



Federal Ministry
of Education
and Research



Social-Ecological Research

Funding Concept for society-related
sustainability research 2015-2020



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Foreword by the Minister



How should a sustainable economy, consumption and way of life be structured? Which new technologies, societal initiatives or business models could develop into the major sustainability innovations of the future? And which political and economic framework conditions have what sustainability impact? We require suitable strategies in order to answer these questions. New technologies are required here. However, societal innovations are just as important.

For this reason, the German Federal Ministry of Education and Research (BMBF) initiated the Social-Ecological Research (Sozial-ökologische Forschung, SÖF) funding priority back in the year 2000. SÖF is a major component of the Research for Sustainable Development (FONA) framework programme. In over one hundred projects that have been funded with a total of around 130 million euros since the start of this funding priority, SÖF has made important contributions that support societal transformation processes. Solutions have been found for challenges such as how energy can be saved through changed consumer behaviour, how successful business models for the energy transformation can be established through citizens' activity, and how citizens' participation can be organised effectively in specific sustainability projects.

SÖF has also provided impetus in terms of structural issues. SÖF junior research groups have shown that interdisciplinary and transdisciplinary career paths in science are possible and can be successful. The meth-

odology of transdisciplinary research was refined in pioneering work by non-university "sustainability institutes". Quality standards and evaluation criteria for transdisciplinary sustainability research were subsequently developed that are being used by an increasing number of scientists, researchers and others working in relevant fields.

Science and research will be required to provide input here in the future too. With the present brochure, the BMBF is presenting a new funding concept for SÖF that follows the approach of a learning programme. This concept is the result of an Agenda process involving science, research, civil society, industry and politicians.

This represents a good foundation to develop and implement sustainability solutions through interdisciplinary and transdisciplinary cooperation.

Prof. Dr. Johanna Wanka
German Federal Minister of Education and Research

A handwritten signature in blue ink that reads "Johanna Wanka". The signature is written in a cursive, flowing style.



1. Social-Ecological Research: Sustainability as a task for society

The global community is currently facing major societal challenges. Humans are part of ecosystems, but human behaviour is significantly modifying the foundations of these systems and thus also the appearance of the earth. Scientists are already speaking of the Anthropocene as a new epoch for the earth. Our current way of life is overburdening our natural resources and is thus endangering the future potential for human development. Threats are resulting from issues such as climate change, loss of biodiversity, soil degradation, water shortages, water pollution and resource shortages.

Societal challenges

Environmental impact is just one aspect here. These challenges also have effects on globalised economic and societal development. This is demonstrated by issues such as global financial and economic crisis, accelerated demographic change and the increasing world population, conflicts over land use, problems with worldwide food security, rapid urbanisation and supply security with sustainable energy. There is no avoiding a sustainable development approach if we are to safeguard a good quality of life in the future.

Taking sustainable development as the starting point, framework conditions for societal change processes and dealing with environmental risks have been developed. It is necessary here to consider environmental problems not just in terms of disturbances to ecological systems, but also in connection with the political, economic and social structures that they cause. Conversely, it is also necessary to take impacts on the environment into account when considering socio-economic crisis phenomena.

Policy aimed at sustainable development must therefore have the goal of taking into account economic, social and ecological issues in equal measure. Solution approaches to tackle global problems that exacerbate one another must not concentrate on measures that can be implemented in the short term. Strategies are necessary that facilitate long-term development that combines economic performance with social justice and ecological sustainability. Sustainable economic activity implies that limited natural resources are only used to the extent that these resources are capable of regenerating themselves. Current levels of resource consumption have to be reduced and decoupled

from economic growth. Against this background, the German Federal Parliament's Enquete Commission on "Growth, prosperity, quality of life – Paths to sustainable economic activity and societal progress in a social market economy"¹ suggested that the prosperity of our society should be measured and evaluated in a different manner than just by considering GDP. Instead, the Commission recommends additional criteria that include issues of justice or the ecological footprint associated with our way of life, alongside material prosperity. In order to achieve prosperity in a long-term manner from the perspective of such an approach, far-reaching changes are necessary to production processes and infrastructures, and also to resource-intensive lifestyles that are focussed on increasing consumption, particularly in industrialised countries.

Research-policy goals

Major societal challenges and the associated fundamental technical and social innovations² can only be tackled if solution strategies are developed and implemented on a solid scientific basis including all societal groups. In order to establish a justification for the necessary changes and desired goals (knowledge about aims and orientation), the investigation of values and norms is also necessary alongside knowledge about empirical facts, system dynamics and interdependencies (system knowledge). Finally, knowledge about how these goals can be achieved (transformation knowledge) is also necessary.

For this reason, the following research-policy goals are associated with funding for Social-Ecological Research³:

- the provision of knowledge on systems, orientation and decisions regarding society's manner of dealing with the main sustainability challenges such as the energy transformation, sustainable economic activity, sustainable urban and rural development, climate change and an analysis of the relevant need

for transformations in economic activity and society;

- the development of proposed solutions for dealing with (ecological, economic and social) risks and crises;
- the development of proposed solutions for conflicting goals (e.g. nature conservation, energy and food production), taking into account the participation and acceptance of important societal groups;
- the consideration of sustainability evaluations in decision-making processes.

To this end, integrated analyses are carried out as part of Social-Ecological Research (SÖF) in order to estimate the interactions between society, economic activity and the environment. These take into account:

- social developments (e.g. ageing of society, distribution of prosperity, social participation, changes in lifestyles);
- economic developments (e.g. increasing global interlinking of markets, need for less-developed countries to catch up economically);
- and political developments (e.g. increasing interlinking of political areas and processes, "global governance").

¹ The final report of the Enquete Commission is available as a PDF at the following web address:

<http://www.bpb.de/shop/buecher/schriftenreihe/175745/schlussbericht-der-enquete-kommission>

² Social innovations are understood here as new types of practices that differ from those that were previously routine and taken for granted and that represent solutions for societal problems and result in far-reaching societal structural changes (ISInova/ZTG TU Berlin 2012: 3).

³ Social-Ecological Research (Sozial-ökologische Forschung, SÖF) is capitalised when it refers to the BMBF funding priority.

Knowledge on systems, orientation and decisions cannot be delivered by isolated work carried out within individual disciplines. Cooperation between various scientific disciplines is required, supplemented by knowledge from practice. The linking of these different sources of knowledge is the subject of the interdisciplinary and transdisciplinary research approach in Social-Ecological Research.

SÖF is problem-oriented research that has its starting point in the consideration of specific societal challenges. Working from this basis, it then involves the necessary scientific disciplines in an interdisciplinary manner (interdisciplinarity). These range from engineering and natural sciences through to social sciences and the humanities. The experience-based knowledge of other societal actors – such as company representatives, environmental and consumer protection societies, and citizens themselves – is another important source of knowledge in the search for solution options. To identify practical solution approaches, transdisciplinarity is thus an important characteristic of the social-ecological research approach alongside interdisciplinarity.

The task of this type of research is not just to provide knowledge as a basis for decisions and actions; the further-reaching tasks include the description and analysis of value conflicts. For example, consideration may need to be given to the extent to which measures should be focussed more on intergenerational justice. Other examples include the issues of the responsibility and ability to act of various bodies, their contribution and significance in society, and the democratisation of societal processes. Social-Ecological Research considers topics that deal with societal negotiation processes and value discussions in order to identify realistic solution options for the question of how to achieve a transition to a sustainable society (i.e. knowledge about transformations).

As a result of the interlinking of issues of knowledge and values, close consideration of practice and applications is essential for Social-Ecological Research. Knowledge for the structuring of the impending major transformation processes must be developed with the targeted participation of societal actors (e.g. companies, NGOs, government, administration) in the research process so that this knowledge can be effective in practice. The joint formulation of societal

problems and the associated research requirement on the part of science and society is a first step here. This first step must be followed by suitable participation formats for the subsequent research process and for the transfer of the generated knowledge into practice. Societal actors must be involved in these processes as knowledge-bearers, on the one hand, and also for the implementation of research results into practice, on the other hand. This time-consuming type of societal participation in research differs from round tables or mediation procedures that aim to resolve societal conflicts. Participation in transdisciplinary social-ecological research implies involvement in the understanding and structuring of transformation processes.



2. Previous and current funding for society-related sustainability research

Society-related sustainability research is a major component of the BMBF's "Research for Sustainable Development" (FONA) framework programme. This research assumes that sustainable development can only be achieved by linking innovations in natural sciences/engineering with social innovations. Previous funding for society-related sustainability research focused on two areas: Social-Ecological Research (SÖF) and Economics for Sustainability (WiN).

2.1 Funding for SÖF and WiN from the BMBF

When the BMBF set up the SÖF funding priority in the year 2000, it was reacting to recommendations by the German Council of Science and Humanities and the German Advisory Council on Global Change (WBGU) that societal aspects should be integrated more strongly into environmental research. Since then, SÖF has followed a transdisciplinary research approach that transcends the boundaries of specialist disciplines and also goes beyond the scientific system itself. A significant component of this approach is the inclusion of interest groups in the research process. Up to 2013, around 100

research projects had been supported with total funding of 85 million euros. Alongside structural measures to strengthen scientific activity in this field, such as the funding of interdisciplinary junior research groups, seven calls for proposals on various subject areas have been funded so far:

- Sustainable development in the interlinked areas of "Environment, Food, Health". Long-term strategies for sustainable consumption
- Political strategies for tackling global environmental problems – between the local and the global
- Social-ecological transformations in the supply and disposal sectors
- Sustainable urban and regional development
- Strategies for dealing with systemic risks
- From knowledge to action – new paths to sustainable consumption
- Social dimensions of climate protection and climate change

The new focal area of “**Environmentally and socially compatible transformation of the energy system**” was started in 2013 with total funding of around 32 million euros. These projects are accompanying the energy transformation from a social-sciences viewpoint and deal with topics such as the acceptability of new solutions within the framework of the energy transformation, with scenarios for the development of the energy system (grid expansion, economic scenarios etc.), with new business models in the energy transformation and citizens’ participation, as well as with governance issues for the energy transformation.

Motivated by the central importance of economic aspects for sustainability issues, the first call for proposals for the “**Economics for sustainability**” funding priority was published in 2006. Its aim was to strengthen the capabilities of the economic sciences for solving sustainability problems; for example, the German Council of Science and Humanities (2002) had identified a lack of focus on applications and political relevance in the economic sciences.

The first funding phase (2006 - 2010) related to the subject focal areas of “Models and instruments of ecological controlling”, “Sustainable-consumption economy” and the interdisciplinary issue of “Sustainability innovations and evaluations”. A total of 16 projects were supported with overall funding of around 7.5 million euros. In the second funding phase (2010 - 2013), 18 projects were funded to the tune of about 8.5 million euros. The focus here was mainly on issues of governance with regard to new forms of control and new boundaries in the relationship between state and market, as well as institutional aspects of sustainability politics. This also included consideration of issues of justice and the social dimension of sustainability.

The projects themselves dealt with issues such as international environmental regulation and policy diffusion (e.g. global water management), with land acquisitions (foreign investments in land), with the structuring of regional markets for renewable energy sources, the long-term development of infrastructure systems or the introduction and evaluation of (market-economy) environmental policy instruments (e.g. protection of biodiversity, pollution control). In these projects, proposals for the evaluation of sustainability were made – for example, with regard to the likelihood of implementation. In addition, the decision-making be-

haviour of state and economic actors (e.g. importance of principles of justice in climate negotiations) and the controlling of innovation behaviour were investigated.

2.2 Society-related sustainability research in Germany and internationally

On a federal level, the BMBF’s FONA framework programme represents the most important basis for funding society-related sustainability research. Of the approximately 2,700 projects funded as part of FONA in the period 2010 - 2013, around 350 can be categorised as being in the social sciences. Alongside the “Societal developments” area of activity that includes the SÖF and WiN funding priorities, there are thus other research areas where research in the social sciences is an integral component.

Annex 1 lists the research institutes and research programmes in the university and non-university sectors, as well as programmes by federal states and foundations that deal with societal sustainability research. In the European Union, the “Horizon 2020” framework programme includes societal challenges as a focal area. International coordination in the area of sustainability research takes place in the so-called Belmont Forum (international forum for funding agencies for sustainability). Further information on the international aspects of societal sustainability research can also be found in Annex 1.



3. Agenda process and re-orientation of the BMBF's society-related sustainability research

From its beginnings, Social-Ecological Research has been conceived as a “learning funding priority” where experience with this new type of research is continually reflected upon and provides input into the structuring of the funding measures. Important steps in this learning process included the programme evaluation carried out by an external committee of experts in 2004/2005 and the revision of the SÖF framework concept on the basis of this evaluation. At the end of the originally planned ten-year programme phase, it was time to re-evaluate the situation and to use the findings of the review of previous funding for a re-orientation of the funding concept.

It can be seen that SÖF provided important new stimuli for sustainability research: for example, significant contributions were achieved as regards support for societal transformation processes with relevance to the focal areas described above (see Section 2.1) and also as regards the development of quality standards and methods of transdisciplinary research. In addition, “capacity building” measures – i.e. measures whose aim is the integration and establishment of an interdisciplinary and transdisciplinary approach in research and teaching – also provided stimuli for the scientific system. In recent years, sustainability has gained in importance as a cross-faculty subject at many universities.

One example here is the founding of a “Faculty of Sustainability” at the University of Lüneburg in 2010. In addition, the interdisciplinary and transdisciplinary approach of SÖF has increasingly begun to appear in other BMBF funding measures as part of FONA, particularly in the area of “global change”.

At the same time, there is still a need for the continuation and refinement of SÖF as an independent funding priority. However, the progress discussed here within the scientific system with regard to comprehensive sustainability research is not sufficient in the light of the complex challenges described above and the resulting pressure to act. The scientific system continues to be structured in a discipline-based manner to a great extent. In sustainability research, the main deficits continue to be identified in the analysis of societal and economic processes. For example, the analysis of the increasing international interlinking of markets and policy processes and the interdependencies within various policy areas in their impacts on the environment and society demands a high-level perspective such as that which has been developed in SÖF.

This fundamental assessment with regard to the continuation of SÖF was confirmed in a joint evaluation by the BMBF together with specialists from science and practice in 2011. However, weaknesses were also identified and guidelines for a re-orienta-



Specialists from science and practice discussing new research topics (Workshop at the 11th BMBF Forum for Sustainability 2014 in Berlin).

tion were prepared. This evaluation also marked the starting point for an Agenda process for Social-Ecological Research where future focal points for research in terms of subject matter and structures in the area of society-related sustainability research were developed with the specialist community, i.e. with experts from science, industry and society.

The most important event here was the Agenda Conference held in Bonn in March 2012, which was attended by over 200 figures from the relevant specialist fields. The latter grouping summarised the results of the Agenda process in a memorandum entitled “Understanding - Evaluating - Shaping. Transdisciplinary Knowledge for a Sustainable Society”⁴, which was presented to the BMBF in June 2012. The present funding concept resulted from the stimuli provided by

the Agenda process and, in particular, by this memorandum. This concept aims to integrate the previously separate funding priorities of Social-Ecological Research and Economic Sciences for Sustainability and to network them more strongly with other funding initiatives within the BMBF's sustainability research.

⁴ This memorandum was presented by an expert group consisting of Rainer Grießhammer (Oeko-Institut), Thomas Jahn (ISOE), Thomas Korbun (IÖW), R. Andreas Kraemer (Ecologic Institute), Claus Leggewie (KWI), Ortwin Renn (University of Stuttgart), Uwe Schneidewind (Wuppertal Institute) and Angelika Zahrnt (BUND) at the BMBF's Agenda Conference “Social-Ecological Research for a Sustainable Society” in Bonn on 19 and 20 March 2012. It was subsequently revised in the light of the results of this conference. The memorandum can be accessed online at the following address: http://www.fona.de/mediathek/pdf/soef-Memorandum_2012_de.pdf



4. Funding strategy

As part of Social-Ecological Research, solution approaches that have a solid academic basis and can be applied in practice are to be developed for specific societal challenges. The high-level goals of this funding priority can thus be described as follows: SÖF funding aims to provide knowledge on systems, orientation and decisions regarding society's manner of dealing with global sustainability problems; this knowledge will serve as a foundation for change processes that will lead to a sustainable society.

4.1 Aims of the funding priority

In particular, the most important sustainability transformations are the energy transformation, sustainable urban and rural development, climate protection and adapting to climate change, and the transition to sustainable economic practice with the aim of reducing the consumption of resources in absolute terms despite qualitatively increasing prosperity. A prerequisite for a sustainable society is the evaluation of that which should be considered a sustainable way of life and sustainable economic practice in the first place. The aim of SÖF is the further development of qualitative and quantitative evaluation standards for sustainability in specific cases. In order to evaluate sustainability (e.g. of new technologies or modes of consumer behaviour),

research must first identify facts and knowledge. For example, it is also necessary to be able to estimate the possible rebound effects (see p. 24 for a definition) of a given new energy-efficient technology as accurately as possible. However, this is not sufficient: sustainability (e.g. in consumption) is often a societal negotiation process where evaluation standards and systems have to be developed.

SÖF aims to deliver decision-making knowledge for dealing with ecological, economic and social risks and crises. The crises of recent years, such as that in the financial and economic sector, are such complex processes that often no clearly defined solutions are possible. Solution approaches are often based on uncertain knowledge and differing value judgements. For this reason, SÖF provides alternative scenarios and orientation guidelines that result in opportunities for well-founded decision-making. Sustainability debates often involve conflicting goals (e.g. between nature conservation, energy and food production). These too must be reconciled in a societal negotiation process. This is why SÖF also takes into account the aspects of participation and acceptance among societal groups, in particular.

On the one hand, participation and acceptance are therefore research subjects for SÖF; on the other hand, the transdisciplinary research approach of SÖF ensures

the participatory involvement of societal actors and thus also contributes to the implementation of the research findings. With this in mind, transdisciplinary cooperations between various scientific disciplines, specialist cultures, research institutions and practice on innovative subjects that are related to societally relevant sustainability are to be supported more strongly than previously.

While the social sciences will continue to be the focal point of the BMBF's Social-Ecological Research, networking with engineering and natural sciences will be fostered more intensively than before. Developments in the economic sciences towards a "sustainability economy", such as those initiated by the "Economics for Sustainability" funding priority, are to be continued within the framework of Social-Ecological Research. Also necessary is the strengthening of interdisciplinary and transdisciplinary skills in general and the further development of corresponding methods, quality criteria and scientific standards in particular.

4.2 Target groups for funding

SÖF is primarily aimed at scientists at universities and at non-university research institutes. However, in order to develop solution approaches that can be implemented in practice, it is essential that actors from civil society and industry should at least participate in research projects and maybe even initiate and manage these projects too. The research requirements should be identified together with partners from practice and the corresponding research issues should be formulated. Furthermore, application-relevant knowledge and societally relevant, scientifically founded solution approaches should then be developed in a joint research process with actors from practice.

Companies represent important partners from practice within SÖF, as many sustainability innovations can only be implemented together with industry. Providing answers to questions regarding the ecological and social impacts of new business models, products and services and the societal acceptance of innovations is a prerequisite for economic success in many cases. The political sphere is a further target group for the transformation knowledge developed as part of SÖF and for the actions recommended by researchers. Decisions in

sustainability policy can thus be based upon the latest findings in society-related sustainability research.

4.3 Participatory further development of the funding priority

Social-Ecological Research is to be understood as a learning funding priority that will be continuously refined and adapted to take into account the latest developments. This process of refinement will be structured so as to include relevant specialists by means of the Agenda processes. To this end, subject-specific discussions and dialogues about conflicting social-ecological goals will be supported.

Specialist discussions with small groups of experts will involve the specialist community in the process of identifying subjects for future funding. These specialist discussions also serve to specify the research topics in more detail and to prioritise them. In addition, the regular Agenda Conferences that include the specialist community support the process of identifying research topics. To ensure the practical relevance of this research, the bodies responsible for the relevant specialist policies (the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the German Federal Ministry of Justice and Consumer Protection (BMJV), the German Federal Ministry of Food and Agriculture (BMEL) and the German Federal Ministry for Economic Affairs and Energy (BMWi), in particular) will generally be involved in the development of new subject focal areas. On the one hand, this serves to sound out both the research requirements of these bodies as well as possible support from the BMBF; on the other hand, the research results obtained should reach the relevant political decision-makers more quickly in this way.

Within the framework of the first Agenda process in 2011/2012, various topics were identified in cooperation with the specialist community from research and industry. These topics are briefly outlined in Section 5 of this funding concept and represent a starting point for the upcoming calls for proposals for funding. However, these topics are not set in stone, and can be expanded, supplemented or else replaced if necessary. As one of the first topics to emerge from the Agenda process, a funding measure on the issue of "Sustainable

economic activity” was initiated with the focal areas of “Companies and consumers as shapers of social-ecological change” and “Systemic issues in the transformation of the economic system”.

This funding priority will be evaluated and refined after around five years with the participation of those awarded funding from various projects as well as independent specialists.

4.4 Future structural focal area: Strengthening of the specialist community – Instruments and institutions

Fostering young scientists

Support for junior research groups is being further developed based on the findings of the Evaluation Workshop in 2011 and the Agenda Conference, on the proposals by the relevant specialists contained in the 2012 Memorandum, and on the evaluation carried out in winter 2012/early 2013 of the impacts and results achieved in phases I and II (see Annex 2). This is necessary because the scientific system continues to be primarily structured in a discipline-based manner. In this way, interdisciplinary and transdisciplinary

work is still not being rewarded to a sufficient extent. It remains difficult to establish scientific careers on the basis of interdisciplinary and transdisciplinary work, even though SÖF support for young scientists has shown definite progress in this issue. More next-generation scientists still need to be introduced to transdisciplinary research approaches and they also need to learn the relevant methods and instruments. The aim of SÖF junior research groups is to contribute to the structural establishment of interdisciplinary and transdisciplinary work in the scientific system.

Announcements for social-ecological junior research groups will continue to be published in a non-subject-specific manner. The aim is to provide stronger support to young scientists in negotiating the divide between discipline-based qualifications and interdisciplinary/transdisciplinary project work – for example, by defining phases of (primarily discipline-based) obtaining of qualifications and phases of interdisciplinary and transdisciplinary cooperation. In order to provide support for group leaders and team members, the mentoring programme is to be intensified and cross-group training and coaching measures are to be expanded. In the future, more attention will be paid to ensuring that each group has access to interdisciplinary and transdisciplinary research expertise. Mentors in particular have a task to fulfil here, and external experts can also be



Emerging talent: A caterpillar turning into a butterfly.

called upon to provide special support where necessary. In addition, the linking of group-head functions with a junior professorship should be aimed for.

In contrast with previous practice, junior research groups will in future be selected at shorter regular intervals for funding. In addition to the non-subject-specific junior research groups, there will also be more focus on support for young scientists in subject-specific SÖF calls for proposals. In concrete terms, this means that:

- doctoral programmes, transdisciplinary post-doc positions, junior professorships and limited-term research visits abroad as part of subject-specific SÖF projects are to be supported;
- guest scientist visits and research visits as part of subject-specific SÖF projects are to be facilitated.

However, support for young scientists alone will not drive change processes to a sufficient extent. Supporters of SÖF will also be required in academic committees and subject-area societies who will contribute to increased transfer of the SÖF approach into science and research.

Scientific foundations: Interdisciplinary and transdisciplinary development of methods

In recent years, the BMBF's Social-Ecological Research has helped to support the changes in the scientific system that are necessary in order to develop transformation knowledge and thus to advance the establishment of the social-ecological research approach in research and teaching. In future, the development of the scientific foundations of SÖF is to be carried out to a greater extent in cooperations between universities, non-university institutes that are specialised in social-ecological research, and partners from practice. At the same time, new partners are to be found so that sustainability research will have a broader basis in the scientific system. This particularly applies to concepts and methods for the integration of knowledge from various disciplines and from practical experience and also to interdisciplinary and transdisciplinary framework concepts and term definitions.

On the other hand, the development of new methods for social-ecological research is also possible. For this reason, projects are supported that further develop the



Networking: Cooperation between universities, non-university research institutions and partners from practice should be further developed.

conceptual, theoretical and methodical foundations as well as quality standards for transdisciplinary sustainability research.

Innovative research projects

In order to be able to react quickly and flexibly to current thematic and methodical research needs, particularly innovative and risky pilot projects and measures for the further development of interesting new subjects are to be funded.

Strengthening of the social-ecological science community

A further aim of funding for Social-Ecological Research is to make the methodology of and knowledge about transformative sustainability research⁵ more widely known in the science community. After all, a platform – such as a professional society – does not yet exist that would systematically support exchange processes between scientists, bundle knowledge and disseminate this knowledge both to users and to young scientists.

Within the framework of SÖF, methodical and conceptual development could be bundled in a platform

project that supports networking and exchange between the science community and actors from practice. Workshops on interdisciplinary and transdisciplinary methods and current issues are to be organised at various locations through this platform. It is important here that methods are not developed within the framework of this platform in an abstract manner, but instead in connection with a specific problem. Research contents and research structures must be considered together.

In addition, panel discussions on specific topics are to be organised that will bring together leading figures from the SÖF specialist community and representatives of professional societies for various relevant subject areas such as the German Sociological Association (GSA), the German Economic Association (Verein für Socialpolitik), the German Association of Political and Business Economists (bdvb), the Association of Professional Societies in Biology (Zusammenschluss der Fachgesellschaften in der Biologie) and the Geological Society (Geologische Vereinigung, GV). On the one hand, these panel discussions can serve to identify additional topics for research; on the other hand, they can also promote the entry of society-related interdisciplinary and transdisciplinary research into established professional societies and academic committees.

Stronger focus on transfer into practice

The aspect of transfer between science and practice is to be strengthened in funding activity. In the future, users will be integrated into projects to a greater degree than previously and, to the greatest extent possible, already at the conceptual stage. On the one hand, this offers an increased opportunity for users to apply for their own funding as group partners. Users include companies as well as public administration bodies (local authorities) or partners from civil society. It is expected that the users will participate in the research project with their own work that contributes to the preparation for the implementation of project results. On the other hand, for selected projects the option should be made available to apply for a transfer project that follows on from a research project. The acquired

scientific findings are to be transferred into practice in a targeted manner using special measures in this separately funded follow-up project. The aim should be that actors from practice assume leadership here and are merely guided by the research.

Scientific coordination of funding measures and research on impacts

One prerequisite for the effective transfer of results is that the research results should be structured in such a way that dissemination into broad societal use or on the marketplace is possible. This also demands that the research results should be presented in language that will be understood by the partners from practice. In many projects, synergies between the findings of various projects must be rendered visible in a systematic manner and individual results must be combined to create an overall picture. This goes beyond the scope of individual research projects. For this reason, accompanying projects are generally set up for the research focal areas in SÖF; these accompanying projects deliver an overview and a synthesis of the results of all participating projects and thus support transfer into practice together with the group partners.

The impacts of research results should not be considered only “up to application”, but also “during” and, if necessary, “after” application too. Impact research is required that identifies which changes SÖF has triggered in society and economic activity and how this impact can be improved. Possible reasons for the failure of the transfer of results should be investigated. New methodical approaches are necessary here to identify and categorise impacts.

International networking and research cooperation

International networking and the international compatibility of Social-Ecological Research are to be strengthened. In particular, this is to be achieved by making the subject-specific calls for proposals for funding open for international cooperation in principle and allowing applications for funding within the framework of subject-specific projects.

⁵ Cf.: World in Transition – A Social Contract for Sustainability. German Advisory Council on Global Change (WGBU), 2011. The flagship report can be downloaded from the following website: <http://www.wbgu.de/hauptgutachten/hg-2011-transformation/>



Networking of Social-Ecological Research both in Europe and internationally.

There are two focal areas to international networking:

- Participation in European Joint Programming Initiatives (JPI). For example, projects on the social dimensions of climate change have been funded together with European partners since 2014 within the framework of JPI Climate.
- International initiatives: topics in the social sciences on the transformation towards sustainability can be dealt with within the framework of international initiatives (e.g. the Belmont Forum of international funding organisations) for sustainability research.

The project results are to be presented to a greater extent at international conferences. In addition, international-level events are to be organised at regular intervals where exchange between social-ecological and international research can take place. The opportunities for funding for research visits abroad within the framework of support for young scientists also help to foster international networking.



5. Focal subject areas

The focal subject areas identified hereunder are merely examples and should not be considered as a definitive list. They are broadly based on the previous SÖF Agenda process. The Agenda process will be continued in line with the philosophy of a learning programme, meaning that subject areas can be continually revised.

5.1 Sustainable transformation of urban areas

Rural and urban areas worldwide are currently changing to a degree rarely seen before. The historical urban-rural dichotomy appears to be becoming even more pronounced on a global scale. Economic potentials, ecological situations and qualities of life are diverging in many cases and causing enormous population movements, including movements across borders.

Even if urbanisation has served to balance out these dichotomies to a certain extent in many parts of Europe, urban and rural areas are still subject to enormous pressure to change here too: the pressure for action is resulting not just from demographic and economic

processes, but primarily from climate change. In Germany too, concepts for climate-compatible development must be designed and implemented for residential, natural and open-space systems. At the same time, strategies are required that will adapt cities to the foreseeable climate changes both structurally and in terms of social spaces, i.e. make them resilient.

All this must be considered against the background of socially and spatially disparate developments in areas that lie close to one another geographically in certain cases. The following examples can be identified: the contrast between shrinking and growing cities, the emptying of rural areas taking place alongside “commuter belts” with one-off housing in suburban areas, and re-urbanisation taking place at the same time as counterurbanisation. Residential land areas are still expanding to a great extent here – even in regions with falling population numbers. At municipal level, there is often a lack of awareness of sustainability problems; there is generally little municipal reporting on sustainability.

Cities are facing a modernisation process that is a reaction to climate change and other environmen-

tal problems, that impacts upon economic, spatial and technical issues, and that also takes into account social problems in urban societies. The aim here is to minimise social divides, stabilise socio-economic and urban-spatial built structures and, at the same time, to establish environmentally friendly and socially acceptable systems as well as new technical systems – energy systems, in particular – in urban infrastructure, commercial companies and private households. New forms of citizens' participation and new cooperative structures definitely need to be set up here; new business models and forms of organisation are necessary that are based on the principles of sustainability and that pursue the common-good goals.

This sustainable transformation of urban areas will only succeed if it is supported and accompanied by adequate efforts from society-related and interdisciplinary sustainability research which have the aim of developing problem solutions in a transdisciplinary manner and implementing these with partners from practice.

A research agenda has now been developed for this purpose: with the City of the Future National Platform (Nationale Plattform Zukunftsstadt, NPZ), the German Federal Ministry of Education and Research (BMBF), the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB), the

German Federal Ministry of Economics and Technology (BMWi) and the German Federal Ministry of Transport and Digital Infrastructure (BMVI) have initiated a forum for dialogue where specialists from science, industry, local authorities and civil society have developed a research agenda for the sustainable city of the future. These experts are active in four working groups on the topics of Energy and Resource Consumption, Climate Adaptation and Resilience, Transformation Management and Governance, and System Research. The City of the Future strategic research agenda is being published in early 2015.

The concepts of decentralisation and regionalisation will play a significant role in supporting development in favour of decarbonisation within the transformation processes for the “City of the Future”. The transformation of the energy system is one example of this, while urban electromobility concepts can also be included here. Transformation processes on this scale cause massive impacts on the existing structures of human environments, social relationships and technical infrastructure. They give rise to significant problems of adaptation and acceptance when these impacts call into question familiar procedures and patterns of spatial order. For this reason, Social-Ecological Research is called upon to make its own contribution to this important topic for the future.



Cyclists in the city: Bicycle-friendly cities help support sustainable development.

5.2 Co-transformation of social-ecological supply systems

The topic of “Transformation of supply systems” is closely associated with the sustainable transformation of urban areas. Supply and disposal systems for water, energy, food and waste are interlinked to an increasing degree. One example here is the link between water supply and energy supply: water is transported across long distances in certain cases with a high expenditure of energy, and wastewater is treated in energy-intensive chemical processes. However, wastewater is increasingly regarded as a valuable resource. This includes the recovery of energy, nutrients and fresh water from wastewater and the use of these in crop-growing. The increasing importance of renewable energy sources is also influencing the interdependency between the water and energy sectors, particularly in the areas of hydropower, bioenergy and energy storage. In addition, the supply networks identified here are increasingly being linked with IT infrastructure. On the one hand, this leads to gains in efficiency; on the other hand, this also poses questions regarding the security and resilience of these networks along with issues regarding the protection of citizens’ privacy, as additional consumer data increases the amount of data that citizens have to share about themselves. Social-Ecological Research can identify interdependencies here and thus help to develop outlooks and alternatives.

On this issue, the memorandum states:

“Social-ecological supply systems satisfy basic needs such as water and energy, mobility, food and health. The resilience of our society is largely determined by these systems, systems now caught up in transformation processes. In order that these systems can continue to fulfil their role of supplying goods in sufficient amount and quality in the future they must be made sustainable. The prerequisite for this is an analysis of numerous networked processes in their interaction. These so-called co-transformations have both a material-technical side and a societal-cultural side, and take place on different spatial, temporal and social scales.”

5.3 Sustainable economic activity: Consumers and companies as key actors for sustainable transformations

The economic and financial crisis has made it clear that the existing control systems of competition and profit optimisation reward non-sustainable solutions for market participants. These systems can lead to a destabilisation of our society, cause a significant environmental impact and also run counter to standards of social justice in production. What is required is an outlook for development that takes sustainability into account in all its dimensions and, in this way, com-



Research can contribute to products being manufactured and used in a more sustainable manner.

bines long-term economic success with protection of natural resources and more social justice in both the national and international arenas. Such an approach will presumably also increase the resilience of societal systems and help to strengthen companies, organisations and individuals in their ability to deal with crises (cf. Section 5.4).

The Green Economy approach has emerged in the English-speaking world, and was a central topic at the Rio+20 UN Conference⁶ in 2012, for example. The Green Economy refers to a low-carbon, resource-efficient and socially inclusive economy where incomes and employment result from investments in sustainability innovations. With this in mind, the BMBF and BMUB have initiated a joint Agenda process where the scientific community, industry and civil society can engage in dialogue with the aim of developing a research agenda regarding a Green Economy. Research in the social sciences on sustainable economic activity represents one contribution of SÖF to the research agenda on a Green Economy.

On the one hand, the production and consumption of goods and services can make a contribution to prosperity and quality of life; on the other hand, however, this production and consumption is often the most important cause for the emergence of social-ecological problems. For this reason, many companies and consumers are successfully searching for and trying out new forms of production and consumption. As a result of the great importance of this activity, these companies and consumers are the key actors in sustainable transformations alongside state actors: they influence society through the market. As market participants, companies actively shape patterns of production and consumption and, as political actors, they impact on societal and political processes. Consumers also have an influence in multiple manners: as drivers of demand, users, generators, providers of finance or as politically active citizens. Cooperative innovation processes between companies and consumers are becoming more prevalent. The issue of how the state can better improve the framework conditions for sustainable companies and sustainable products in a targeted manner should also be discussed.

Despite the progress that has already been achieved and the numerous examples of sustainable company management, a guiding philosophy of sustainable economic activity has not yet been implemented overall. There has not been any pioneering development in favour of sustainable patterns of consumption in recent years.

There is a specific need for research with regard to the following areas in particular:

Measurement and evaluation of sustainability impacts of company activity and of selected products and services:

A transparent and comparable evaluation – possibly extending as far as an evaluation of impacts – is required in order to encourage companies to contribute to societal change in favour of sustainability. Only when the environmental and societal impacts of a company as well as its economic impacts are known can improvement measures be tackled. The measurement and evaluation of the impacts of company activity have an input into internal controlling within the company, on the one hand; it also contributes to external communication to provide information to business partners and consumers, on the other hand. In this regard in particular, the question arises as to how to structure consumer information in such a way that complexity is reduced, while nonetheless creating transparency and providing orientation.

Potentials and sustainability impacts of new business models:

Innovations are necessary for commercial success. However, not every innovation is sustainable and not every innovation supports social-ecological transformation processes. For this reason, it should be investigated how companies can base their innovation processes on sustainability requirements in a more targeted manner. In addition, the sustainability potential of collaborative innovation processes needs to be researched. There is a need for further research with regard to current innovation trends such as “prosuming” and “open innovation” and to the issue of whether and how these trends can be used more in the development and implementation of sustainability innovations.

⁶ The final report of the Rio+20 Conference can be accessed at the following web address:
<http://rio20.net/wp-content/uploads/2012/06/N1238164.pdf>



Consumers can contribute to sustainability with their purchasing decisions.

Consumer behaviour and communication:

Social innovations in the area of sustainable consumption must be analysed and a stronger empirical foundation needs to be provided for consumer behaviour research. There is a need for research on transformation barriers and transformation drivers for sustainable consumption: hindrances and information deficits along the path to sustainable consumption are to be identified, and opportunities for market penetration for sustainable products and the sustainable use of these products must also be found.

Rebound effects:

It has been known for some time that efficiency gains thanks to new technologies alone are not sufficient to reduce the consumption of resources. Rebound effects can lead to efficiency gains being negated or even turned into negative outcomes again due to increased consumption. For example, it has been observed that

drivers who buy a particularly economical car then use this car more and/or drive longer distances than they did with their old car. Although the rebound effect has been known for a long time in research, investigations of this topic remain insufficient. In cases where quantifiable data is available at all, this data generally refers to direct rebound effects, i.e. to the fraction of the potential savings due to a more efficient technology (such as in the case of very economical cars) that is lost again due to increased demand for this technology. There is lively debate among researchers with regard to the extent of indirect⁷ and macroeconomic⁸ rebound effects. Research is required on the following issues in particular:

1. Consideration of methods for measurement of rebound effects, as there is considerable divergence in the results of research up to now.

⁷ Indirect rebound effect: As a result of financial savings due to increases in efficiency, consumers additionally use other resource-consuming goods and services.

⁸ Macroeconomic rebound effect: More efficient technologies lead to productivity increases that ultimately stimulate increased growth and, as a result, additional resource consumption.

2. Analysis of the occurrence of rebound effects.
3. Quantification of rebound effects.
4. Avoidance of rebound effects and the associated development of efficiency strategies and the development of new approaches for resource conservation.
5. Behavioural research that deals with issues such as what motivates consumers to engage in sustainable consumption and thus to avoid rebound effects. Ideas can be derived here as to which incentives political actors can create to encourage a sustainable lifestyle among consumers.

5.4 Resilience of social-ecological systems against crises

The term “resilience” is one of the central concepts in social-ecological approaches. Resilience means that a system is resistant to internal or external influences and is thus capable of dealing with stresses or risks without lasting damage occurring.

The term “resilient” may be applied to persons (e.g. as a result of vaccination against illnesses), buildings and other structures (e.g. as a result of earthquake-resistant constructions), infrastructures (e.g. as a result of redundant safety precautions) or supply systems (structured with diversity, an ability to cope with errors and a range of functions in mind). One important feature of Social-Ecological Research is the investigation of factors and processes in order to make vulnerable systems more resilient.

In particular, complex and networked systems such as the global economic system are often vulnerable to disturbances to a high degree. In such cases, the development of the system is often determined by economic interests that dominate over ecological or social interests. One example here is climate protection, which is not being implemented in a decisive or systematic enough manner for fear of economic losses. For this reason, a balanced outlook for development that is guided by economic, ecological and social sustainability is necessary: this would give equal consideration to the protection of natural resources and social justice in both the national and international arenas alongside

the economic performance of a given society. The guiding philosophy here is that the economy should develop to become a Green Economy (cf. Section 5.3 too). An essential prerequisite here is that the development of prosperity should be completely decoupled from the consumption of resources and energy, i.e. the reduction of the consumption of resources and energy despite increasing prosperity. This type of re-orientation has the potential to increase the resilience of societal systems and to help strengthen companies, organisations and individuals in their ability to deal with crises.

In order to support this type of transformation of the economy to achieve a more sustainable and resilient system, it is necessary to keep the overall system in mind alongside specific measures by individual actors so that the framework conditions for sustainable economic activity can be appropriately structured. In this regard, the political sphere, industry and civil society require the identification of options and solution approaches in a systemic outlook that integrates and coordinates approaches from various fields of activity. Thus what is required is research that considers regulatory policy action, investigates the suitability of social-policy measures and economic-policy instruments with regard to sustainable economic activity, and develops proposals for suitable economic framework conditions on the basis of an integrated analysis.

It should be taken into account here that resilience and the ability to function of the social-ecological system



Resilience: Residential buildings must be able to withstand floods.

must be secured from a dynamic perspective: the system also needs to work while change is taking place so that collapses do not occur during the transformation process. Stability goals that relate to the protection of the environment and the preservation of desirable social conditions are to be reconciled with sustainable development as a dynamic process that is dependent on innovations.

As regards the introduction of new technologies, opportunities and risks should be weighed up against one another, and risks should be evaluated in accordance with the criteria of ubiquity, persistence and irreversibility in the case of uncertainty about consequences (as already recommended by the German Advisory Council on Global Change – WBGU – in 1999).

A discourse-based, participatory approach is required when new technologies are being used or larger infrastructure projects are being implemented that are associated with risks that are difficult to assess. Within such a context, precaution-oriented risk assessment and evaluation must be carried out that takes natural resources and society into account in equal measure.

An overall strategy must be developed that identifies how incentives to increase resource efficiency can be combined with sufficiency strategies so that rebound effects can be avoided. The definition of ecological guidelines plays an important role here. The following issues need to be clarified: which quantity goals and target corridors need to be specified in order to achieve progress towards a resilient and sustainable economic system; how target achievement can be measured and evaluated; and how the target system must be adapted, if necessary. The internal logic and the constraints of globalised economic systems must be taken into account here.

The overall strategy must also contain proposals on “sustainability governance” on various regional levels. It should be investigated to what extent national pioneering roles (e.g. with regard to certain sectors) or approaches for the “regionalisation of globalisation” are promising and how issues of the just reconciliation of interests on an international scale can be negotiated (by means of suitable compensation schemes, for example). Of particular importance here are proposals for the structuring of institutions and instruments for the just and efficient harnessing of shared global resources

(such as the atmosphere or the oceans).

The acquisition and/or establishment of social and ecological capital can be regarded as an important prerequisite for the resilience of the social-ecological system. Incentives for corresponding investments by companies and private individuals must be put in place by means of consistent framework conditions in various policy areas (financial policy, economic policy, social policy, employment policy).

5.5 Democracy, participation and governance for a sustainable society

Climate change, scarcity of resources, the ecological crisis and the central idea of sustainability are major societal challenges of our time that cannot be adequately tackled using conventional procedures and mechanisms. Major political projects such as the energy transformation, for example, call for new paths in democratic negotiation and decision-making. It is evident that tasks such as electricity grid expansion in Germany cannot be implemented in a “top down” manner without the participation of the population. The public interest must be weighed up against the interests of individuals who are directly affected. The energy transformation, which is welcomed by the majority of the population, can only be implemented in a quick and efficient manner if new forms of governance are put in place. This also applies to other transformation processes in similar manners. It is the task of the scientific community to also carry out research on the “how” of the transition towards a sustainable society, i.e. on the governance of a transformation in favour of sustainability.

The demands being made on the legitimization of political activity are increasing. Society is increasingly becoming an open society of knowledge and networking, and the desire for direct, continuous participation is growing accordingly. The consideration being given to new concepts such as those of deliberative or collaborative democracy is reflected here. Reflexivity appears to be becoming a characteristic feature of this culture. It acknowledges that there are no ready-made solutions for clearly defined problems in a complex society. There is a high degree of uncertainty that makes the formulation of relevant, suitable political strategies a

joint process of searching and learning on the part of all participants.

This process demands that knowledge about the plurality of values and the differentiation of social situations in society must be taken into account in a broader, more long-term manner than previously. Furthermore, it also demands that the political culture and the forms of exchange and transfer of knowledge take on new forms within the context of higher levels of general education, global media and interactive communication platforms.

Ultimately, this also has consequences for the organisation of decision-making and implementation processes. This affects both major infrastructural projects and other projects of regional importance, such as those being implemented as part of the energy transformation. However, institutional change is primarily noticeable at municipal level among local actors. After all, the fact that they are directly affected triggers an authentic desire for participation. The question arises here as to how to put in place the necessary prerequisites so that citizens are able to actively get involved in political participation processes that deal with complex subjects in certain cases.

There is a long way to go before it is clarified whether and – if so – to what extent participation processes are to be (pre-)structured or channelled and to what extent they should operate in a self-structured manner. It is also unclear which form professional support for such processes could take, whether this support should be based on prescribed standards and how quality can be assured. There are many other questions to be answered here. Who is to be regarded as an affected party and in which form should they be involved? What understanding of their roles and what interests and expectations do citizens have when entering into participation processes? How can as broad a cross-section of the population as possible be involved, particularly those who are really affected? And how can the barriers be reduced for lower-income groups and for migrants in particular? What success criteria are to be applied? What participation formats are suitable and how can these achieve true participation so that citizens are convinced both of the effectiveness of their activity and of the results? Another central question is how science and research can support participation processes.



Active participation in a workshop.

One example for the potential of participation with academic accompaniment and consultation is the citizens' dialogue regarding the filter for a tunnel in Schwäbisch Gmünd (Germany). With the support of the BMBF, a model for the participation of citizens in major projects was tried out here; this model delivered findings on a number of the issues discussed here. Another successful model is the "ZukunftsWerkStadt" competition, in which 15 local authorities consulted with their citizens and developed concepts for sustainable urban development with support from academics. However, citizens' participation has many more dimensions too. As regards the topic of "urban governance", the question can be posed as to how participation procedures can be more strongly institutionalised in general and how they could thus have a more binding character for all the parties involved. How can the already existing regulations on participation – such as those in municipal land-use planning – be modified and refined? And how can further inputs for the structuring of participation procedures be gained from the discussion on sustainability?

One possible model here is activity in the form of networks and cooperations, as is characteristic of the discussion about how to deal with shared resources. To what extent can new forms of coordination of activity on this basis alter traditional individualistic and hierarchical structures and the logic of maximum benefit and add a new mode of governance to the approach taken? In this way, the image of humans as a "homo oeco-

conomic”, which is to be regarded critically from a sustainability viewpoint, is increasingly coming under pressure from that of the “homo cooperativus”. After all, the goals of sustainability can often only be achieved by joint action. The potential of new institutional arrangements on this basis for the establishment of sustainability management is to be investigated by academia and in practice.

However, cooperation and networking must not lead to a shifting of responsibilities. The respective roles of academia and research, civil society and the political sphere must be preserved. For academia and research, this corresponds to academic freedom in terms of deciding on the topics that are researched. As regards the political sphere, its responsibility is subject to democratic decision-making. The unrestricted responsibility of the political arena for decision-making results from this.

Theory-led and empirically well-founded interdisciplinary research on participation is thus required. This research must also operate in a transdisciplinary manner, as one of the main subjects of this research is the evaluation and thus also the investigation of the impacts and legitimation of participation procedures. And this is only possible with the accompaniment and evaluation of processes and the subsequent feedback of results into practice.

If democracy is understood as a common project, as “government with the people”, then fundamental questions arise on issues such as the relationship between citizens and the state and on development and change in institutions – for example:

- What new forms of informal and formal citizens’ participation do we require? How can these be structured in concrete terms?
- To what extent and in which cases is it possible that citizens can actively help to shape processes that deal with complex subjects in certain cases and can have their opinions and concerns heard? Where are the boundaries of effective participation?
- How can the wish for broad participation be reconciled with the necessity for strict and speedy implementation of important and broadly accepted political goals?

- What forms of organisation need to be found and implemented in order to better institutionalise sustainable developments?



6. Organisation of the funding priority

Future funding for SÖF will have close links with other funding areas (energy research, climate research, land management, sustainable use of resources and sustainable urban development in particular) within the BMBF's FONA framework programme. The aim is to have joint calls for proposals with other funding areas, following the example of the "Environmentally and socially compatible transformation of the energy system" funding measure, which is a joint initiative of SÖF and the "Basic Energy Research" programme.

Process of identifying research topics

The focal areas listed in the funding concept were developed as part of the Agenda process. These will first be pursued on a priority basis. However, they should be regularly evaluated and, if necessary, replaced by more up-to-date topics. SÖF remains a "learning programme". The Agenda process for SÖF is being continued and can produce recommendations for new focal points of research, add to the topics already identified or replace certain topics no longer judged to be a priority. Further Agenda Conferences will be organised for this purpose that involve a broad specialist community. In an additional step, research topics will be dealt with in detail in specialist discussions with groups of

experts. There will also be non-topic-specific calls for proposals, particularly with regard to junior research groups, which also serve to find additional topics for research so that particularly innovative research subjects are identified. Research projects that do not fit any specific call for proposals can also be suggested through the "Innovation Fund".

Assessment procedure

Calls for proposals are published regularly on the basis of the SÖF funding concept. These calls for proposals involve an assessment procedure that generally contains the following elements:

- Assessment of eligibility for funding by the project sponsor according to formal criteria and subject-related suitability.
- Evaluation of project sketches by assessors. In particular, the evaluation criteria are the scientific quality of the project, the specialist expertise of the applicant or research team, the methodical approach, the expected contribution of the results to sustainable development, the opportunities for economic utilisation, and the societal innovation potential.

The funding decision is taken by the BMBF on the basis of the complete applications, taking into account administrative aspects.

Public relations work

As a consequence of the societal importance of SÖF for sustainable development, it is essential that its results are communicated to the public. The audience here includes potential users in industry and the political arena as well as the general public, who can be influenced in their manner of living as consumers or as persons affected by a transformation (energy transformation, city as a living environment etc.) by results from this research.

Targeted public relations measures can increase the visibility of the research results and present their societal benefits and the scientific added value of the transdisciplinary research approach. Content-related points of interest in the results are refined (e.g. with regard to a specific potential for use), and the problem solutions developed in the various projects are presented in differentiated formats and made accessible for various target groups. Of particular importance is knowledge transfer to the political sphere, civil society and companies (and federations of companies), along with the dissemination of the results among the science and research community. To this end, particularly successful projects are communicated to the public in an effective manner. Focal-area and special-issue publications on selected subject areas within SÖF will be prepared for specialist scientific journals with interdisciplinary and transdisciplinary approaches. All SÖF projects will be published on the fona.de website. An SÖF Newsletter will be issued regularly that provides information on the latest project results, events and publications.

7. Further information

Further information and a project overview can be found on the website of this funding priority:
<http://www.fona.de/de/9883/>

Contact

The BMBF is supported by the Project Management Agency of the German Aerospace Centre (DLR) as regards the conception and implementation of funding measures. The Project Management Agency is the direct point of contact for researchers.

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The application forms with guidelines and information sheets and the auxiliary conditions for funding approval can be obtained from the Project Management Agency upon request and are also available in electronic form at the following website:

https://foerderportal.bund.de/easy/easy_index.php?auswahl=easy_formulare&formularschrank=bmbf&menue=-block

Annex 1: Funding of society-related sustainability research in Germany and internationally

Society-related sustainability research in Germany

On a **federal level**, the BMBF's "Research for Sustainable Development" (FONA) framework programme represents the most important basis for funding for society-related sustainability research. Around 13% of the projects funded as part of FONA in the period 2010 - 2013 can be categorised as being in the social sciences. Alongside the "Societal developments" area of activity that includes the SÖF and WIN funding priorities, there are thus other research areas where research in the social sciences is an integral component.

In the "Energy" area of activity, the previous focus on technological innovations for sustainable energy production and use will increasingly be supplemented with research projects that also target societal innovations and aim for an environmentally and socially compatible transformation of the overall energy system.

Interdisciplinary and transdisciplinary research approaches are playing an increasingly important role in the "Global change" area of activity. Within the "Klimzug – Climate Change in Regions" funding priority, for example, networks between companies, administration, social-policy actors and science and research are being supported on a regional or local level in order to develop implementable solution concepts for successful adaptation to climate change. In a similar manner, the "Future Megacities" funding priority is aiming to support urban growth centres in their strategic decisions with not just technical, but also non-technical innovations. The economic, ecological and social consequences of climate change are being investigated using economic-science methods and compared with the corresponding impacts of various climate-protection measures in the "Economics of Climate Change" funding priority. The funding measures in the subject areas of "Biodiversity", "Water Management" and "Land Management" are increasingly employing interdisciplinary and transdisciplinary approaches and are using them to work on social-science issues.

In the "Climate/Energy" and "Mobility" demand fields, the German Federal Government's High-Tech Strategy

(HTS) is also making contributions to sustainability research; these contributions have been categorised into so-called future projects ("The CO₂-neutral, energy-efficient and climate-adapted city", "Sustainable mobility", "Regenerative raw materials as alternatives to oil", "Intelligent restructuring of energy supply"). The establishment of an interdisciplinary and transdisciplinary research institute – the Institute for Advanced Sustainability Studies e.V. (IASS) in Potsdam (Germany) – is being supported by the BMBF with the participation of the federal state of Brandenburg. The IASS's focal areas of research are societal transformation, energy and technologies, and the climate and earth system. Particular emphasis is being placed on international cooperation here by facilitating the participation of numerous guest academics in research projects at the IASS.

In addition, departmental research at other ministries is making important contributions to sustainability research. The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB) is refining the conceptual, strategic and legal bases for environmental and sustainability policy. Individual research and development projects, many of which are of relevance to the issue of sustainability, are announced in the annual Environmental Research Plan (UFOPLAN) with the aim of implementing environmental-policy goals. Sustainability research – particularly in the area of buildings – is being supported as part of the "Zukunft Bau" research initiative.

The German Federal Government is funding energy research by means of its Energy Research Programme, which the BMWi, BMBF, BMUB and BMEL participate in. However, social-science research topics are primarily tackled by the BMBF within the framework of FONA.

Alongside various financial funds for R&D, there are also a range of topic-specific funding priorities in the **federal states'** funding for research and development. "Fortschritt NRW" (2013 - 2020), the new research strategy by the federal state of North Rhine-Westphalia, is worthy of mention here as an example for sustainability research. This re-orientation has the aim of bundling

research-policy activities in a framework programme, concentrating more strongly on research fields aligned with major societal challenges and making increased use of the instruments and funds available to the state for research and innovation funding in accordance with the goal of sustainable development. In addition, the “Science for Sustainability” research programme of the federal state of Baden-Württemberg and the new focus on sustainability in the research strategy of the state of Lower Saxony should also be mentioned here. A major proportion of the sustainability research carried out in Germany is done at **universities**. Particularly well-integrated interdisciplinary and transdisciplinary approaches are being followed at the universities in Lüneburg (Leuphana), Eberswalde (University for Sustainable Development), Berlin (Center for Technology and Society at TU Berlin), Bremen (Sustainability Research Center), Oldenburg, Kassel and Heidelberg, which have set up cross-faculty centres.

Non-university research is also very active in sustainability research. The focal areas of eight institutes within the Gottfried Wilhelm Leibniz Scientific Association (WGL) can be categorised under sustainability research:

- Potsdam Institute for Climate Impact Research (PIK)
- Leibniz Centre for Agricultural Landscape Research (ZALF)
- Leibniz Institute for Zoo and Wildlife Research (IZW)
- Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB)
- Leibniz Institute of Atmospheric Physics at the University of Rostock (IAP)
- Leibniz Institute for Baltic Sea Research Warnemünde at the University of Rostock (IOW)
- Leibniz Institute for Tropospheric Research e.V. (IFT)
- Leibniz Center for Tropical Marine Ecology (ZMT) at the University of Bremen

Research is also being carried out on society-related topics, e.g. climate economics at the PIK. The Helmholtz Association (HGF) is concentrating on sustainability research in its “Earth and Environment” and

“Energy” research fields. Funds of 375 million euros and 357 million euros (2014), respectively, are being spent annually on these research fields. The following HGF centres are participating in the Earth and Environment research field:

- Alfred Wegener Institute (AWI)
- Research Centre Jülich (FZJ)
- German Research Centre for Geosciences (GFZ)
- Helmholtz Centre Munich – German Research Center for Environmental Health (HMGU)
- Helmholtz Centre Geesthacht – Centre for Materials and Coastal Research (HZG)
- Karlsruhe Institute of Technology (KIT)
- Helmholtz Centre for Environmental Research (UFZ)
- Helmholtz Centre for Ocean Research Kiel (GEO-MAR)

Non-university research institutes are also participating actively in SÖF/WIN projects on the basis of institutional funding; these include the Helmholtz Centre for Environmental Research (UFZ), the Potsdam Institute for Climate Impact Research (PIK), the Leibniz Centre for Agricultural Landscape Research (ZALF) and the Fraunhofer Institutes for Solar Energy Systems (ISE) and for Systems and Innovation Research (ISI). A range of **independent non-university research institutes with a social-ecological focus** are playing a pioneering role in the development of transdisciplinary sustainability research in Germany. In 2011, the following seven institutes combined to form the “**Ecological Research Network**” (Ecornet):

- Ecologic Institute
- Ifeu - Institute for Energy and Environmental Research Heidelberg
- Institute for Ecological Economy Research (IÖW)
- ISOE - Institute for Social-Ecological Research
- Oeko-Institut e.V. – Institute for Applied Ecology

- Wuppertal Institute for Climate, Environment and Energy
- Independent Institute for Environmental Issues (UfU)

Ecornet aims to establish a scientific foundation for societal transformations towards sustainability and to carry out research on paths leading to a post-fossil and post-nuclear society across the boundaries between scientific disciplines in a manner focused on applications. The University of Kassel, Leuphana University of Lüneburg, the Wuppertal Institute for Climate, Environment and Energy and the Institute for Advanced Sustainability Studies have combined to form the “**Alliance for Sustainable Science**” (**Verbund für nachhaltige Wissenschaft**, NaWis-Runde). The aim of this alliance is to support transdisciplinary sustainability science within the German scientific system – both at universities and at non-university research institutes.

Contributions to sustainability research are also being made by **private foundations**. Stiftung Mercator acts to support social-policy goals through research projects, for example. One of these goals is the prevention of dangerous climate change. Numerous research projects are being funded on the subject cluster of climate change. The Volkswagen Foundation also frequently deals with sustainability issues. At the moment, research projects on climate change are being funded as part of the “Europe and Global Challenges” funding initiative, for example.

The main task of the **German Federal Environmental Foundation** (DBU) is the funding of projects for the protection of the environment, taking particular account of small and medium-sized companies. It supports projects on environmental technology, environmental research, nature conservation and environmental communication that are outside of state pro-

grammes. The list of research institutes that are active in societal sustainability research could be continued.

Sustainability research on European and international levels

Society-related sustainability research in the European Union is strongly influenced by current EU policies. Fundamental here is the **Europe 2020 Strategy**⁹ (2010), which aims to contribute to the transition to a sustainable Green Economy by means of intelligent, sustainable and integrated growth. This strategy has resulted in seven flagship initiatives. The flagship initiative and roadmap for a resource-efficient Europe¹⁰ (2011) is particularly relevant as far as sustainability research is concerned. Concrete goals and measures are formulated here on how the European economy can be structured in a more resource-efficient manner.

Food, construction and mobility are identified as the key sectors. The “**EU Sustainable Development Strategy**”¹¹ (2006) formulates the EU’s sustainability goals for seven key challenges and describes approaches for achieving these goals. This strategy is being implemented in a manner compatible with the Europe 2020 Strategy. The “Roadmap for moving to a competitive low carbon economy by 2050”¹² (2011) also identifies goals for development towards a low-emissions economy in the EU and is also a policy document with a great degree of relevance for European sustainability research with regard to climate protection.

The 7th EU Framework Programme for Research (7th FP 2007-2013) contributed with over one third of its supported projects between 2007 and 2011 to the transition to a Green Economy in the context of sustainable development. Most of the funding topics with relevance to sustainability were in the areas of the environment, energy and transport, in particular. The EU’s research funding has been targeted particularly at societal challenges such as climate change, clean en-

⁹ Commission Communication ‘Europe 2020. A strategy for smart, sustainable and inclusive growth’, COM (2010) 2020 final of 03.03.2010

¹⁰ Commission Communication ‘A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy’, COM (2011) 21 final of 26.01.2011 and Commission Communication ‘Roadmap to a Resource Efficient Europe’ COM (2011) 571 final of 20.9.2011.

¹¹ Council of the European Union ‘Review of the EU Sustainable Development Strategy (EU SDS) – Renewed Strategy’ (0917/06) of 26.06.2006

ergy and the preservation and management of natural resources. Other important challenges such as sustainable consumption and production and sustainable urban development were also addressed by the 7th FP¹³. The EU's international research cooperation has been concentrated on the least-developed countries and emerging countries. These are of particular importance for the transition to a Green Economy, as fundamental transformations such as climate change have a particularly strong impact here.

One focal area of sustainability research in the 7th FP was the transfer of research findings into politics and society. To this end, projects were funded on the mobilisation of environmental knowledge for politics, industry and society and on methods and instruments to aid decision-making for policy development and the assessment of the consequences of policies. The assessment of the economic, societal and organisational impacts of climate change and of the development of new technologies, processes and services (eco-innovations) was also supported. The calls for the 7th FP in 2012 focused increasingly on projects on the transition to a sustainable society and Green Economy. The following calls from the "Environment" theme can be quoted here as examples: "Accelerating progress towards the Green Economy" and "Transition to sustainable, low-carbon societies". In parallel with this, the "Socio-economic Sciences and Humanities" theme within the 7th FP included a call entitled "Obstacles and prospects for sustainable lifestyles and green economy in Europe".

The Europe 2020 Strategy and all the resulting initiatives and plans are shaping the transition from the 7th FP to HORIZON 2020, the new EU framework programme for research and innovation¹⁴ (2014-2020). The "Societal Challenges" policy priority within Horizon 2020 includes topics on society-related sustainability research. For example, one research area will

deal with support for innovative strategies and societal changes for the transition to an environmentally friendly economy, including the measurement and evaluation of the progress made. Another area of society-related sustainability research is to be the establishment of resilient, integrated societies in Europe.

Sustainability is not an independent research area in Horizon 2020 (as was also the case in the 7th FP). However, it is anchored as an interdisciplinary area in all societal challenges (e.g. agriculture, food, energy and, in particular, climate protection, resource efficiency, raw materials) and will thus remain an integral component of EU research. The inclusion of civil-society organisations and of developing and emerging countries is an overarching characteristic of these funding topics.

Alongside the Framework Programme for Research, there are also links with societal sustainability on a European level in the **Joint Programming Initiatives (JPI)** between member states. In particular, JPI Climate is working on "Societal Transformation in the face of Climate Change" (www.jpi-climate.eu) within the framework of a call for proposals; the BMBF is participating here as part of SÖF funding. Other relevant JPIs with German involvement are those on the topics of "Water Challenges for a Changing World" and "Healthy and Productive Seas and Oceans".

Approaches to society-related sustainability research on a European level can also be found in the coordination networks of the European Research Area, the **ERA Nets** (e.g. the "Eco-Innovaera" ERA Net on eco-innovations; www.eco-innovaera.eu).

In the international arena, the Future Earth global scientific programme can be identified, which was officially founded at the Rio+20 Conference in June 2012. This research network is a joint initiative by the ICSU (International Council for Science), ISSC (Inter-

¹² Commission Communication 'Roadmap for moving to a competitive low carbon economy by 2050' COM (2011) 112 final of 08.03.2011

¹³ 'Monitoring the FP7 contribution towards the transition to a green economy in the context of Sustainable Development' FP7-4-SD.eu Policy brief No. 06 of June 2012

¹⁴ Commission Communication, 'Horizon 2020 – The Framework Programme for Research and Innovation', COM (2011) 808 final of 30.11.2011

national Social Science Council), the Belmont Forum (international forum for funding agencies for sustainability), UNESCO (United Nations Educational Scientific Cultural Organization), UNEP (United Nations Environmental Programme) and UNU (United Nations University). In addition, Future Earth is building upon the following four international scientific programmes that were/are also supported by the BMBF:

The International Human Dimensions Programme on Global Environmental Change (IHDP; <http://ihdp.unu.edu>), which ran from 1996 to 2014, had the aim of promoting innovative social-science research on society's manner of dealing with global ecological change and coordinating interdisciplinary cooperation (with the natural sciences too).

Diversitas has been focusing since 1991 on research for the preservation of biodiversity for the good of humankind. The third phase of this programme is currently under way and will run until 2020.

The “International Geosphere-Biosphere Programme” (IGBP), which was founded in 1986, aims to coordinate research on the interactions between the biological, chemical and physical processes of the earth and the human system. The social economic dimensions are specifically taken into account here.

The “World Climate Research Programme” (WCRP) was founded in 1980 and works on the predictability of climate development and the determination of the effects of human activities on climate. The direct, application-based importance of research and the benefits for society are the explicit focuses here.

Future Earth aims to bundle and use the experience gathered by these programmes over more than 20 years to set research priorities and to develop adaptation and avoidance strategies for global environmental changes. The research is divided into the three main areas of “Dynamic Planet”, “Global Development” and “Transformation towards Sustainability”. The Future Earth global network acts as a knowledge hub and promotes transdisciplinary cooperation between research, politics and practice/users. This network facilitates the coordination of research activities and agendas at both global and regional levels.

Annex 2

Summary of the results of the evaluation of “SÖF junior research groups”

The aims of the SÖF junior research groups have been largely achieved. Thus 93 percent of all surveyed members of junior research groups rated their participation as positive or generally positive. The fundamental idea behind this funding instrument is rated particularly positively; this instrument facilitates interdisciplinary and transdisciplinary research work and, at the same time, allows young scientists to pursue a doctoral degree in an application-oriented manner with a solid scientific basis. In contrast, those surveyed regard the divide to be negotiated between transdisciplinary project work and discipline-based qualifications as a particular challenge.

Another positive outcome was the comparatively large number of professorships held by former and current group members and the numerous qualifications (35 ‘Habilitation’ post-doctoral qualifications and 55 doctoral degrees) that were achieved or will soon be achieved despite the difficult circumstances. Seven researchers from a total of 21 junior research groups – eleven of which are still being funded – have been appointed to full professorships (five at universities, two at universities of applied sciences). Eleven associate, guest, substitute or junior professorships have also resulted from the groups. This outcome provides grounds for optimism, given that according to the National Report on Junior Scholars¹⁵ in 2013 only around one third of all those qualified generally obtain a professorship and that it also continues to be relatively difficult to establish oneself in the scientific system on the basis of interdisciplinary and transdisciplinary research.

Another positive result is that an above-average number of researchers from SÖF junior research groups continue to work in science and research after the end of their projects. Of the surveyed group members from phase 1 of funding (2002 - 2007), almost half of them were working at universities and almost one third of them were working at non-university research institutes. Of these former junior researchers, almost all of them continue to carry out interdisciplinary and/or transdisciplinary research. This shows that the SÖF junior research groups are promoting interdisciplinary and transdisciplinary research careers.

However, it can be seen that there is room for improvement – particularly in the areas of the supervision of junior research groups – in order to meet the high level requirements that are demanded of the groups in a smoother manner. This applies both to support for group leaders in carrying out their demanding tasks and also to the groups overall. With regard to mentors, more attention needs to be paid to ensuring that they are familiar with the goals and requirements of the funding measure and that they can guide their mentees accordingly in a competent manner.

The large majority of those surveyed regard the SÖF junior research groups as a funding instrument with an important unique character that cannot be replaced by other support measures for young researchers.

¹⁵ The National Report on Junior Scholars is available online at: buwin.de/site/assets/files/1002/6004283_web_verlinkt.pdf

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