Swiss National Science Foundation

National Research Programme

“Promoting Biodiversity and Sustainable Ecosystem Services for Switzerland” (NRP 82)

Call document

What are National Research Programmes (NRPs)?
Research conducted by National Research Programmes consists of research projects that contribute to solving contemporary problems of national importance. Under the provisions of Article 10, paragraph 2, letter c of the Federal Act on Research and Innovation of 14 December 2012 (Status as of 1 July 2023), the Federal Council selects the topics and focus areas for research in NRPs and mandates full responsibility for implementing the programmes to the Swiss National Science Foundation.

Article 3 of the Federal Ordinance on the Federal Act on Research and Innovation of 29 November 2013 (Status as of 1 September 2023) describes the NRP funding scheme as follows:

[1] The National Research Programmes (NRPs) of the Swiss National Science Foundation (SNSF) are a means of generating and conducting coordinated research projects that pursue a common goal.

[2] Topics of research are appropriate for National Research Programmes if:

a. Swiss research can make a significant contribution to resolving the issue;
b. research contributions from multiple disciplines are required to resolve the issue;
c. research on the topic can be expected to produce research results within a five-year period that have practical applications.

[3] In justifiable exceptional cases, an NRP may also be used to create specific additional research potential in Switzerland.

[4] During the selection process, it will be considered whether:

a. the expected results of the programme can be used as the scientific basis for governmental and administrative decisions;
b. the programme can be carried out in the context of international cooperation.

Table of contents

Summary

The National Research Programme "Promoting Biodiversity and Sustainable Ecosystem Services for Switzerland" NRP 82 is based on the critical importance of biodiversity for human well-being, as well as the severe threats facing biodiversity due to factors like intensive land use, habitat loss, pollution, climate change, and more. Switzerland's biodiversity is in poor condition, with a significant number of species and habitats under threat, undermining the supply of ecosystem services. Moreover, Switzerland has a considerable biodiversity footprint abroad. This situation violates both Swiss and international legal obligations and undermines Swiss contributions to the UN Sustainable Development Goals.

Given this background, Switzerland has initiated NRP 82, which aims to fill existing knowledge gaps, identify valuations, visions, and goals for safeguarding biodiversity and ecosystem services, and explore governance options for transformative change. Stakeholder involvement is emphasised, and projects will use a transdisciplinary approach throughout the programme, engaging with government agencies, NGOs, civil society, businesses, and academia.

The programme will address questions according to three thematic modules:

1. Module 1: Drivers and Trends - Investigates the drivers and trends of biodiversity change and how to safeguard biodiversity and ecosystem services, focusing on establishing knowledge related to the direct use and management of ecosystems.

2. Module 2: Valuation and Visions - Examines valuation perspectives on biodiversity and ecosystem services, including economic, social, and cultural aspects, and addresses goals and visions for the future.

3. Module 3: Governance and Transformation - Explores governance options and pathways promoting biodiversity and ecosystem services, with a focus on transformative change.

Ultimately, NRP 82 seeks to provide a comprehensive understanding of the challenges facing, and opportunities offered by, biodiversity and ecosystem services, and to develop practical solutions for their conservation and sustainable use.

NRP 82 operates with a budget of CHF 15.5 million. The programme starts with a preparatory phase, for which proposals are invited by the end of February 2024. Successful applicants will be provided with a preparatory grant for preparing full proposals for a four-year research phase, which will be submitted by February 2025. The research phase will start in the second half of 2025. This document details the background and scope of NRP 82 along with practical information for applicants.

1 Introduction

1.1 Background and problem framing

Our quality of life depends on biodiversity, as the ecosystem services we rely upon cannot be sustained without biodiversity[1]. However, the biosphere, upon which humanity depends, is being altered to an unparalleled degree, and biodiversity is deteriorating in Switzerland and worldwide[2]. Switzerland's biodiversity and the national and international ecosystem services the country relies upon are under pressure due to intensive land use, loss of habitats, fragmentation, urbanisation, pollution, invasive species, and climate change[3,4]. Although relevant policy objectives were adopted and some measures for change are having a positive effect, biodiversity remains in a poor state and continues to decline. According to the Federal Office for the Environment (FOEN), a third of all species and half of all types of habitats in Switzerland are threatened. Switzerland's resource use exceeds sustainable levels, and its demand for ecosystem services abroad continues to increase. The globally observable decline in biodiversity is diminishing the ability of ecosystems to provide resources and services for human communities and their ability to recover from disturbances. This deterioration also threatens economic stability, food and water security, and well-being in Switzerland and globally. Furthermore, it compromises biodiversity's contribution to mitigating climate change and its effects.

This situation and negative trend conflict with Swiss and international legal obligations, and they undermine Swiss contributions to the UN Sustainable Development Goals. According to the Kunming-Montreal Global Biodiversity Framework of the Convention on Biological Diversity (2022), biodiversity should be safeguarded by managing at least 30 percent of land and sea as protected areas or under some other area-based conservation measure by 2030. Moreover, to advance biodiversity recovery, restoration of 30 percent of currently degraded terrestrial, inland water, and coastal and marine ecosystems must be under way; even though Switzerland is not adjacent to the sea, it relies on and affects marine resources via production and consumption. In addition to promoting biodiversity-friendly practices, the above-mentioned obligations require that current policy measures be evaluated in detail, e.g. subsidies harming biodiversity, and subsequently, to identify whether they must be removed or reformed, while scaling up positive incentives for biodiversity and sustainable use. Beyond its goals to be achieved by 2030, the Kunming-Montreal Global Biodiversity Framework of the Convention on Biological Diversity also includes important long-term goals, to be met by 2050, to enhance the integrity, connectivity and resilience of all ecosystems, their sustainable use, fair and equitable sharing of their monetary and non-monetary benefits, and providing the necessary financing.

To reverse the current biodiversity decline and to meet national and international objectives for its safeguarding, it is essential for decision makers and other actors to understand the economic, social, political, demographic, and technological causes of biodiversity loss and take action to address them. In accordance with the Convention on Biological Diversity and further policy options and guidelines issued by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

[1] This call document refers to "ecosystem services", a term, which is widely used in Switzerland and familiar to many actors. While using "ecosystem services" NRP 82 recognizes the notion of "Nature's contributions to people (NCP)", which is used in IPBES assessments, where it is defined as all the contributions, both positive and negative, of living nature (i.e. all organisms, ecosystems, and their associated ecological and evolutionary processes) to people's quality of life. NCP encompass ecosystem services and explicitly complement them with notions of various perspectives taken by different stakeholders, of plural valuations of benefits to people, and of local to global scales. These important notions are also included in the call document and modules of NRP 82.

[2] IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages.

[3] Swiss Biodiversity Forum (SCNAT), Policy Studies Interface (2020): Relevance of IPBES action options for sectors in Switzerland. Report on the mandate of the Federal Office for the Environment, Bern.

[4] Swiss Biodiversity Forum (SCNAT), Policy Studies Interface (2022): What Switzerland can do for biodiversity – Policy options for selected sectors. Swiss Academies Factsheets 17 (2)

(IPBES), the International Union for Conservation of Nature (IUCN), and other international organisations, as well as previous NRPs, e.g. NRP 73 "Sustainable Economy: resource-friendly, future-oriented, innovative", a transformative strategy and effective incentives are urgently needed to reverse the decline of biodiversity and the degradation of ecosystem services in the coming years.

Despite efforts made since the adoption of the Swiss Biodiversity Strategy of 2012, major gaps remain in the knowledge about the state of biodiversity, the health of ecosystems, the direct and indirect drivers of biodiversity change, and how to achieve the necessary transformation to protect and promote biodiversity and ecosystem services. There is a need to assess the risks of biodiversity loss, to measure the effectiveness of policies and interventions, and to study the effect of specific policies and policy mixes on the promotion, sustainable use and management of biodiversity and ecosystem services of Switzerland (both in Switzerland and abroad).

Switzerland has some of the best biodiversity observing systems (including monitoring schemes such as the “BDM Biodiversity Monitoring Switzerland” or the “ALL-EMA Agricultural Species and Habitats’ Monitoring Programme”), which provide important baseline information for the projects of this programme. However, Switzerland lags behind other countries when it comes to monitoring rare species, and to linking biodiversity with ecosystem services, resource management and other drivers of change. There is thus a need for integrative schemes that combine different data sources while considering different aspects of biodiversity, ecosystem functioning and ecosystems services as well as their drivers.

To tackle global challenges, to identify and build on synergies, and to balance trade-offs, gaps in systems knowledge, target knowledge and transformation knowledge need to be filled. ‘Systems knowledge’ refers to analytical and descriptive knowledge about the actual state of the system. With ‘target knowledge’ we describe knowledge about desired future developments of the system. Finally, ‘transformation knowledge’ refers to knowledge about how we can move from the actual state to a more desirable state[5]. This requires interdisciplinarity and strong integrations between biodiversity science, climate science, land systems science, economics, politics and other social as well as natural sciences. Moreover, transdisciplinary collaboration between researchers and stakeholders from civil society, private and public sector is urgently needed.

1.2 The national and international research environment

Despite active sectoral research and agreement over the need for more integrative approaches, there is currently no coordinated research programme at the national or international level to address the causes and consequences of biodiversity change. Ongoing research fails to comprehensively tackle the consequences of such change for nature and people. It does not sufficiently provide options for decision-makers and stakeholders to take action. Nor does it contribute to the target and transformation knowledge required to inform the necessary societal transformation to change the current loss of biodiversity. Moreover, knowledge and implementation gaps exist concerning the realisation of synergies (and assessment of potential trade-offs) between promoting biodiversity and sustainable use and management of ecosystem services and achieving climate neutrality by 2050.

At the international level, Biodiversa+, the European Biodiversity Partnership, supports research on various aspects of biodiversity, aiming at a research impact on society and policy. While this initiative, and many nationally funded individual research projects, yield excellent scientific insights on specific aspects, these projects do not provide the required integrated perspective as outlined above.

[5] https://transdisciplinarity.ch/en/transdisciplinarity/was-ist-td/three-types-of-knowledge/

Moreover, many context-dependent findings from European countries are not directly applicable to Switzerland. It is nevertheless crucial for this NRP to integrate knowledge from previous and ongoing efforts (e.g. IPBES assessments, Clean Energy Transition Partnership (CETP), Ecosystem Accounting (SEEA-EA), Eurostat guidance notes on the implementation of ecosystem accounting, or the environmental accounting project for the development of an environmental accounting system by the Federal Statistical Office and expertise built during previous NRPs, e.g. NRP 61, 66, 68, 70/71 and 73) as well as to collaborate with projects outside NRP 82 at the national and international levels.

1.3 Mandate

In June 2022, the State Secretariat for Education, Research and Innovation (SERI) mandated the Swiss National Science Foundation (SNSF) to assess the feasibility of conducting a National Research Programme on “Sustainable Resource Management to Safeguard Ecosystem Services” and tasked the SNSF on 29 November 2022, to develop a programme concept on the more focused subject of “Biodiversity and Ecosystem Services” that would define the aims and the key research issues to be addressed. Based on this programme concept, the Federal Council decided on 2 June 2023 to launch the transdisciplinary NRP 82 "Promoting Biodiversity and Sustainable Ecosystem Services for Switzerland”. The members of its Steering Committee were elected by the National Research Council of the SNSF between May and September 2023. The Steering Committee elaborated this Call for proposals and ensures the strategic management of the programme. The Call for proposals was approved by the National Research Council on 31 October 2023, and by the SERI on 28 November 2023. NRP 82 operates with a budget of CHF 15.5 million and conducts research for a period of five years.

2 Goals of the National Research Programme

NRP 82 "Promoting Biodiversity and Sustainable Ecosystem Services for Switzerland" is a comprehensive effort to address the conservation, management and use of biodiversity and ecosystem services in Switzerland, as well as the Swiss footprint on biodiversity and ecosystem services abroad, and their underlying societal, economic, and political drivers. The programme focuses on Switzerland, but considers that Swiss consumption and production also rely on ecosystem services from abroad (e.g. timber, agricultural products, sea food), thereby causing environmental effects and affecting biodiversity in other countries.

The programme will identify and explore **biodiversity trends, visions and options for transformation that will enable Switzerland to fulfil or exceed the necessary national contribution to achieving the ambition set by the goals of the Global Biodiversity Framework of the Convention on Biological Diversity (2022)**, and the UN Sustainable Development Goal 15 for Life on Land. To this end, close collaboration with stakeholders from civil society, as well as from the private and public sectors is being sought.

The specific objectives are to:

1. fill knowledge gaps to enable an integrative monitoring and analysis of trends in biodiversity and ecosystem services, their relationships, the underlying drivers, and to enable actions towards reversing the negative Swiss footprint on biodiversity.

2. identify the value systems informing stakeholders' engagement with biodiversity and ecosystem services and visions for safeguarding them.

3. analyse and develop governance options and instruments (e.g. economic, social, regulatory, or legal ones) for promoting biodiversity and sustainable ecosystem services.

4. develop and explore transformative pathways, which lead towards realising visions of biodiversity and ecosystem services and which encompass cultural, political, economic and technological dimensions.

3 Main research areas

All three research modules employ a solution-oriented, transdisciplinary and transformative approach. Hence, the projects will focus on:

(1) analysing current states and trends related to biodiversity, ecosystem functioning and ecosystem services, and their drivers and consequences,

(2) identifying desirable states and potential pathways toward realising such states and

(3) developing and exploring options for decision-making, management and governance, which allow Switzerland to advance from the current to desirable states.

For all modules, stakeholder involvement is crucial. The projects are expected to establish and build on close cooperation among relevant stakeholder groups including government agencies from various sectors and levels, NGOs, communities, businesses, and academia, to ensure a diverse range of perspectives. The term 'stakeholders' used in this call comprise those affecting positively or negatively biodiversity and ecosystem services, as well as those positively or negatively affected by the changes in biodiversity and ecosystem services or the envisaged projects interventions. Stakeholder collaboration will entail initiating innovative consultation approaches (e.g. broad and inclusive visioning processes, citizen assemblies, integrated landscape approaches etc.) and applying integrative approaches focusing on finding synergistic options to overcome conflicting goals and trade-offs. Research approaches are expected to cover both problem analysis and testing of concrete solutions (e.g. living labs, pilot actions or practice-oriented contributions). Real-world experiments have the potential to shorten the time to implementation and allow projects to assess the effectiveness of the governance options as well as potential unintended side effects.
Three thematic modules structuring the main research areas of NRP 82 are presented below. Each module lists important questions concerning current gaps in systems, target and transformation knowledge. Projects are expected to combine several of these questions. As a general rule, projects should rather focus on addressing gaps in target and transformation knowledge, and address gaps in systems knowledge only to the degree that is absolutely necessary. The modules should be regarded as interconnected and mutually interactive. Accordingly, projects are encouraged to address questions from different modules, as appropriate for the projects' research foci.

3.1 Module 1: Drivers and trends

What changes in biodiversity and ecosystem services do we observe, which are the drivers of these changes, and how can we reverse the negative Swiss footprint on biodiversity and ecosystem services?

The goal of this module is to better understand the impact of use and management of natural ressources on biodiversity and ecosystem services. This knowledge should enable the safeguarding and sustainable use and management of biodiversity and ecosystem services. The following research questions could be investigated.

Where we are (systems knowledge)

- What are the status and trends of biodiversity and of the supply of ecosystem services in Switzerland? How do these trends relate to the Swiss demand for ecosystem services in Switzerland? What are the gaps in our knowledge of these trends and how to monitor them?

- How does the Swiss demand for ecosystem services abroad affect the status and trends of biodiversity and the supply of ecosystem services abroad?

- Which relationships, synergies and trade-offs occur among various components of biodiversity and ecosystem services at different scales, particularly at the landscape and broader scales?

- What are the direct (e.g. via land and water use or spatial development, and via inputs, management-related actions) and indirect (e.g. economic, societal, governance-related, legal and regulatory) drivers diminishing or promoting biodiversity and ecosystem services? How does global change (comprising climate change, the spread of invasive species and novel pests and diseases, and man-made pollutants) interact with these direct and indirect drivers, and how does biodiversity affect the recovery of ecosystems from disturbances?

Where we should go (target knowledge)

- Which biodiversity potentials and ecosystem service potentials that are currently not realised could be achieved in Switzerland?

- Which management-related goals could help achieve these potentials, while considering potential trade-offs and synergies among different components of biodiversity and ecosystem services?

- Which goals should be set for the integrative monitoring of biodiversity and ecosystem services (e.g. data management, synergies between existing monitoring schemes, sets of indicators, or the integrated monitoring of drivers, trends and outcomes, novel technological approaches)?

How we can get there (transformation knowledge)

- How can use- and management-related activities be transformed towards safeguarding and promoting biodiversity and ecosystem services in Switzerland and abroad?

- How can the goals for the integrative monitoring of biodiversity and ecosystem services mentioned in the previous section be achieved?

- How could the competencies and behaviour of management-related stakeholders be transformed by means of social learning and knowledge exchange, and how can potential impediments be overcome?

- How can living labs providing a co-creation environment with scalable implementation of innovations help transform current biodiversity management and Swiss regulations?

3.2 Module 2: Valuations and visions

What are the plural perspectives on valuing biodiversity and ecosystem services, and how can they be employed to inform visions and pathways towards safeguarding and promoting biodiversity and sustainable ecosystem services?

This module focuses on the plural valuation of biodiversity and ecosystem services from different economic, social, and cultural perspectives. The economic perspective importantly includes, but is not limited to, approaches for monetary valuation. The module further aims to identify visions, goals and pathways to net-positive biodiversity outcomes and sustainable ecosystem service delivery, together with other economic, social, and environmental development goals. This includes the assessment of trade-offs between different interests.
Work in this module will be guided by the following questions:

Where we are (systems knowledge)

- How can different valuations of biodiversity and ecosystem services be conceptualised (e.g. via intrinsic, relational and instrumental values), how do these concepts align with the current values held by Swiss actors, and how can they be put into practice?)

- What are the values (economic, social, cultural) of ecosystem services in Switzerland?

- How well are the needs of different stakeholders for biodiversity and ecosystem services currently met, and why? If they are not met, how does this affect the stakeholders' well-being?

- Which goals and visions do Swiss actors have to promote biodiversity and sustainable ecosystem service delivery, while observing other economic, social, and environmental development goals and minimising trade-offs?

- Which synergies and conflicts exist between these visions, and which pathways to transformative change that protect biodiversity and promote sustainable ecosystem services can be identified in collaboration with these actors?

Where we should go (target knowledge)

- Which valuations, visions and goals can help Swiss actors in various sectors and at various scales (communal, cantonal, national, international) achieve net-positive biodiversity outcomes and sustainable ecosystem service delivery?

- Which approaches to participation allow to value biodiversity and ecosystem services in a comprehensive way that reflects its value for human well-being?

- Which approaches to participation (such as an integrated landscape approach, geodesign, etc.), allow to balance interests between various stakeholders at appropriate scales?

How we can get there (transformation knowledge)

- How can valuations, visions and goals inform pathways across various societal, political, economic, and cultural sectors and scales, for safeguarding and promoting biodiversity and ecosystem services in Switzerland, and for achieving a positive Swiss impact on the sustainability of biodiversity and ecosystem services abroad, while observing other economic, social, and environmental development goals?

- How can valuations, visions and goals be used to enhance the competencies and behaviour of relevant stakeholder networks by means of social learning and knowledge exchange?

3.3 Module 3: Governance and transformation

What are the current governance mechanisms affecting biodiversity and ecosystem services, what are the desired governance mechanisms for promoting biodiversity and sustainable ecosystem services, and which transformation allows us to get there?

The aim of this module is to identify and enable transformative governance options to safeguard biodiversity and ecosystem services. Transformative change related to biodiversity refers to modification of the underlying causes of biodiversity loss, including both indirect drivers and their underpinning by paradigms, goals and values.[6] For successful biodiversity governance, it is necessary to adopt an integrative and transdisciplinary approach, consider innovations, and set the right incentives (finances, costs, technologies, or habits, while omitting incentives that are negative for biodiversity and ecosystem services), to positively influence individual, organisational and collective behaviour. Transformative governance options can foster avenues for change, e.g. by creating legal and policy frameworks, developing new economic models, or enabling community engagement. Work in this module will be guided by the following questions.

Where we are (systems knowledge)

- How does the current system of public, private and public-private governance safeguard, promote or harm biodiversity and ecosystem services?

- Which evidence exists for effective transformative biodiversity governance in current institutional and societal structures across sectors, scales and places?

- Which factors enable or hinder transformative governance options for promoting biodiversity and the sustainable use of ecosystem services?

[6] Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, et al. IPBES secretariat, Bonn, Germany. 56 pages. https://doi.org/10.5281/zenodo.3553579

Where we should go (target knowledge)

- How can various measures and instruments (e.g. legal, financial, related to spatial-planning, cultural, artistic, technical, communicational, educational, etc.) support the transformation of the current governance systems at local, cantonal and national levels towards achieving the visions and pathways outlined in module 2?

- Which incentives (in terms of finances, costs, technologies, or habits) are adequate to positively influence individual, organisational and collective behaviour to safeguard and promote biodiversity and ecosystem services?

- How can interconnected problems (nexuses) be addressed for a biodiversity-positive transformation, and which obstacles should be overcome, such as those caused by unfair power dynamics and inequalities?

- Which actors, stakeholders and social groups, and which national and international agreements need to be considered to achieve the desired transformation?

- Which actors, stakeholders and social groups can provide integrated governance options for complex problems (e.g. the energy – food – biodiversity nexus)?

How we can get there (transformation knowledge)

- How can transformative governance options be put into practice at various scales (e.g. cantonal, national, international and transnational, intergovernmental) and sectors (e.g. finance)?

- How can transformative governance options be put into practice in reconciliation with sustainable development goals other than the ones related to biodiversity and ecosystem services?

- How can different actor categories, such as social, economic, and political groups, be put in charge of protecting biodiversity and promoting sustainable ecosystem services, while accounting for potential trade-offs in their goals and while considering appropriate spatial scales, e.g. encompassing urban and rural areas?

- What are the drivers underlying the behaviour and relationship towards biodiversity and sustainable ecosystem services of different actor categories (social, economic, political and different urban-rural spaces; collective-individual)?

- How can actors in Switzerland contribute to promoting biodiversity and sustainable ecosystem services in countries and regions, where these are impacted by the Swiss demand for ecosystem services abroad?

4 Implementation and expected broader impact

4.1 Implementation of research findings

From the onset of the programme, researchers and societal actors will collaborate and cooperate in shaping the projects in a transdisciplinary set-up[7]. This will shorten the time from research to implementation and ensure the early involvement of important end-users of the project findings.

Implementation of research findings by relevant stakeholders is expected to happen throughout the programme, i.e. during research projects, in the phase of Transformation Accelerating Grants (TAGs), and during the synthesis phase. Also, implementation is expected to continue beyond the programme.

4.2 Expected broader impact

NRP 82 will provide a comprehensive view of the impact of human activities on biodiversity and ecosystem services for, and of, Switzerland. It will show the importance of biodiversity and ecosystem services as assets for human well-being and prosperity. It will identify new cross-sectoral options for decision-making and trigger decisions and actions aimed at promoting biodiversity and realizing the full potential of biodiversity for providing ecosystem services. In this context the NRP 82 Steering Committee monitors relevant, thematically related research projects and programmes and ensures appropriate thematic coordination, in particular with NRP 81 “Baukultur. For an ecological and social transition of the built environment” launched in parallel to this call. Furthermore, some projects in this NRP are likely to lead to spin-offs and other civil society and private sector initiatives around biodiversity and ecosystem services.

NRP 82 will also improve the measurement and quantification of biodiversity, ecosystem services and their environmental and anthropogenic drivers, and hence their consideration in decision-making, incentive and management schemes. It will further provide options for the integrated monitoring of drivers, trends, and benefits of biodiversity and ecosystems services, and stimulate the provision of databases and tools to support biodiversity-related decision-making and management.

Contribution to the Sustainable Development Goals

NRP 82 addresses the following UN Sustainable Development Goals: 12 Responsible consumption and production, 13 Climate action, 14 Life below water, 15 Life on land, 17 Partnerships for the goals.

Further, NRP 82 will contribute substantially to informing Switzerland as to how it can meet or exceed the necessary national contribution to achieving the ambition of the Kunming-Montreal Global Biodiversity Framework of the Convention on Biological Diversity.

4.3 Theory of change

Transdisciplinary research, which is aimed at realising impact and transformation, must make its assumptions about this impact explicit. In NRP 82 we suggest using the Theory of Change (ToC) according to Belcher et al. (2020), which is available on td-net’s toolbox (go.transdisciplinarity.ch/ToC) for this purpose. This ToC distinguishes three spheres (see Figure 1). At the one end is the Sphere of Control which includes all the activities that the planned research project will carry out. At the other end is the Sphere of Interest indicating the main transformations towards which the project seeks to contribute – illustrative examples could be safeguarding the diversity of aquatic species in Swiss lakes, or promoting multiple ecosystem services in agricultural landscapes, or internalising the environmental

[7] Cf. r4d Infographic Use of research knowledge by society, 2021, https://www.k4d.ch/infographic-use-of-researchknowledge-by-society/; r4d Policy Brief 2/2021, Utilization of research knowledge in transformation pathways towards sustainability, https://www.k4d.ch/utilization-of-research-knowledge-in-transformation-pathways-towards-sustainability/.

costs of imports of food and fodder into Switzerland. In the middle is the Sphere of Influence. Projects influence this sphere by their activities to initiate changes e.g. in knowledge, skills, technologies, regulations, routines, social interactions, discourses, power relations, or attitudes of actors from different societal sectors. Projects might have a variety of ideas of how to achieve such change. Depending on the societal problem they identify, this might also require addressing conflicts, challenging established power relations or deliberating new measures with those who will benefit and those who will lose.

In NRP 82, projects must submit a ToC as part of the full proposal. Each project will develop a Theory of Change to make the assumptions about its intended impact explicit. The assumptions are made explicit by describing – in the form of boxes and arrows –the impact pathways through which the project plans to achieve its overall goals. The different impact pathways of a project can influence each other to form a system of impact hypotheses.

Figure 1 shows a simple ToC for the whole programme, focussing on the hypothesised impact of funding the projects. The activities of NRP 82 are shown on the left side of the figure. On the right side the goals of the NRP 82 are summarised. These activities and goals are connected via approximately 15 funded projects. Each project brings together researchers working on a particular biodiversity topic with the societal actors interested in changing or maintaining the respective practices. Projects could e.g. address the monitoring of biodiversity or biodiversity in businesses. First impacts will already take place in the project team when the problem and developing solutions are jointly framed and analysed. Each project will have to show whose practices it plans to change and how in its own ToC.

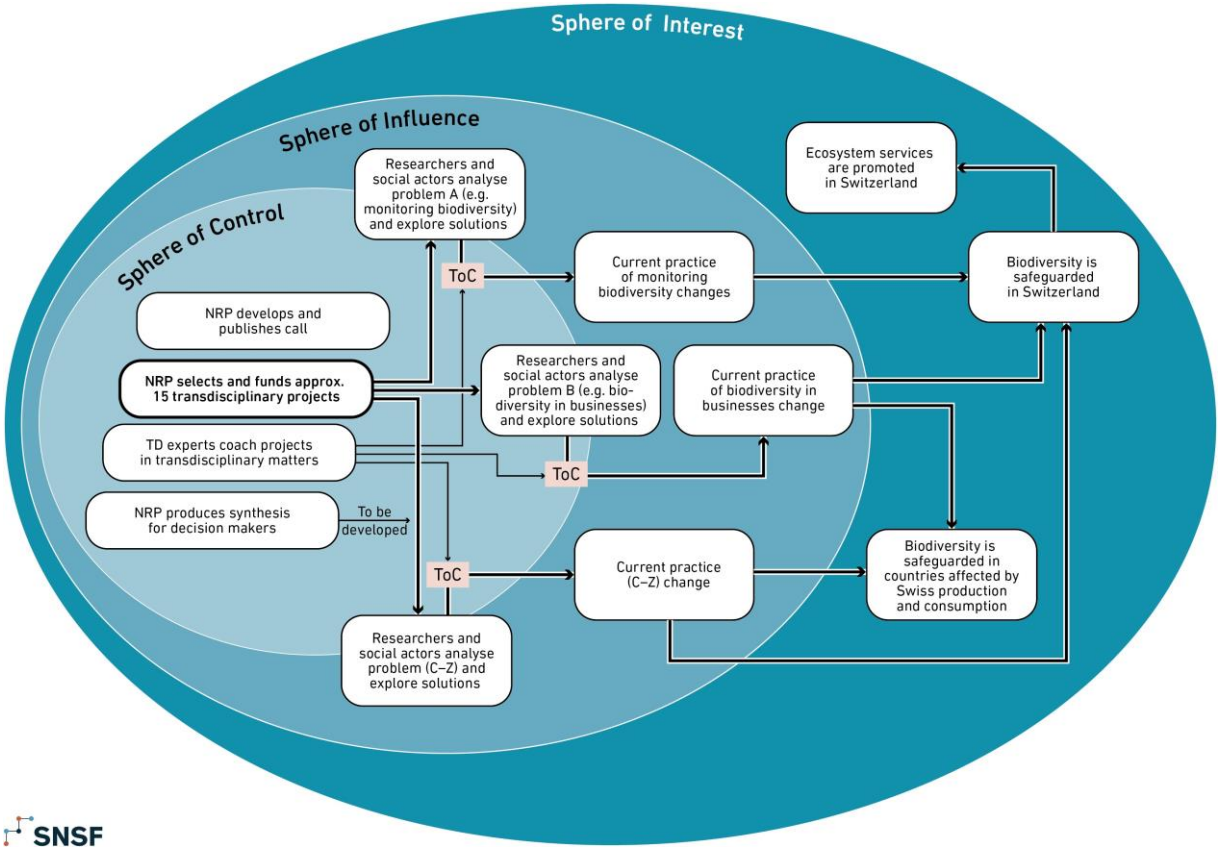

Figure 1: An illustration of the Theory of Change of NRP 82 on the level of the programme. The focus (bold boxes and arrows) is on how the NRP leads to impact through the selection, funding and coordination of the approximately 15 projects, each addressing a particular problem related to biodiversity and ecosystem services.

ToCs should not be understood as maps of impact pathways that have to be followed strictly by projects. Rather, ToCs are tools to help identify which impact hypotheses are working and which are not, and to reflect why this is the case (link to movie).

4.4 Monitoring and evaluation of the programme and its projects

The 'landscape' of evaluation approaches for inter- and transdisciplinary research is diverse, and standardisation is still at an early stage. To evaluate the achievement of the programme goals, NRP 82 plans to build on the indicator categories for transdisciplinary research proposed by Schäfer et al.[8]. Indicators that allow the assessment of the research teams, research processes, and research results are foreseen. Applicants for individual research projects are envisaged to co-develop about 4-8 project-level indicators during the preparatory phase that are broadly consistent with this framework.

[8] Schafer, M., Bergmann, M., & Theiler, L. (2021). Systematizing societal effects of transdisciplinary research. Research Evaluation, 30(4), 484-499. https://doi.org/10.1093/reseval/rvab019

5 Characteristics of the National Research Programme

5.1 Practical significance

The programme is relevant for all stakeholders affecting biodiversity and ecosystem services or depending on biodiversity and ecosystem services. The project teams including researchers and stakeholders will identify options to promote biodiversity and the sustainable use of ecosystem services, while contributing to meeting other sustainable development goals. To this end, researchers will closely collaborate with societal actors. The close collaboration will be achieved by a transdisciplinary research approach.

5.2 Target audience

NRP 82 aims to provide transformative evidence-based and context-related solutions and specific options for action to:

- local, cantonal and federal authorities
- professionals of the various public and private sectors e.g. professionals in agriculture, horticulture and aquaculture, fishery, forestry, spatial planning (including urban development and architecture), , food, energy, infrastructure, finance, education, economics.
- international and national NGOs
- civil society
- community groups
- the media
- stakeholders abroad affected by Swiss production and consumption abroad

5.3 Inter- and transdisciplinarity

In the context of NRP 82, interdisciplinarity means the collaboration of diverse disciplines with the aim to understand biodiversity, and its relationship with ecosystem functioning and the services ecosystems provide for society, in a comprehensive way. This means that natural, social, technical and other factors that influence the state of biodiversity are considered.

Transdisciplinarity adds to this comprehensive understanding by collaborating with stakeholders through the whole research process, which starts with framing and analysing the problem and exploring the impact together (see Figure 2). The aim of this close collaboration is to link scientific processes of knowledge production on biodiversity with societal processes of learning and changing practices that influence biodiversity and ecosystem services. The programme uses a transdisciplinary approach to provide solutions and accompany the transformation phases together with stakeholders from relevant sectors.

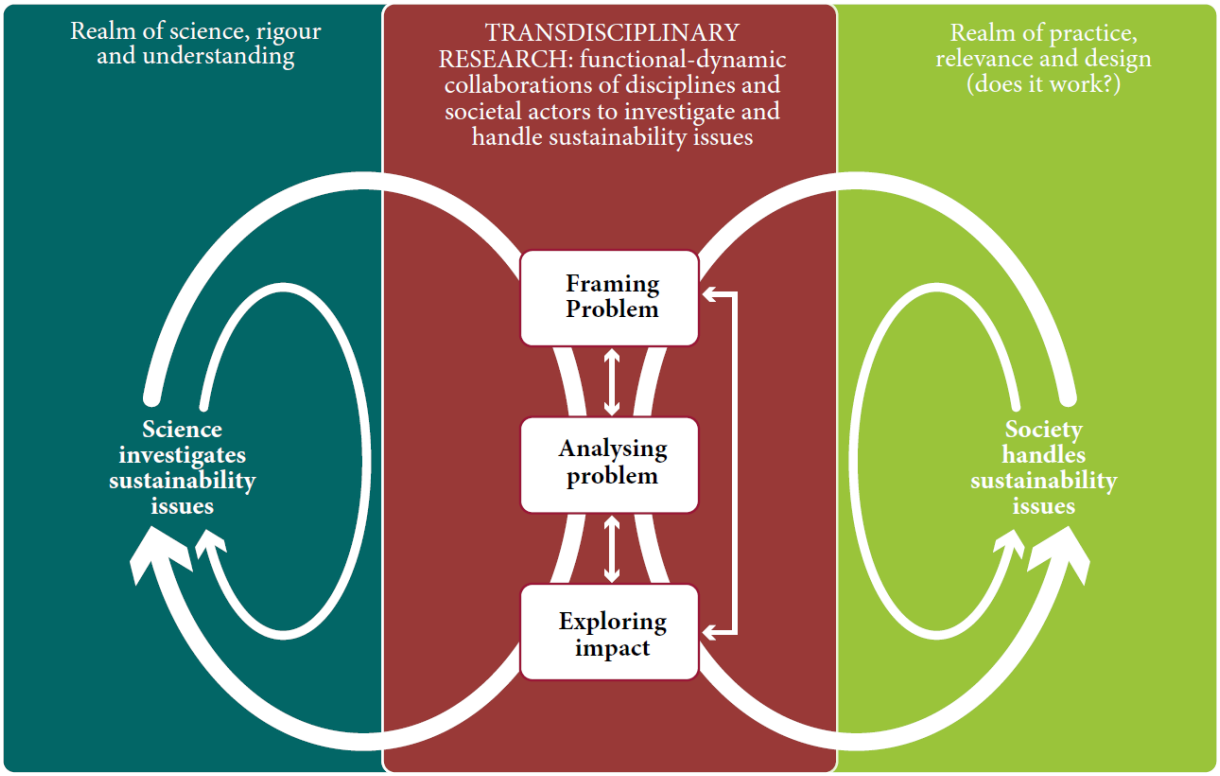

Figure 2: A transdisciplinary project connects scientific knowledge production and societal problem handling. In contrast to disciplinary research, it includes a phase of joint problem framing and a phase of exploring impact (Pohl et al., 2017, 44).

5.4 Data access, data management and open research data

Applicants are asked to consider the availability of data at an early stage of the project development. Data management will generally be guided by the FAIR (Findable, Accessible, Interoperable, Reusable) principles, the CARE (Collective benefit, Authority to control, Responsibility, Ethics) principles (Russo Carroll et al. 2021)[9] for data management in participatory projects, and the open access guidelines of the SNSF.

Research funded by the public sector should be publicly accessible as far as possible and free of charge. The SNSF is committed to this goal (Open Science (snf.ch)). A data management plan (DMP) must be submitted for approved full proposals. At the same time, the SNSF expects data generated by projects funded by the SNSF to be publicly accessible in FAIR principles compliant digital databases provided there are no legal, ethical, copyright or other issues.

It will be critical to ensure coherence and interoperability of all relevant infrastructures and services according to the National Strategy and Action Plan on open research data and the ORD Strategy Council.

[9] Operationalizing the CARE and FAIR Principles for Indigenous data futures | Scientific Data (nature.com)

5.5 Overview of programme phases

Transdisciplinary research requires a research environment that enables social processes for exchanging knowledge, learning, building trust and evolving a joint ownership. Because these processes are often slow and complex, they need skilful facilitation. The following phases as depicted in Figure 3 will be established in NRP 82:

1. **Preparatory phase proposal**: Project teams submit outlines for transdisciplinary projects (see also section 7). Depending on the problem to be analysed and solutions to be explored, different societal actors are included. There is no funding for preparing a preparatory phase proposal.

2. **Preparatory phase and full proposal**: Based on their fit with the programme scope and quality (see detailed evaluation criteria in section 7.4), approximately 30 preparatory phase proposals will be selected for submission of a full proposal and funded for six months for problem framing, each with funding of up to CHF 20'000. During the six-month preparatory phase, researchers and societal actors will clarify the actual problem that hinders the promotion of biodiversity and sustainable ecosystem services within their specific topic (problem framing). Also, they establish the final consortium composition (clarify collaboration, roles, and responsibilities), build trust, and collaboratively design and define the full proposal. Examples of activities are:

   – activities directed at building the consortium (meetings, workshops, moderation).
   – generating baselines for indicators intended to assess the impact of the project.
   – analysis of research field and what is lacking.
   – data strategy: ensure that project has timely access to the data needed for the project, and that the quality of data that is needed for the project is sufficient.

   Comments from the Steering Committee on the preparatory phase proposal need to be addressed in the full proposal. At the end of this phase, the team submits a full proposal, including a description of their theory of change.

3. **Research phase**: The projects address the challenges identified in a transdisciplinary way and work towards effective options to promote biodiversity and ecosystem services. Projects might include further research, restructure existing knowledge, use new forms of exchange and joint learning, or conduct real-world experiments and living labs. Approximately 15 projects will be funded for a maximum duration of 4 years.

4. **Transformation-accelerating phase**: In their last year, funded projects will be invited to submit proposals for Transformation Accelerating Grants (TAGs) of up to 100'000 CHF for an additional 12 months. These TAGs will be specifically directed at implementing research outputs. TAGs can be used, for example, for a validation/implementation study, a policy dialogue, creation of a spin-off or start-up, scaling up of developed solutions, for training courses or materials, cultural initiatives, or small-scale improvements in infrastructure and technology. Specific activities designed to enhance programme-wide collaboration to accelerate research-based transformation in Switzerland or on an international scale will be particularly encouraged. In NRP 82, TAGs will aim to safeguard biodiversity and promote sustainable ecosystem services.

5. **Synthesis and dissemination phase on programme level**: To build on the learnings and synergies, a programme synthesis aimed at acquiring new knowledge that goes beyond the findings of individual research projects will provide tailor-made target group-specific products.

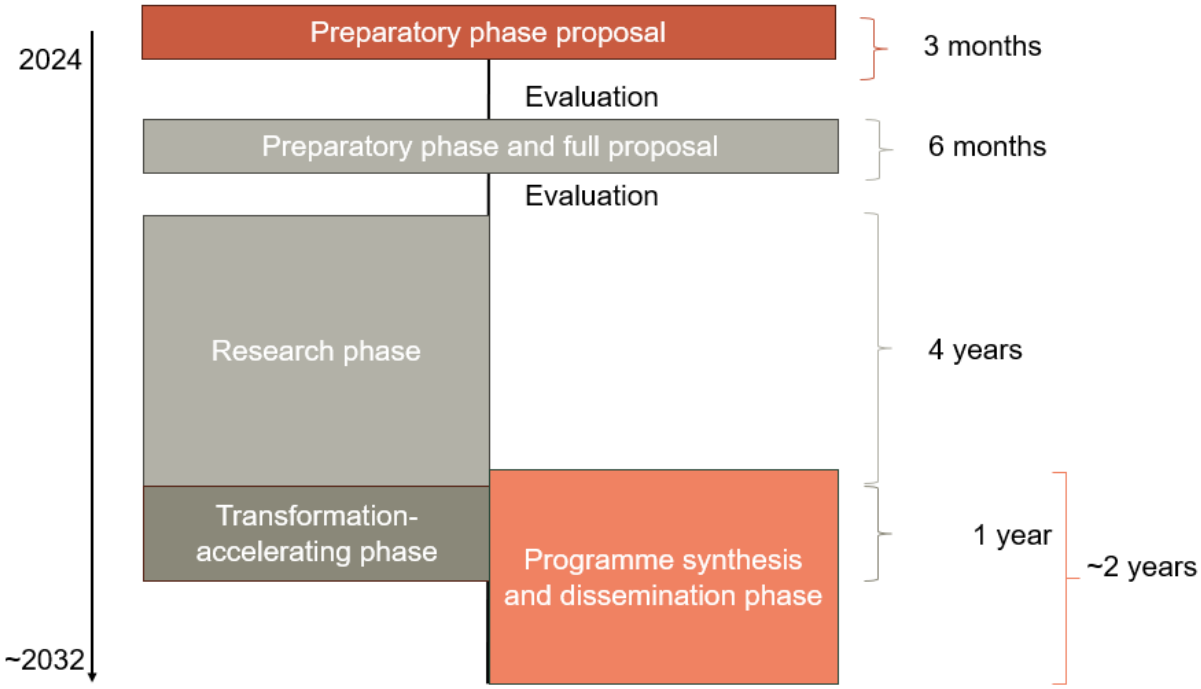

Figure 3: Illustration of the different programme phases.

To support applicants in transdisciplinary research aspects, a dedicated expert on transdisciplinarity research will be mandated. During the preparatory phase, this expert will provide training on the Theory of Change or integrative methods. During the research phase, the expert will coach project teams and organise a continuous sharing of transdisciplinary expertise. This expert will also support the projects during the TAG phase.
Participation in NRP 82 implies participation of the project teams in various programme-specific activities.

6 Submission and evaluation procedure

6.1 General conditions

Legal basis: The present call document of NRP 82, the SNSF Funding Regulations and the General implementation regulations for the Funding Regulations provide the legal basis for NRP 82.

Number of projects: Applicants are kindly asked to choose the number of proposals in which they are involved, in accordance with their capacity to actually manage the projects.

Project budget and duration: The average budget of a project is expected to be around CHF 700'000. This figure is provided as a benchmark. Co-financing of projects with other funding sources is allowed. The salaries of applicants and co-applicants will not be funded by NRP 82. The duration of the projects is a maximum of four years.

Project start: The start of the preparatory phase will be in August 2024. To allow for optimal coordination, the start of the subsequently approved research projects shall be no later than four months after the approval of the full proposal.

Project team set-up/Eligibility of applicants: It is a prerequisite that projects go beyond the academic setting by integrating societal actors. Preparatory phase proposals and invited full proposals must therefore be submitted by a project consortium consisting of a minimum of:

- one main applicant according to the SNSF Funding Regulations and the General implementation regulations for the Funding Regulations. The main applicant is responsible for submitting the preparatory phase proposal and full proposal in the name of the full consortium of co-applicants.

- one societal actor as co-applicant. A societal actor is a self-employed or a natural person employed at a non-commercial institution based in Switzerland and with majority Swiss core funding according to Swiss law, or who has assured such employment in writing. They must not be employed by commercial institutions. A societal actor can be any type of organisation, other than a higher education or research institution, that represents a group of people actively engaged in policies and/or practices, including public organisations (governmental departments of line ministries, local or international governments, extension services etc.), as well as private non-profit organisations such as NGOs, cooperatives, unions and civil society organisations etc.

Additional co-applicants from scientific institutions and societal actors are welcome. Both main applicant and co-applicants share equal responsibilities for the project.

Eligibility of project partners: Project partners are researchers and/or other stakeholders who make a partial contribution to the research project without being responsible for the project. They are eligible according to the SNSF Funding Regulations and the General implementation regulations for the Funding Regulations. The funding share for project partners should not exceed 20% of the total project budget. They may not refer to the support received from the SNSF as a grant they have themselves acquired.

Cross-border research projects: Collaboration with research groups in other countries is encouraged, provided the cooperation either generates significant added value that could not be achieved without cross-border cooperation or substantially enhances the proposed research with respect to content or methodology, or if the competencies of researchers from abroad are essential for the successful completion of the project. As a rule, the funding share requested for co-applicant researchers abroad may amount to 30% of the requested research budget. Societal actors from abroad are not allowed as co-applicants and can only participate as project partners. For co-applicants from abroad, the norms and salary rates of the relevant country will be applied mutatis mutandis, with the SNSF maximum rates as the upper limit. Before submitting a proposal with a cross-border component, please contact the programme managers of NRP 82.

6.2 Submission procedure

A **two-stage submission procedure** is in place: preparatory phase proposals are submitted first, followed by an invitation to submit a full proposal if selected in the first evaluation round.

Online submission via *my*SNF: Preparatory phase proposals and full proposals must be submitted online via *my*SNF. Applicants need to register as *my*SNF users before they can submit a proposal. User accounts obtained in the past remain valid and provide access. It is advisable to request new user accounts as well as to create NRP 82 preparatory phase proposals as early as possible via *my*SNF.

Language of proposals: Preparatory phase and full proposals are expected to be submitted in English.

Details for the preparatory phase proposals

The deadline for the submission of preparatory phase proposals is 29 February 2024, 17:00 CET.

In addition to the administrative data that needs to be entered directly in *my*SNF, the following documents must be uploaded:

- **Preparatory phase description** (in PDF format): Applicants must use the template provided on *my*SNF under 'Information/documents' in their newly created proposal. The preparatory phase description should indicate how the transdisciplinary research team plans to engage relevant stakeholders to match societal knowledge demand and research questions and jointly define achievable project goals. It should present a detailed timeline for the 6-month preparatory phase with planned activities (workshops, meetings, exchanges, surveys, data collection) and corresponding budget. The maximum budget is CHF 20'000 and can be allocated freely, but no original research will be funded. No grant writers will be supported. The preparatory phase description must not exceed two pages.

- **Research plan** (in PDF format): Applicants must use the template provided on *my*SNF under 'Information/documents' in their newly created proposal. The project description must include a concise description of the biodiversity issue to be addressed, as well as the projects' planned contribution to this issue according to this NRP 82 call. The project description must not exceed five pages.

- **CV** (one PDF per applicant): Applicants need to compile their CV on the SNSF Portal and subsequently upload a PDF onto *my*SNF in the data container "CV and major achievements". Information can be found on the CV website and on the SNSF-Portal.

- **Supplementary documents**: For example, support letters from co-applicant's institutions and confirmation of non-commercial purpose, are requested and can be uploaded onto the appropriate data container in *my*SNF.

Details for the full proposals
The deadline for submitting full proposals is expected to be 06 February 2025, 17:00 CET.

In addition to the administrative data to be entered directly in *my*SNF, the following documents need to be uploaded:

- **Research plan** (in PDF format): Applicants must use the template provided on *my*SNF under 'Information/documents' in their newly created proposal. The research plan must not exceed 20 pages.

- **CV** (one PDF per applicant): Applicants need to compile their CV according to the template on the SNSF Portal and subsequently upload a PDF onto *my*SNF in the data container "CV and major achievements". Information can be found on the CV website and on the SNSF-Portal.

- **Supplementary documents**: For example, support letters, confirmation of cooperation from project team and project partners, confirmation of data access, co-financing, ethical approvals (if needed), confirmation of non-commercial purpose and response to evaluation panel recommendations, are requested and can be uploaded onto the appropriate data container in *my*SNF.

6.3 Evaluation procedure
For the evaluation of the preparatory phase proposals, the Steering Committee and ad-hoc experts appointed by SNF form the evaluation panel. The ad-hoc experts provide the missing expertise needed for the evaluation of the preparatory phase proposals. The Steering Committee will recommend a selection of preparatory phase proposals to be either approved or rejected by the National Research Council.

The applicants of the selected preparatory phase proposals will be invited to submit a full proposal. In the invitation, the Steering Committee may include recommendations or set conditions for the full proposal. Applicants who are not invited to submit a full proposal will be informed accordingly by means of a ruling.

Full proposals will be reviewed externally. Based on these reviews, the Steering Committee, will assess the full proposals at the evaluation meeting and propose their approval or rejection to the National Research Council.

6.4 Evaluation criteria
The Secretariat of the SNSF checks whether the personal and formal requirements are met before forwarding the proposal for scientific review. Preparatory phase and full proposals that do not meet the personal and formal requirements will not be further considered. Eligible preparatory phase and full proposals will be reviewed based on the following criteria:

- **Design of preparatory phase (preparatory phase proposal only):** The preparatory phase objectives provide a convincing co-creation process engaging relevant stakeholders. The timeline includes a detailed and sound description of the planned activities with their associated budget for the preparatory phase.

- **Compliance with the goals of NRP 82:** Preparatory phase and full proposals must correspond to the programme aims specified in this call for proposals and fall within the overall framework of the programme.

- **Scientific quality:** Proposals need to be state-of-the-art and comply with high research standards in terms of scientific quality, scientific relevance, originality and topicality, suitability of methods and feasibility. Proposals must contain an innovative component and must be relevant to completed or ongoing research projects in the same field.

- **Contribution to problem handling in society:** The project shows familiarity with the state of societal problem handling and knows what knowledge is currently needed. The project generates systems, target and/or transformation knowledge, depending on the identified need. The project is aware of, and builds on, already available knowledge, e.g. from national or international sources on the monitoring of biodiversity and ecosystem change.

- **Qualification and adequate distribution of tasks of the project consortium:** Given the project's goals, the relevant disciplines and stakeholder groups are part of the project. Applicants must have a sound scientific track record in the field of the proposal. Co-applicant societal actors must be well connected and experienced with local, national and/or regional governmental, political, civil society or business contexts to ensure that the transdisciplinary research addresses societal needs and sensitivities. The distribution of roles, power and resources within the project is adequate to the project's goals.

- **Suitability and feasibility of overall transdisciplinary approach, methods, and budget:** Proposals need to apply adequate methods and a comprehensive approach suitable to address biodiversity and ecosystem services in a transdisciplinary way. Methods and means to (a) handle complexity and (b) co-produce knowledge must be clearly specified. Respective responsibilities as well as personnel and financial resources must be clearly defined and be adequate to the project's goals. There should be a plan for how to deal with unexpected developments, which typically arise in transdisciplinary research.

- **Proposal includes an explicit theory of change to make the project's impact hypotheses explicit (full proposals only):** The theory of change is co-produced by the mixed consortia and includes clearly stated success criteria. During the project, the theory of change is used to critically reflect the impact hypotheses and, if needed, to further adapt and improve them.

6.5 Potential second call and Transformation Accelerating Grants (TAGs)

Only one call for projects of up to 4 years' duration is envisaged. However, in the event of significant thematic gaps in the coverage of the programme's objectives, a second call for projects may be launched.

In their last year of research, grantees will be invited to submit proposals for Transformation Accelerating Grants (TAGs) for an additional 12 months. An extra budget for TAGs of up to CHF 100’000 will be granted on a competitive basis.

7 Budget and schedule

Research in NRP 82 will run for a period of 5 years with a total budget of CHF 15.5 million. The individual projects of this NRP are expected to have an average budget of CHF 700'000 and a maximum duration of 4 years. Teams invited to submit full proposals will benefit from a 6-month preparatory phase with a maximum of CHF 20'000 prior to full proposal submission. Transformation Accelerating Grants (TAGs) will be awarded for one year. A two-year synthesis and communication phase will run in parallel to the TAGs (1-year overlap). After project selection, research work must start within 4 months of the date of approval.

The following preliminary funding allocation among the various research modules and administrative activities is envisaged for NRP 82:

Budget

Preparatory phases		CHF 0.6 million (approx. 30 x CHF 20'000)
Research (CHF 11.2 million) *(Please note that projects may contribute to one, two or all three modules)*	Module 1: **Drivers and trends**	CHF 4.2 million
	Module 2: **Values and visions**	CHF 3.5 million
	Module 3: **Governance and transformation**	CHF 3.5 million
Transformation Accelerating Grants		CHF 1 million (approx. 10 x CHF 100'000)
Knowledge building, creation and exchange; implementation and technology transfer; programme synthesis; trans-disciplinary support		CHF 2.2 million
Scientific evaluation and support, administration		CHF 0.5 million
Total budget		**CHF 15.5 million**

The following schedule is envisaged for NRP 82:

Schedule

Publication of the call for preparatory phase proposals	30 November 2023
Information Webinar	8 January 2024
Deadline, submission of preparatory phase proposals	29 February 2024
Evaluation meeting	15-17 May 2024
Final decision on preparatory phase proposals	25 June 2024
Invitation for preparing full proposals	July 2024
Start preparatory phase	August 2024
Deadline, submission of full proposals	February 2025
Evaluation meeting	May 2025
Final decision and communication of decisions on full proposals	June/July 2025
Start of research	August to November 2025
Submission, evaluation and selection of TAG proposals	2028-2029
End of research	End 2030
Publication of the programme synthesis	May 2032

Research projects cannot be prolonged beyond the duration of the research phase of the programme.

8 Organisation and actors

Steering Committee NRP 82
Prof. Dr Markus Fischer, Institute of Plant Sciences, University of Bern (President)

Prof. Dr Christine Bichsel, Department of Geosciences, University of Fribourg

Prof. Dr Mathias Binswanger, Institute for Competitiveness and Communication, University of Applied Sciences and Arts Northwestern Switzerland

Dr. Thomas Brooks, International Union for the Conservation of Nature

Prof. Dr Arthur Gessler, Swiss Federal Institute for Forest, Snow and Landscape Research WSL and Department of Environmental Systems Science, ETH Zurich

Prof. Dr Birgit Kopainsky, Department of Geography, University of Bergen, Norway

Dr Daniela Pauli, Department of Habitats and Protected Areas, Birdlife

Dr Sandrine Petit-Michaut, UMR Agroécologie, National Research Institute for Agriculture, Food and Environment (INRAe), France

Prof. Dr Christian Pohl, Department of Environmental Systems Science, ETH Zurich

Prof. Dr Camilla Sandström, Department of Political Science, Umeå University, Sweden

SNSF Research Council Delegate
Prof. Dr Chinwe Ifejika Speranza, Institute of Geography, University of Bern

Representatives of the Swiss Federal Administration
Dr Matthias Stremlow, Federal Office for the Environment (FOEN)

Dr Sylvain Aubry, Federal Office for Agriculture (FOAG)

Knowledge Exchange expert
N.N.

Transdisciplinarity expert
N.N.

Programme Managers
Dr Anne Jores, Swiss National Science Foundation (SNSF)

Dr Beatrice Schibler, Swiss National Science Foundation (SNSF)

Engagement Board
The establishment of an Engagement Board that will bring together additional relevant stakeholders and accompany NRP 82 from the final selection of the projects to the implementation of the results is envisaged and will help strengthen the transdisciplinary nature of the programme.

9 Contacts

For questions regarding the submission of preparatory phase proposals and full proposals, please contact the programme managers: Anne Jores and Beatrice Schibler, nrp82@snf.ch or 031 308 22 22.

For questions concerning salaries and eligible costs, please contact the Head of Finance: Roman Sollberger: roman.sollberger@snf.ch or 031 308 22 22.

Technical help with *my*SNF and electronic submissions:

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