



Sustainable Economy
National Research Programme

Call Document

Swiss National Science Foundation

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What are National Research Programmes (NRPs)?

Research carried out by National Research Programmes consists of research projects that contribute to the solution of contemporary problems of national importance. Under the provisions of Article 10, paragraph 2, of the Federal Act on Research and Innovation of 14 December 2012 (version of 1 March 2014) the Federal Council selects the topics and foci to be researched in NRPs and mandates full responsibility for implementing the programmes to the Swiss National Science Foundation.

The Federal Ordinance on the Federal Research and Innovation Promotion Act of 29 November 2013 (version of 1 January 2015, art. 3 VIFG) 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 generally appropriate for National Research Programmes if:

- a. Swiss research can make a significant contribution to the resolution of the problem;
- b. solutions require research contributions from multiple disciplines;
- c. research on the problem can be expected to produce research results that have practical applications within a five-year period.

³ In exceptional cases, an NRP may also be used for the targeted creation of additional research potential in Switzerland.

⁴ The following criteria are also taken into consideration in setting forth the topics of National Research Programmes:

- a. the programmes can provide the scientific basis for decision-making by the government and administration;
- b. the programmes can be conducted with international collaboration.

1. Summary

Natural resources are becoming increasingly scarce and their regeneration capacity is limited. This insight has triggered intense scientific and policy debates on issues such as resource efficiency, de-carbonisation of the economy, innovation, development of clean technologies and modernisation of society. In Switzerland, too, consumption and production exceed sustainable levels. The National Research Programme "Sustainable Economy: resource-friendly, future-oriented, innovative" (NRP 73) invites research projects that (1) enlarge the available knowledge base in this area, (2) assess the risks and opportunities faced by the Swiss economy, (3) analyse measures, instruments and their effects, and (4) break down general findings to the level of concrete applications.

NRP 73 is at the intersection of different disciplines ranging from economics and business administration, via social sciences, through to law, environmental sciences and industrial ecology. The programme is ambitious in that it requires a systemic view of all natural resources and every stage of the value chain connecting the environment, the economy and society.

2. Introduction

No human activity is possible without using goods and services derived from natural resources. However, nature's ability to supply resources such as clean air, fresh water, raw materials or healthy soils is limited. In some cases the use of natural resources and services is already at the limits of nature's capacity. Fresh water for example is already scarce in some regions, and the gap between freshwater demand and supply will rapidly grow worldwide in the near future. Nutrition security has been a global challenge for many years, and no international consensus exists on how to feed adequately a population of 9 billion by 2050. For many minerals the burn-off time (i.e. the estimated extractable resource stock divided by present net extraction rates) is significantly below 50 years. There is a risk that critical environmental thresholds will be exceeded. This could have harmful effects on ecosystems, threaten the security of raw materials supply, hamper the possibility of sustaining prosperity worldwide and compound persistent social inequality, manifested in job losses, socio-economic insecurity, disease and social instability.

A sustainable economy takes account of the scarcity of non-renewable resources and the regeneration capacity of renewable resources while also strengthening economic competitiveness and social welfare. A precondition for this approach are prices that reflect the full economic costs, including relevant externalities and a decoupling of economic activities from the use of natural resources. This can create new economic opportunities, e.g. by developing and distributing innovative products and services as well as cleaner technologies. If Switzerland were to move alone, this could pose a threat to its international economic competitiveness. Concepts of a sustainable economy therefore need to consider the Swiss economy in its international context.

3. National and international research environments

A wide range of programmes focusing on a sustainable economy are underway nationally and internationally. To avoid duplication, applicants of this NRP should make use of existing knowledge and generate synergies when designing a specific research project.

National research environment

NRP 73 is the first National Research Programme that focuses on all natural resources, includes all stages of the value chain and aims to integrate the environment, the economy and society in a systematic and holistic way. But significant sector- and problem-specific knowledge related to NRP 73 has already been acquired in a number of completed and ongoing research programmes.

Most notable are the following complementary NRPs: NRP 48 “Landscapes and Habitats of the Alps”, NRP 54 “Sustainable Development of the Built Environment”, NRP 61 “Sustainable Water Management” (all completed), NRP 66 “Resource Wood”, NRP 68 “Sustainable Use of Soil as a Resource”, NRP 69 “Healthy Nutrition and Sustainable Food Production”, NRP 70 “Energy Turnaround”, NRP 71 “Managing Energy Consumption” (all ongoing). Furthermore there is a close relationship to three National Centres of Competence in Research (NCCRs), namely: “Climate”, “North-South”, and “Plant Survival” (all completed), as well as five thematic modules of the Swiss Programme for Research on Global Issues for Development (r4d programme): “Social conflicts”, “Employment”, “Food Security”, “Ecosystems”, and “Public Health” (all ongoing). In addition, the new cross-cutting call from the r4d programme on “natural resource governance for sustainable development” is highly complementary to this NRP, in particular through the involvement of developing countries.

In addition, the Federal Council has approved a number of application-oriented programmes such as the "Strategy Sustainable Development 2016-2019 (Federal Office for Spatial Development ARE), the "Green Economy Action Plan 2013" (Federal Office of the Environment FOEN) as well as its reporting and further development 2016-2019 (see Bericht an den Bundesrat "Grüne Wirtschaft - Massnahmen des Bundes für eine ressourcenschonende, zukunftsfähige Schweiz "). Finally, the "Statistical Multi-Year Federal Programme 2016 - 2019" of the Swiss Federal Statistical Office FSO aims to develop an environmental-economic accounting system. The new NRP should base its work on these existing resources.

International research environment

At the international level, an even higher number of initiatives exists addressing topics such as sustainable growth, green economy and circular economy. Important initiatives include those of the OECD, EU and UNEP, which involve the creation of supporting knowledge and information bodies, such as the “Green Growth Knowledge Platform” (GGKP) established by the OECD, UNEP, the World Bank and the Global Green Growth Institute. The European Commission developed detailed proposals for a “Circular Economy” which suggest that resource efficiency improvements along the value chain could reduce material input by 24% by 2030 and save European industry up to EUR 630 billion per year. In addition, by the end of 2015 the Commission has adopted a “*broad and more ambitious approach*”, prepared by the European Academies' Science Advisory Council (EASAC). Moreover, the European Commission’s Raw Materials Initiative assesses economically important raw materials, for which supply risks are high, and addresses related risks for growth and employment.

International research programmes that are relevant to NRP 73 include almost all areas of the “Societal Challenges” section of the EU Framework Programme for Research and Innovation (Horizon 2020) as well as the “Science with and for Society” programme (also Horizon 2020).

Finally, there are international agreements that are relevant to this NRP. For instance, Switzerland is a member of the United Nations Framework Convention on Climate Change (UNFCCC), the

Convention on Biodiversity (CBD), the Montreal Protocol, the Intergovernmental Panel on Climate Change (IPCC) and a signatory of the United Nations' Sustainable Development Goals (SDGs), adopted in September 2015, according to which all signatories commit themselves to a development in line with sustainable resource use and poverty reduction.

4. Goals of NRP 73

The overall goal of NRP 73 is to acquire scientific knowledge about and for a more sustainable economy with a more efficient use of resources, higher resource security and greater welfare. The implementation of current and planned strategies in these fields has the potential to underpin the competitiveness of the Swiss economy and to foster the welfare of its citizens. It is therefore important to understand the opportunities and risks associated with these processes, for example against the backdrop of international research efforts, and how they depend on the measures and instruments adopted – for the economy as a whole as well as for individual sectors and businesses.

In terms of communication and knowledge transfer, the goals of NRP 73 are to ensure that the business world and other actors are aware of the potential for a sustainable and more efficient use of natural resources and the specific options for action – against the backdrop of a globally intertwined economy.

A sustainable economy is neither just a matter of technological change and innovation, nor just of the political framework conditions or the implementation of governmental regulations, and it cannot be limited to a few selected resources. NRP 73 is expected to generate a systemic view which takes into account the environment, the economy and society considering all natural resources and all stages of the value chain. Based on this approach, the programme identifies future areas of action and proposes areas for implementation. The scientific goals of NRP 73 can be broken down into the following major research topics:

Expanding the knowledge base

Although a significant volume of data and scientific insights is already available, consistent and comprehensive knowledge bases are still missing. Moreover, existing research methods have to be adapted for the purpose of analysing the socio-economic and environmental aspects at the micro-, meso- and macro-levels in an integrated and systematic manner.

Opportunities and risks

A transition towards a sustainable economy entails risks and opportunities for different sectors and firms, for consumers and producers as well as for the country's economy as a whole. It will create winners and losers and affect the welfare of citizens. Based on existing international research, it is therefore necessary to carefully assess the costs and benefits of a possible transition – thereby differentiating between different measures, instruments and related incentives.

Measures and instruments

Incentives will be necessary to decouple the use of resources from economic activities and welfare. This will require technological change as well as appropriate political framework conditions and economic instruments. Systemic and integrated research is needed to examine the impact of such measures and their most efficient combination against the backdrop of global challenges.

Enterprise applications

In order to test the effects of a transition towards a sustainable economy, applications for specific enterprises or groups of enterprises need to be developed and tested directly at the firm level. This notably requires case studies in close collaboration with the relevant companies.

5. Main research topics

The above-mentioned general research topics are reflected in the four modules of NRP 73. These modules are complementary. Proposals combining more than one module are strongly encouraged.

Module 1: Expanding the knowledge base

This module focuses on expanding existing knowledge about the use and dependence of Switzerland on resources; see also the environmental-economic accounting system of the Swiss Federal Statistical Office BFS. In this context, it is important to always keep an eye on the fact that Switzerland is very much a part of the international economy. This will enable researchers to analyse systematically how the Swiss economy in its global economic context and the use of natural resources are interconnected. In order to ensure international comparability and consistency, proposals should consider international and European integrated accounting standards such as the UN system of integrated environmental-economic accounts or the Eurostat system of the European environmental economic accounts. Key areas with apparent knowledge gaps are identified below.

Evaluating scarcity of resources

In order to gain a detailed understanding of the resource dependence and environmental vulnerability of the Swiss economy, it is important to analyse the interconnectedness of the environment and the economy as well as options to diversify and substitute resource use. Adopting a holistic approach, this analysis needs to be undertaken in view of the specific reliance on natural resources. Taking an ex post perspective, researchers should be able to identify the driving forces such as market distortions of an overexploitation of resources and natural services. Taking an ex ante perspective, they should be able to identify which resources are expected to become scarce in the next decades and which sectors will be most affected.

International trade and security of supplies

With export and import ratios of 49% and 41% respectively, Switzerland's integration into global markets is one of the highest worldwide. Questions that need to be addressed include the increasing spatial separation of production-related resource extraction from final consumption as a result of increasingly complex trade relations. Important issues are: (1) how to measure resources and environmental services embodied in traded goods and services and (2) how to include these aspects into resource efficiency indicators and analytical models? Closely related is the issue of how affected companies can efficiently use these insights to secure raw materials supplies. Like many other industrial countries Switzerland relies on imports of essential raw materials with an increasingly complex material composition that are often difficult to substitute with more sustainable raw materials. The assessment of supply risks for the Swiss economy and its different

sectors therefore requires an improved methodological toolkit taking into account the multidimensional nature of these risks in a comprehensive manner.

Costs and benefits of resource use

Some resources are already greatly overused from an overall economic perspective. In some cases, the economic effects of resource use are demonstrated and well understood. For example, a failure to reduce greenhouse gas emissions in order to stabilise the global climate will result in annual costs of 5-20% of global GDP while the costs of climate stabilisation are estimated at only 1% of global GDP. In other cases, however, the effects are less well known because it is difficult to attribute a market price to goods and to express the effects in units of a national accounting system. And even in cases where resources are private goods with market prices (e.g., metals or fossil fuels), there may be externalities of production and transportation that are not incorporated in market prices.

The environmental effects of resource use vary greatly according to the types of resources, the location, the technology in use and the regional context. The rapid globalisation adds further complexity to the material supply chains and environmental impacts of modern economic systems. Currently a large gap exists between (1) micro-level studies, which typically assess life cycles, (2) national-level studies such as carbon, material and water footprint studies, and (3) attempts to define a safe global operating space for the world's population. It is necessary to develop innovative approaches to assess the environmental effects of resource use associated with economic activities in Switzerland. These approaches need to adopt appropriate up- and down-scaling methods and an adequate classification of resources.

There is also a lack of knowledge about how resource use affects human well-being. The use of natural resources is instrumental for essential services ranging from nutrition, housing and clothing to mobility and access to health, education and modern information infrastructure systems. The following questions require particular attention: (1) if the current level of resource use continues or increases, what will be the effects on social welfare in Switzerland and elsewhere? (2) What are the options and challenges of decoupling social welfare from the use of resources? (3) What are the distributional and social welfare effects of current and future Swiss resource use patterns?

Module 2: Opportunities and risks

Against the backdrop of long-term global challenges, this module investigates the risks and opportunities of a more sustainable resource use for producers and consumers, individual sectors and for the Swiss economy as a whole. In addition, researchers will identify challenges for the Swiss economy when transitioning towards a more sustainable economy and assess how national and international changes will affect the ecological, economic and social framework conditions. Assessing the opportunities and risks requires a baseline. The analysis therefore must include an assessment of the consequences of inaction which could be expected if Switzerland did not take measures for reducing the resource intensity of its economy.

Costs and benefits

Beyond the assessment of costs and benefits as covered in Module 1, it is important to analyse under which conditions new opportunities can be exploited while simultaneously minimising the risks. It is important to identify winners and losers and to analyse the conditions under which

gains and losses arise. For instance, the distribution of benefits and costs depends on specific political instruments. Furthermore, it is important to analyse the potential costs and benefits of transforming the production system, its modernisation and the implications for the competitiveness of the Swiss economy and quality employment.

Trade-offs

A sustainable economy has the potential to generate profits and the resulting environmental benefits could lead to an increase in international competitiveness of the economy. However, the social, environmental and economic goals of a sustainable economy may also be conflicting. Research should address these trade-offs for the economy, society and the environment as well as examine the conditions under which they can be minimised.

Wait or act?

If Switzerland decides to wait rather than to initiate significant steps towards a sustainable economy, new challenges will arise as a result of changes in the international context as well as in the environmental, economic, societal and political and/or institutional conditions. At the same time, it is possible that more cost-effective technical solutions may become available over time. This leads to the question whether it is better to strive for a transition now or to wait for new solutions and, as the case may be, implement measures later. This question is relevant both from an economic and a social perspective. Research projects should therefore analyse the appropriate timing of action both from an economic and a social perspective. Distributional aspects should also be considered in this context.

First mover advantage and international competitiveness

There is an international dimension to a sustainable economy. For example, other countries might benefit from the strengthened knowledge and technology transfer by Swiss enterprises. At the same time, Switzerland is already benefiting from exporting its clean technologies and products as well as its innovative standards and models of production and consumption. Research projects should examine what framework conditions would enable Switzerland to expand its expertise and thereby improve the export opportunities in the area of clean technologies. However, depending on the policies, moving to a sustainable economy could also result in competitive disadvantages and risks. Research projects should investigate in which areas Switzerland might benefit from being a first mover, what might obstruct such moves and where it might compromise competitiveness.

New business models

At many companies, there is room to reduce their high level of raw material consumption to a sustainable level, at least technologically. Generally, a sustainable economy implies a technological change with environmentally friendly innovations replacing old technology and practices. Research projects should explore the risks and opportunities and analyse the relevant institutional and political framework conditions (e.g., financial support and policy consistency) that enhance the potential benefits of the Swiss economy.

Changing consumption patterns

Consumption patterns are changing in favour of stricter safety and quality standards, as well as goods and services with low environmental impacts. The actors involved in the value chain, from

resource extractions to retailing, are striving to catch up with new consumer attitudes. Research projects will investigate the impact of voluntary measures and individual consumers and how they are determined. Research projects will also analyse the role of environmental education, education for sustainable development (both training and further training) and communication. Valuable knowledge can be added by studies on how primary commodity producers, manufacturers, and retailers perceive changing consumption patterns and how they are reacting to them or anticipating them. The scope of research projects can also include the role of product labelling and information for consumer behaviour, voluntary product standard and pricing strategies on the part of enterprises, specific initiatives by retailers on more resource efficient and safer products, and industrial cooperation along the entire value chain (see also Module 3). Insights into consumer behaviour from a behavioural economic perspective are also very important.

Module 3: Measures and instruments

Transition towards a sustainable economy would require transparent strategies in order to trigger the necessary technological, structural, institutional, social and behavioural change. This module focuses on how voluntary cooperation, positive incentives and federal policies can promote concrete options for action.

Challenges and approaches

For companies, one important reason to be opposed to a sustainable economy is that currently prices do not reflect the polluter pays principle, i.e. external costs are not reflected in prices. As a result, companies do not have to incorporate them in their calculations. This leads to prices that do not fulfil their roles of providing information on scarcity, coordinating between supply and demand, and providing full monetary compensation for all the goods and services used during consumption and production. Sustainable, economically efficient decision-making processes therefore depend on accurate prices that reflect the overall costs.

But inadequate or unstable market signals that do not provide the necessary incentives are not the only challenge. Other obstacles include the lack of targets and indicators as well as the lack of a coherent policy framework and supportive regulation. Uncertainty regarding the scale and direction of future regulations may be a particular barrier for entrepreneurs. Clear rules should therefore be a priority. Equally important are skill-related gaps in the workforce, lack of education at all levels, lack of investment and long pay-back periods in particular in cases where investment is risky and radical or early stage innovations are necessary.

Policy instruments

The range of policy instruments can be categorised roughly into two types: (1) regulatory instruments (i.e., laws and directives) and (2) market-economic instruments (e.g. environmental taxes, fees and user-charges, certificate trading, refunded emission payments, environmental financing, environmentally friendly public procurement programmes, voluntary contributions, etc.). It is not clear if the current legal provisions for the various instruments are sufficient. Research projects should analyse various political instruments in terms of their efficiency (including implementation costs) and effect as well as assess their feasibility in terms of politics and commercial law.

There is a substantial literature in environmental economics showing that market-based instruments are often superior to regulation in terms of economic and ecological efficiency. However, there is almost no literature on how incentives for stimulating an increasingly efficient resource use affect the ecology and the economy as a whole. Research projects should focus specifically on assessing the impacts of resource-related policy measures on the labour market, economic growth, technological change as well as the distribution of income.

Incentives for innovation and its dissemination

Research projects should deal with incentives that can stimulate the development and diffusion of clean technologies. This applies in particular to sectors where technological change is a key issue and where the interaction between technological and social change plays an important role, such as transportation, housing and food. Examples of policy-determined instruments are innovative policy designs, targeted institutional changes, policy coherence and participatory processes as well as price-based and fiscal instruments, targeted regulations or environmentally friendly public procurement programmes. Some other instruments are the result of industrial strategies like eco-design and product innovation, circular economy approaches, sustainable business models and shared consumption tools. Integrated strategies to enable environmentally friendly innovations within complex systems bringing together the private sector, public administration and consumers can be a valuable topic of research (module 2). Generally, the systemic nature of eco-innovation processes should be highlighted and creative, interdisciplinary strategies can be proposed.

New financing models

The transition to a sustainable economy requires additional capital. Typical examples are investments that enable a more efficient resources use and sustainable mobility. At the same time, investors and customers increasingly request that some share of financial flows is allocated according to environmental and social sustainability criteria. Research on innovative financing systems can therefore also be a relevant area of research.

Module 4: Enterprise applications

At the heart of this module are case studies on the basis of international and national experience. The idea is to run pilot projects in close collaboration with enterprises or groups of enterprises. The aim of the case studies is to test concrete options for action, for example industrial ecology principles and measures such as eco-design, cradle to cradle, recycling, recovery and eco-symbiosis, etc. At company level, this requires numerous and highly specific adjustments of business practices including accounting, monitoring, procurement, production technologies, supply chain management or marketing strategies. By participating in case studies, companies offer a voluntary contribution to sustainable development (entrepreneurial social responsibility) and employees acquire new skills. Examples of research fields that may be interesting in this context are detailed below. Most of them will require close cooperation between researchers and enterprises or groups of enterprises.

Adapting industrial ecology principles and measures

Research projects in this field should focus on the development of methods to account for and integrate comprehensive and up to date information on material use into the company accounting

routines, especially for SMEs. Moreover, they should identify bottlenecks and vulnerability hotspots in the firm's material supply chain. Projects should also assess the technical and economic potential to improve resource efficiency through cascaded use, reuse, recycling, and eco-symbiosis.

Knowledge, professional skills and social welfare

A transition towards a sustainable economy requires investing into human knowledge and capital at company level. Research projects could also consider “green job” opportunities and the development of medium- to long-term projections of the demand for related competences. Research projects are needed to assess educational requirements, notably in the higher education sector. They could also examine the payoffs, welfare gains and living conditions of employees who work for companies that are aiming to be environmentally friendly.

The retailer-consumer nexus

In high-income countries, consumers tend to prefer consuming environmentally friendly goods and services. A retailer who wishes to meet this demand needs to identify the relevant consumption patterns and has to calculate the material, carbon and water footprint across the entire value chain of key consumer products. This offers valuable information for decisions on procurement, product portfolio and marketing strategies. By breaking down the general outcomes of Modules 2 and 3 through the use of company-level case studies, retailers can be supported in addressing the relevant consumer preferences.

6. Practical significance and target audience

Scientific knowledge obtained through research within NRP 73 will generate valuable know-how for the private sector, policy makers and administrative authorities at the municipal, cantonal and federal level.

For decision makers and administrative authorities, NRP 73 is expected to identify which incentives, private contributions, policy instruments and measures are necessary for Switzerland to move towards a more sustainable economy while simultaneously improving the welfare of its citizens and the competitiveness of the different sectors of its economy. This can help the federal government, the cantons and the municipalities to realistically estimate the economic and welfare potentials of a sustainable economy while identifying undesirable side effects of policy measures at an early stage.

For the private sector, this programme is expected to show opportunities how and where its competitiveness can be strengthened through innovative technologies, products and production structures combined with efficient and sustainable resource use, transport systems, and related skills development. The programme is also expected to analyse cost-intensive areas and acquire knowledge about costs and benefits in a context of increasingly scarce resources.

7. Characteristics of NRP 73

The NRP “Sustainable Economy” is ambitious in the sense that it will improve our understanding in this sphere by adopting a systematic approach which considers environment, economy and society as well as all natural resources and every stage of the value chain. However, as Switzerland has already invested substantial funding in energy related research (including the management of energy consumption) proposals focusing particularly on energy are excluded from this NRP.

Interdisciplinary and transdisciplinary research / cooperation projects

An interdisciplinary and/or transdisciplinary approach is appropriate when research questions cross boundaries between disciplines as well as between science and practice. NRP 73 aims at strengthening both interdisciplinary and transdisciplinary research. In interdisciplinary teams, political and social scientists will work hand-in-hand with economists, legal scholars and industrial ecologists; in transdisciplinary teams, researchers will collaborate closely with experts and stakeholders from sectors outside academia, such as industry, politics, NGOs, etc. Academic cooperation across different institutions is also welcome. This can involve higher education institutions of the ETH Domain, universities and universities of applied sciences as well as non-commercial research institutes outside the area of higher education. Cooperation projects of scientists and enterprises or groups of enterprises are particularly welcome in module 4. Experts from enterprises or groups of enterprises can contribute to the research project as project partners.

Use-inspired basic research

Proposals combining more than one module are encouraged. Generally, they are preferred to proposals addressing one module only. Project teams will be coordinated and will meet at programme events to foster cooperation and to share and develop ideas. Research projects should increase the knowledge and contribute to solving problems. In addition to cooperation in academic research groups, this requires innovative research projects proposing direct cooperation between researchers, private companies and public authorities (explicitly requested in module 4). The latter can play an important role in ensuring that the results are of great value for institutional, economic, social and political actors.

National and international cooperation

National collaboration with other projects within and outside NRP 73 is welcomed. Collaboration with research groups in other countries is encouraged, provided the planned cooperation either generates significant added value which could not be achieved without cross-border cooperation or which substantially enriches Swiss part of the research with respect to content or methodology.

8. Submission procedure and project selection

General conditions

Research projects conducted under NRP 73 will generally run for 30 to 48 months. The average budget of a project is expected to range between CHF 400,000 and 800,000. This range is given as a reference point. Smaller and larger budgets are possible.

One call for proposals is envisaged. In the event of significant thematic gaps, a second call for proposals may be launched.

To allow for optimal coordination, approved projects must start no later than three months after the approval date.

A two-stage submission procedure is applied: pre-proposals are submitted first, followed by full proposals upon invitation. Pre- and full proposals are expected to be submitted in English, unless it can be shown that either German or French is intrinsically better suited to the research topic. Before handing in the proposal in German or French, the programme manager of NRP 73 must be contacted for approval. For evaluation purposes, the pre- and the full proposal must be written in the same language.

Cross-border research projects are supported if the competence of researchers from abroad is essential for realising the project. As a rule, the share of financing requested for researchers abroad may not exceed 30 % of the overall budget, and the person responsible for the project abroad may not be assigned the role of corresponding with the SNSF. For applicants from abroad, the norms and salary rates of the relevant country will be applied *mutatis mutandis*, with the SNSF maximum rates generally serving as the upper limit. Before submitting a proposal for a cross-border research project, please contact the programme manager of NRP 73.

Cooperation projects involving scientific research and businesses are particularly welcome in module 4. Experts from enterprises or groups of enterprises can contribute to the research project as project partners. Please contact the programme manager of NRP 73 before submitting a pre-proposal for a cooperation project.

The Funding Regulations of the SNSF, the General Implementation Regulations for the Funding Regulations and the Call for proposals of NRP 73 provide the legal basis. All forms, rules of procedure and instructions for the submission of proposals can be found on the *mySNF* portal under 'information/documents' after selecting the corresponding NRP and creating a new application.

Online submission on *mySNF*

Pre- and full proposals have to be submitted on the *mySNF* portal (www.mysnf.ch). For this purpose, user-registration is required. User accounts obtained in the past are valid and provide access to all the funding schemes of the SNSF. It is advisable to request new user accounts as early as possible via the homepage of *mySNF*.

Pre-proposals

The deadline for the submission of pre-proposals is **26 September 2016, 17:00 CET**.

In addition to the data that is to be entered directly in *mySNF* the following documents are to be uploaded:

- Project description (as a PDF file)
Applicants must use the document template provided on the *mySNF* portal under 'information/documents' of their newly created proposal. The project description includes details about the project team and the module allocation as well as five key publications of third parties regarding the project, five key publications of the project team and a project plan. The project description must not exceed six pages.

- Short CVs and five key publications of the applicants (as PDF files)
The CVs and the five key publications must not exceed a maximum of two pages each. Links to full publication lists may be included.

Project descriptions and CVs exceeding the indicated length will not be considered.

Full proposals

The deadline for submitting full proposals is expected to be 3 April 2017.

Besides to the data to be entered directly in *mySNF* the following documents need to be uploaded:

- Research plan (as PDF file)
Applicants must use the document template provided on the *mySNF* portal of their newly created proposal. The research plan must not exceed 20 pages.
- Short CVs and publication lists of all applicants (as PDF files)
The CVs must not exceed two pages each. Publication lists must be submitted according to the guidelines on *mySNF*. Links to publication lists may be included.

Supplementary documents (support letters, confirmation of cooperation or co-financing, forms regarding international cooperation, etc.) can be uploaded on *mySNF*.

Project selection

The Steering Committee evaluates the submitted pre-proposals and makes final decisions based on the selection criteria outlined below. In making its decisions, it may refer to assessments by national and international reviewers. Authors not invited to submit a full proposal will be informed accordingly by means of a ruling.

In the second stage of the submission procedure the Steering Committee will invite the authors of the selected pre-proposals to submit a full proposal. In the invitation, the Steering Committee may include recommendations or set conditions for the full proposal. Based on external reviews as well as on an evaluation by the Steering Committee, it will propose full proposals to be either approved or rejected by the National Research Council (Programmes division and Presiding Board).

Project teams invited to submit full proposals may be requested to present their projects to the Steering Committee. Such presentations are expected to take place in June 2017.

Selection criteria

The Secretariat of the Division Programmes checks whether the personal and formal requirements are met before forwarding the proposal for scientific review (cf. Funding Regulations of the SNSF). Pre- and full proposals that do not meet the personal and formal requirements will not be processed further.

Pre- and full proposals will be reviewed by the Steering Committee on the basis of the following criteria:

- **Compliance with the goals of NRP 73:** proposals must reflect the programme's objectives as outlined in the call and comply with its overall framework.
- **Scientific quality:** proposals must fulfil international state-of-the-art criteria with respect to scientific quality and methodology. Proposals must contain an innovative component and be relevant as compared to completed or running research projects in the same field.

- **Inter- and transdisciplinarity/cooperation projects:** projects with research questions addressed by different disciplines or that demand approaches that transcend the boundaries between science and practice must secure adequate cooperation between the actors and project management, and in terms of methodology.
- **Application and implementation:** the potential for the practical application and implementation of results is a key element of NRPs. Projects of high practical relevance are therefore given priority.
- **Personnel and infrastructure:** applicants must have a sound scientific track record in the field of the submitted proposal. Adequate personnel resources and an adequate infrastructure must be secured for the project.
- **Response to comments:** the Steering Committee may offer comments, suggestions or recommendations to the research teams when inviting them to submit a full proposal. The implementation of such suggestions or recommendations will be assessed in the full proposals.

Budget

Total funds of CHF 20 million are available for this NRP. The provisional allocation of this funding between the different research modules and management activities is as follows:

Module 1	approx. CHF 5 million
Module 2	approx. CHF 4 million
Module 3	approx. CHF 6 million
Module 4	approx. CHF 3 million
Scientific quality management, knowledge exchange and implementation	approx. CHF 2 million

Schedule

At present, the following schedule is envisaged for NRP 73:

Call for pre-proposals	16 June 2016
Submission of pre-proposals	26 September 2016, 17:00 CET
Invitation to submit full proposals	December 2016 or January 2017
Submission of full proposals	3 April 2017 (expected)
Final decision on full proposals	August 2017
Start of research (latest possible point in time)	1 September 2017 (1 December 2017)

9. Contact

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