data information offices are set up as points of contact in order to offer guidance on the handling of data (copyright, administration and use). Volunteers who are actively involved in scientific activities, for example when collecting data, are covered by insurances through additional agreements. An ethics working group or an ethics board is established which examines ethical questions that arise in relation to the possibilities and limitations of Citizen Science. The ethic working group provides advice and further develops a ethical framework for Citizen Science.

Marine microorganisms combined with bioinformatics. Photo: Frank Oliver Glöckner / Ocean Sampling Day
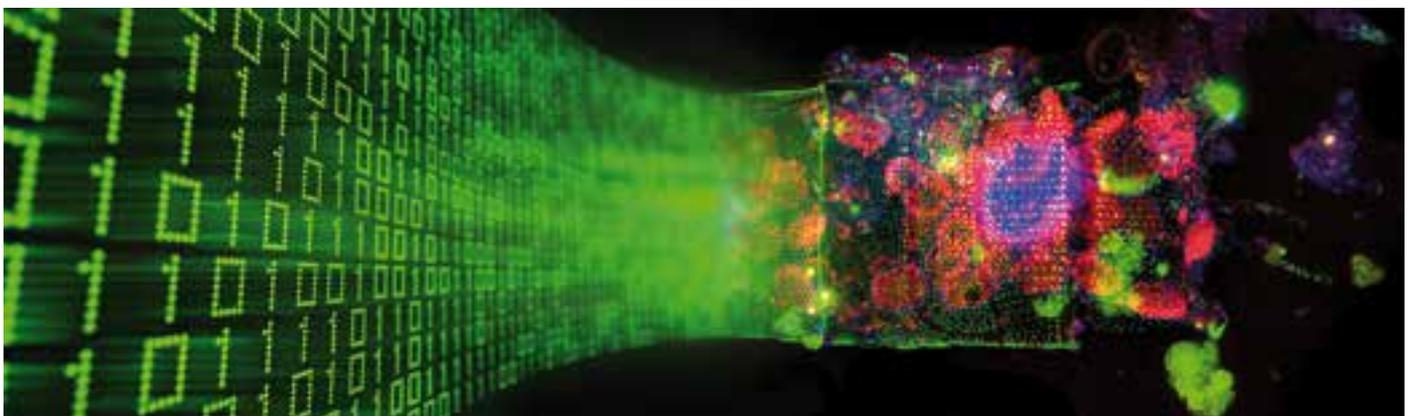
**Guiding Principle 8**

Citizen Science, in all its facets, is a lively form of collaboration between science and society. As an expression of a contemporary scientific process, Citizen Science enables societal engagement through participatory methods. Citizen Science enriches scientific culture and social, ecological and economic challenges are identified and explored in a common effort. The development of methodological knowledge leads to good scientific practice and stringency in Citizen Science.

## 3.3 Integrating Citizen Science into Existing Concepts

### 3.3.1 Including Citizen Science in Scientific Processes

Some scientists in Germany have concerns and reservations about involving the public in scientific research. Awareness and acceptance of the value added by the co-production and co-design of knowledge – for example the introduction of new perspectives – are not yet sufficiently anchored in the science sector. Scientists fear that the supervision of participants, quality assurance and feedback loops will be too time-consuming. At the same time, they suspect that the resulting scientific data may be of low quality and that there will be a lack of recognition of their Citizen Science engagement within the scientific community. Moreover, there are concerns about civic participation in agenda setting and science funding that could lead to a dominance of popular or application-oriented research topics at the expense of other, less accessible topics of fundamental and basic research.

Recommendations for action:

- Promote the concept of Citizen Science in science by developing and providing further training materials

- Integrate participatory and transdisciplinary methods into academic teaching taking into account practical experiences from successful Citizen Science projects

- Explore opportunities for active collaboration between actors from the scientific community and society by allowing for an extensive phase of defining a joint scientific problem and evaluating the project feasibility (scoping phase)

New media make innovative projects and volunteer networking possible. Photo: Stefan Bernhardt / iDiv
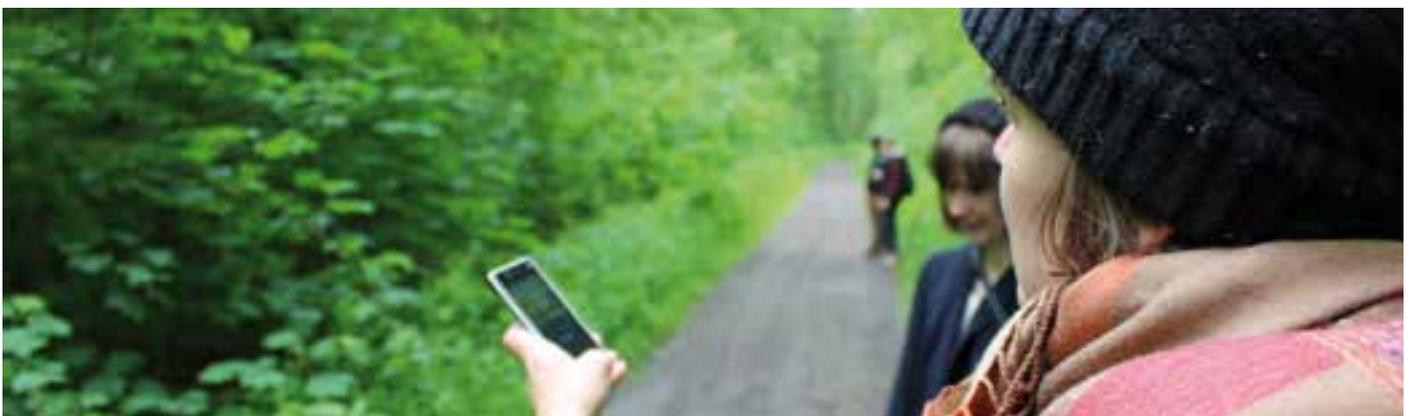
- Design and implement projects with participative methods and approaches

- Carry out accompanying scientific research on Citizen Science and during Citizen Science activities

- Develop and assess Citizen Science methods

- Assess quality, impact and multiple benefits of Citizen Science

### 3.3.2 Integrating Citizen Science into Education Concepts

Many Citizen Science activities fulfil educational missions that enable a deeper understanding of science. This includes the understanding of the respective research subject, modes of scientific thinking as well as taking responsible action. The educational potential of Citizen Science ranges from the individual to the societal and institutional level. Citizen science therefore moves along the axes of science, education and civic engagement. However, there are opportunities for building capacities when it comes to employing Citizen Science in the context of education concepts. School students, in particular, are curious explorers who enjoy engaging with scientific research questions. Involving young people in research projects and questions that are relevant to their local environment increases the motivation to reflect on their own behaviour towards the environment. Thus, implementing Citizen Science projects in school education programmes can instill in students a sense of responsibility for their environment and promote critical reflection on topics relevant to the environment and society. At present, there is little exchange between education and Citizen Science initiatives. Also, there is little common strategic thinking on how to engage young people in science. The innovation potential of Citizen Science for education (e.g. life-long learning for all education groups) is not yet sufficiently taken into account and fully explored.

Citizen Science and living history research. Photo: Anett Richter / Altes Leipzig



## Guiding Principle 9

Citizen Science enhances education concepts. This accounts for society as a whole by strengthening key competences for achieving successful lives and a functioning society. Citizen Science in Germany supports the achievement of the goals of Education for Sustainable Development (ESD). Explicit funding instruments make it possible to conduct Citizen Science projects in schools and at other non-formal education centres. There is close collaboration with schools and with academic education, where teachers serve as important promoters and refer for their work to high-quality teaching materials. Special education programmes are available to trainers and teachers. The activities are tailored to curricula and other framework conditions and are updated on a continuous basis.

- Develop Citizen Science as an extracurricular approach in science education

- Develop and adapt the learning content to include Citizen Science and integrate Citizen Science as teaching approach into school curricula

- Involve school students in Citizen Science activities

- Establish specific programmes for graduates to encourage participation in scientific research inside or outside of scientific institutions

- Integrate Citizen Science into scientific research in university teaching programmes and include it in the curricula of the various courses of study

- Establish and support Citizen Science structures in extracurricular, non-school institutions and places of learning such as environmental education centres or museums

### 3.3.3 Incorporating Citizen Science Results into Decision-Making Processes

Scientific results from Citizen Science projects can provide evidence for decision-making policy and planning processes. Solutions for day-to-day problems can be developed in a realistic manner. This applies, for instance, to research into topics that matter to citizens in the areas of the environment, health and sustainable development in their local and regional environment. Access to online databases and to measuring instruments that are inexpensive and easy to use can promote public participation. In addition, involving interest groups in active research into societally relevant topics at an early stage can lead to a higher acceptance of the scientific results and improve the public's understanding of decisions derived on the basis of those results.

Recommendations for action:

- Take up questions from society on real-life problems

- Involve citizens in research processes relating to society at an early stage and on an ongoing basis

- Increase acceptance of various knowledge generation formats among decision-makers

- Bring together decision-makers for a solution-oriented implementation of the results from Citizen Science projects

**Guiding Principle 10**
Citizen Science contributes to solving real-life issues and societally relevant local and regional questions. This supports decision-making processes in the arenas of policy and planning.

# 4. Green Paper Development Process

## 4.1 Consortium and Advisory Board of "Citizens Create Knowledge – Knowledge Creates Citizens" GEWISS

"Citizens Create Knowledge – Knowledge Creates Citizens" GEWISS is a capacity-building programme aimed at strengthening Citizen Science in Germany. The consorticum programme is led by institutions of the Helmholtz and the Leibniz Association together with their university and non-university partners. Participating partner institutions are the German Centre for integrative Biodiversity Research (iDiv) with the Helmholtz Centre for Environmental Research (UFZ) and the Friedrich Schiller University Jena, the Berlin-Brandenburg Institute for Advanced Biodiversity Research (BBIB) with the Museum für Naturkunde - Leibniz Institute for Evolution and Biodiversity Science (MfN), the Leibniz Institute for Freshwater Ecology and Inland Fisheries (IGB), the Leibniz Institute for Zoo and Wildlife Research (IZW), Freie Universität Berlin, the Leibniz Research Alliance "Biodiversity" (LVB) and Wissenschaft im Dialog (WiD). The project was funded by the German Federal Ministry of Education and Research (BMBF). The strategy development process was conducted independently of BMBF.

The GEWISS project team and the GEWISS advisory board took charge of the editorial processing of the Green Paper. GEWISS team members from the Helmholtz Centre for Environmental Research (UFZ) / German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig assumed responsibility for the final editing. All original contributions to the consultation process and the position papers released by the organisations are available on request. A detailed documentation of the consultation evaluation will be finalised in autumn 2016.

**GEWISS Project Team**
GEWISS team members are Aletta Bonn and Katrin Vohland (joint principal investigators), Anett Richter and Lisa Pettibone (project coordinators), as well as David Ziegler (website), Susanne Hecker and Claudia Göbel (international collaborations).

**GEWISS Consortium**
GEWISS consortium members are Josef Settele, Stefan Klotz, Reinart Feldmann, Doris Wolst – Helmholtz Centre for Environmental Research (UFZ); Johannes Vogel, Claudia Göbel – Museum für Naturkunde (MfN); Heribert Hofer, Miriam Brandt, Anke Schuman, Sarah Kiefer – Leibniz Institute for Zoo and Wildlife Research (IZW); Klement Tockner, Jens Krause – Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB); Matthias Rillig, Almut Scholtysik – Freie Universität Berlin/Berlin-Brandenburg Institute of Advanced

Biodiversity Research (BBIB); Matthias Premke-Kraus – Leibniz Association; Livia Schäffler – Leibniz Research Alliance Biodiversity (LVB); Christian Wirth – German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig; Kirsten Küsel – Friedrich Schiller University Jena; Christin Liedtke – Helmholtz Association; Markus Weisskopf, Thorsten Witt, Wiebke Rettberg, Wiebke Volkmann – Wissenschaft im Dialog (WiD).

**GEWISS Advisory Board**

The consortium and the implementation of the project goals were supervised by an advisory board with representatives from civil society organisations, the scientific community and the media. The GEWISS advisory board included: Christiane Grefe – Die Zeit; Leonhard Hennen – Karlsruhe Institute of Technology (KIT); Thekla Kluttig – State Archives of Saxony, State Archives Leipzig; Oliver Röller (formerly Pollichia e. V.); Uwe Schneidewind – Wuppertal Institute for Climate, Environment and Energy; Bettina Schmalzbauer – German Committee Future Earth (DKN); Klaus Tochtermann – German National Library of Economics, Leibniz Information Centre for Economics (ZBW); Hella von Unger – Ludwig-Maximilians-Universität München; Doreen Walther – Leibniz Centre for Agricultural Landscape Research (ZALF); Magnus Wessel – BUND – Friends of the Earth Germany.

Citizen Science looking to the future.
Photo: Karsten Berlin / DDAD

## 4.2 The GEWISS Dialogue Forum Series

In all, over 700 participants from 350 organisations, scientific institutions, learned societies, NGOs, foundations and private individuals took part in a series of nationwide workshops within the framework of the GEWISS dialogue series from May 2014 to January 2016 (Figure 4). This reflected a high level of interest among participants from Citizen Science projects and society (associations and private individuals), the science sector (university and non-university institutions), private and public funding organisations, and from representatives of the media.

The GEWISS workshops were hosted by the Rhön Biosphere Reserve, the German Federal Environmental Foundation (DBU), EUROPARC Germany, the Institute for Social-Ecological Research (ISOE), the Institute for Technology Assessment and Systems Analysis (ITAS), the Karlsruhe Institute of Technology (KIT), the Leibniz Centre for Agricultural Landscape Research (ZALF), the Leibniz Information Centre for Economics (ZBW), Leopoldina – German National Academy of Sciences, the University of Erfurt, the German Society for Computer Genealogy, and Wikimedia Deutschland e.V..

A huge thank you to everyone who contributed to developing this Green Paper!

The dialogue forum reports can be downloaded at:
**www.buergerschaffenwissen.de**.

Figure 4: Distribution of participants from different sectors in the dialogue forum workshops (in brackets number of participants)
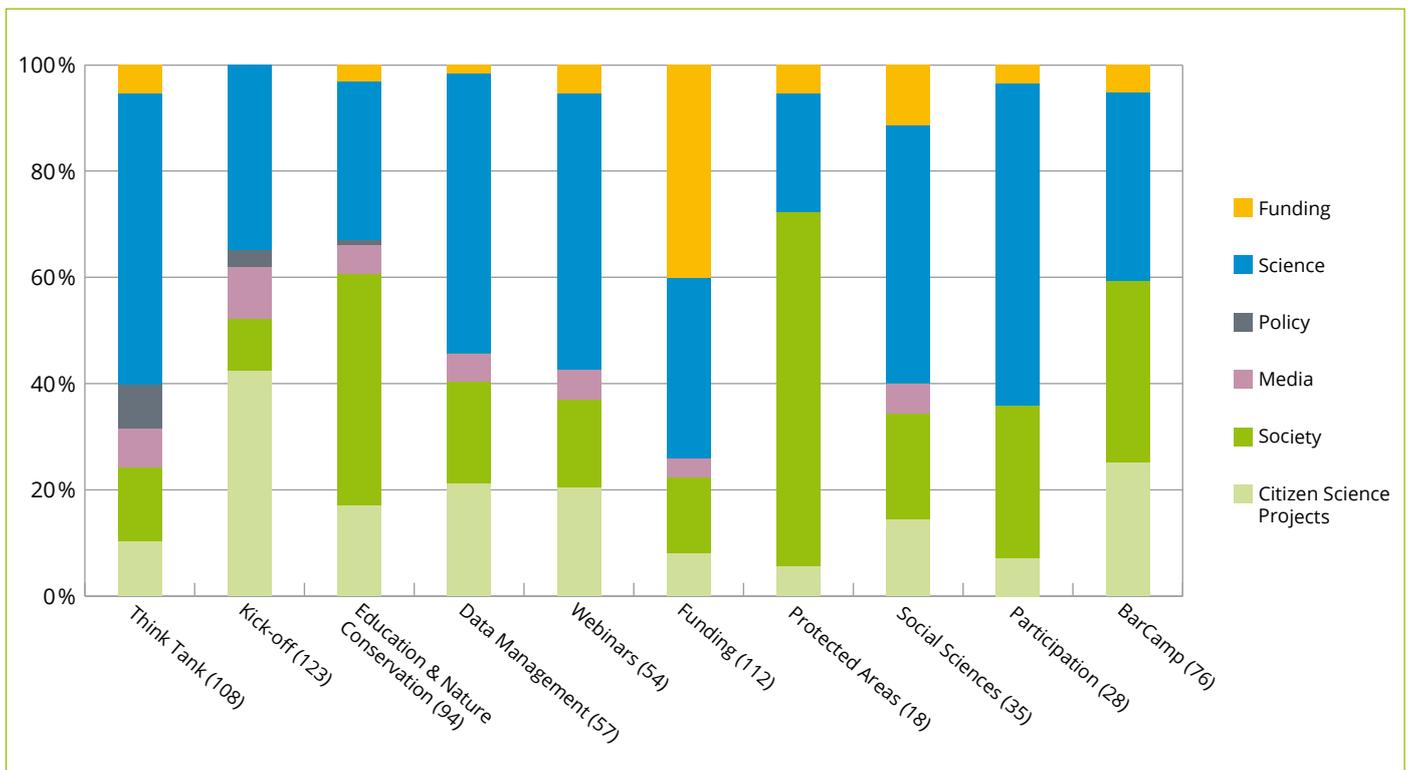
# 4.3 GEWISS Online Consultation and Position Papers

From September to November 2015 a moderated online consultation was conducted to gain inputs on the first draft of the Green Paper. Within four weeks of consultation over 1,000 website visitors and over 400 comments were submitted (**www.konsultation.buerger-schaffenwissen.de**). In addition, 53 position papers were handed in with valuable and in-depth contributions and discussions on the Green Paper. Comments were assessed and discussed among the project team and with the GEWISS consortium and GEWISS advisory board. After the revision the comments were accordingly implemented. This process was extremely inspiring and we are most grateful to all who took part in the process.

Participation in the online consultation process was largely anonymous. Most of the position papers were submitted with names and are available upon request. A detailed evaluation of the consultation will be published separately. Participation by organisations from science and society was very balanced (Figure 5). Participating organisations which submitted position papers are listed below. The views and opinions expressed in this Green Paper do not necessarily reflect those of the participants or their organisations.

Figure 5: Distribution of position papers submitted by different organisations (n=53)
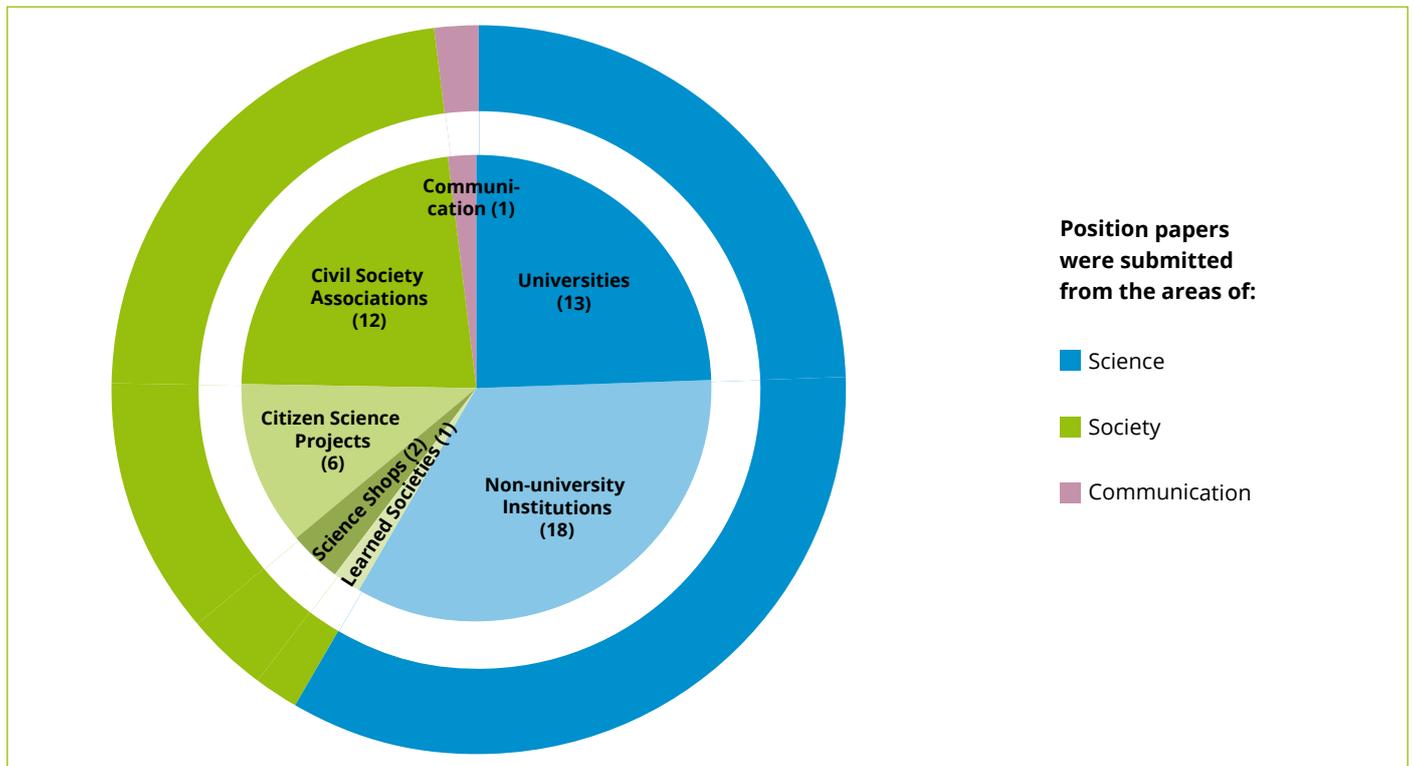
Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI)

Bayerischer Landestauchsportverband e. V., Fachabteilung Umwelt des BLTV

Berufsvertretung Deutscher Biologen (BDBiol) e. V.,
Office of the Vice President

Biotinkering e. V. in collaboration with ITAS/KIT

German Olympic Sports Confederation (DOSB)

German Centre for Integrative Biodiversity Research (iDiv)
Halle-Jena-Leipzig, Group on Earth Observations – Biodiversity
Observation Network (GEO BON)

EUROPARC Germany

Fraunhofer Society, Fraunhofer Institute for Interfacial
Engineering and Biotechnology (IGB), Sustainability Network

FSU Jena, Institute of Ecology

Helmholtz Association of German Research Centres,
Working Group "Knowledge Transfer"

Helmholtz Association, Berlin Office, Communications and Media
Relations

Helmholtz Association, Open Science Coordination Office

Helmholtz Association, Berlin (private person)

Helmholtz Centre for Environmental Research,
Dept. of Conservation Biology, Paper 1

Helmholtz Centre for Environmental Research,
Dept. of Conservation Biology, Paper 2

Humboldt University Berlin, Geography Department



Water samples from around the world are analysed in the

laboratory. Photo: Anna Klindworth / Ocean Sampling Day

## Participating organisations that submitted position papers:

Humboldt University Berlin, Integrative Research Institute on Transformations of Human-Environment Systems (IRI THESys)

KoNat Koordinationsstelle der kooperierenden Naturschutzverbände, Haus der Artenvielfalt

Bavarian Regional Association for the Protection of Birds e.V. (LBV)

German National Library of Economics (ZBW)

Leibniz Institute for Science and Mathematics Education (IPN) at Kiel University

Leibniz Centre for Agricultural Landscape Research (ZALF) e.V.

Ludwig-Maximilians-Universität München, Chair of Informatics, Teaching and Research Unit "Programming and Modelling Languages"

Martin-Luther-Universität Halle-Wittenberg, Didactics of Biology and Geography

Max Planck Institute for Evolutionary Anthropology, Department of Primatology, MPI EVAN, Working Group Pan African Programme

Max Planck Institute for Gravitational Physics, Division of Observational Relativity and Cosmology

Projekt Einstein@Home (Partnerprojekt)

NABU Germany e.V., Paper 1

NABU Germany e.V., Paper 2

Naturgucker.de

Niedersächsischer Heimatbund e.V. (NHB)

Rechenkraft.net e.V.

## Participating organisations that submitted position papers:

Senckenberg Society for Nature Research

Stiftung Lebensraum Moor

TU Dresden, Chair of Geoinformatics, Paper 1

TU Dresden, Chair of Geoinformatics, Paper 2

Umweltbildungzentrum Pleistalwerk e. V.

University of Heidelberg, Institute of Geography,
GIScience Research Group

University of Leipzig, Faculty of Biosciences, Pharmacy and
Psychology, Institute of Biology, Molecular Evolution and
Animal Systematics Working Group

University of Oldenburg, Institute of Chemistry and Biology
of the Marine Environment

Verband deutscher Archivarinnen und Archivare e. V. (VdA)

German Sports Diving Association (VDST),
Environment and Science Department

Verein für Computergenealogie e. V.

Wikimedia Germany e. V., Department for Education,
Science & Culture

Science Shop Bonn

wissnet – Association of North and East German Science Shops

Wuppertal Institute for Climate, Environment and Energy

Seven other organizations, that do not wish to be named

**Participants from the following organisations took place in the dialogue forums (The views and opinions expressed in this Green Paper do not necessarily reflect those of the participants or their organisations.):**

Akademie für Ehrenamtlichkeit Deutschland • Albert-Ludwigs-Universität Freiburg • Alexander von Humboldt Institut für Internet und Gesellschaft • Alexander-Humboldt-Lehrstuhl für Digital Humanities • Alpen-Adria-Universität Klagenfurt • Arbeitsgemeinschaft Natur- und Umweltbildung e.V. Bundesverband • Arbeitsgruppe Biologiedidaktik – Friedrich-Schiller-Universität Jena • Architekturbüro Geerling • ARL – Akademie für Raumforschung und Landesplanung – Leibniz-Forum für Raumwissenschaften • Astronomische Gesellschaft Orion • Auxnet • AVENA Büro für landschaftsökologische Analysen und Planungen • Baltic Environmental Forum Deutschland e.V. • Basis.Wissen.Schafft • Berliner Institut für Sozialforschung (BIS) • Bernhard-Nocht-Institut für Tropenmedizin • Bertelsmann Stiftung • biogeoservices • Biosphärenregion Berchtesgadener Land • Biosphärenreservat Rhön (Hessische und Bayerische Verwaltungsstelle) • Biosphärenzweckverband Bliesgau • Biotinkering Berlin e.V. • Botanischer Garten der Universität Osnabrück • Botanischer Garten und Botanisches Museum Berlin (BGBM) • Brandenburgische Landeszentrale für politische Bildung • Bremen International Graduate School of Social Sciences (BIGSSS) • British Embassy Berlin • BUND – Bund für Umwelt und Naturschutz Deutschland • Bund Heimat und Umwelt in Deutschland • BUND Regionalgruppe Leipzig • Bundesamt für Naturschutz (BfN) • Bundesministerium für Bildung und Forschung (BMBF) • Bundesministerium für Bildung und Forschung (BMBF) – Referat 614: Methoden und Strukturentwicklung in den Lebenswissenschaften • Bundesministerium für Bildung und Forschung (BMBF) – Referat 721: Grundsatzfragen Nachhaltigkeit, Klima, Energie • Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (BMUB) • Bundesministerium für Wissenschaft, Forschung und Wirtschaft Österreich • Bundesnetzwerk Bürgerschaftliches Engagement • Bundesverband Deutscher Stiftungen • Bündnis Nachhaltigkeit Bayern • Büro für Wildtierarchitektur • Büro für Wissenschafts- und Technikkommunikation • Christian Albrechts-Universität zu Kiel • city2science – Wissenschaftskommunikation und Strategieberatung • Clear Sky-Blog • Cluster Transformationsforschung • CODEXCOM / IOX – Connecting Smart Societies • Dachverband Deutscher Avifaunisten e.V. (DDA) • DATAJOCKEY – Institut für Jugendforschung und Jugendbeteiligung • Deutsche Bundesstiftung Umwelt (DBU) • DBU Naturerbe GmbH • Deutsche Akademie der Technikwissenschaften – acatech • DBU Zentrum für Umweltkommunikation • Deutsche Digitale Bibliothek – Stiftung Preußischer Kulturbesitz • Deutsche Digitale Bibliothek – Deutsche Nationalbibliothek • Deutsche Forschungsgemeinschaft (DFG) • Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH • Deutsche Gesellschaft für Ur- und Frühgeschichte • Deutsche Kinder- und Jugendstiftung • Deutsche Stiftung Denkmalschutz • Deutsche Telekom Stiftung • Deutsche Zentralbibliothek für Wirtschaftswissenschaften – Leibniz-Informationszentrum Wirtschaft (ZBW) • Deutscher Bundestag • Deutscher Naturschutzring • Deutscher Olympischer Sportbund (DOSB) • Deutsches Institut für Wirtschaftsforschung (DIW) • Deutsches Klimarechenzentrum • Deutsches Komitee für Nachhaltigkeitsforschung in Future Earth (DKN) • Deutsches Nationalkomitee für Denkmalschutz • Deutsches Schifffahrtsmuseum (DSM) • Deutsches Zentrum für integrative Biodiversitätsforschung (iDiv) Halle-Jena-Leipzig • Die ZEIT • DLR Projektträger Umwelt, Kultur, Nachhaltigkeit • ecologic – Institut für Internationale und Europäische Umweltpolitik • Entomologische Gesellschaft Orion Berlin e.V. • Erdhaftig Natur- & Umweltkommunikation • Eurodistrict PAMINA • EUROPARC Deutschland • European Citizen Science Association (ECSA) • European Institute for Participatory Media • Evangelische Kirche in Mitteldeutschland • Expedition Münsterland • Fachagentur Windenergie an Land • Fachhochschule für öffentliche Verwaltung NRW • Filmakademie Baden-Württemberg • Forschungsbibliothek Gotha • Forschungszentrum der Universität Erfurt • Forschungszentrum Jülich GmbH • FPH Forschungsverbund Public Health Sachsen • Fraunhofer-Gesellschaft • Fraunhofer-Zentrum für Mittel- und Osteuropa MOEZ, Leipzig • Freiberufliche Landschaftsplanerin • Freie Universität Berlin • Freie Wissenschaftsautorin • Freier Forscher – Ökonomie • Freier Journalist • Friedrich-Ebert-Stiftung e.V. • Friedrich-Naumann-Stiftung e.V. • Friedrich-Schiller-Universität Jena (FSU) • Fritz Thyssen Stiftung • Frogs & Friends e.V. • GABO:mi • Garten- und Friedhofsamt • Gedenkort T4 • GEN Europe • Genius GmbH – Wissenschaft & Kommunikation • GENUK e.V. • Group on Earth Observations – Biodiversity Observation Network (GEO BON) • Geographisches Institut an der Christian Albrechts-Universität Kiel • Georg-August-Universität Göttingen • Geschäftsstelle Haus der Zukunft im BMBF • Geschichtsmuseen der Stadt Erfurt • GESIS – Leibniz-Institut für Sozialwissenschaften • GEWISS-Beirat • GEWISS-Konsortium • GEWISS-Team • Goethe-Universität Frankfurt • Institut für Humangeographie • HafenCity Universität Hamburg • Hanns-Seidel-Stiftung • Hasso-Plattner-Institut • Haus der Kulturen der Welt • Haus der Universität • Heidelberger Life-Science Lab • Heinrich Böll Stiftung • Heinrich-Pette-Institut (HPI) – 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