



Healthy Nutrition and Sustainable Food Production

National Research Programme NRP 69

Implementation Plan



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What are National Research Programmes (NRP)?

The research carried out by National Research Programmes consists of targeted research that contributes to the solution of contemporary problems of national importance. Under the provisions of Article 6, paragraph 2, of the Federal Act on Research of 7 October 1983 (as of 1 March 2010) 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 (SNSF, Division IV).

Article 4 of the Federal Ordinance on the Federal Act on Research of 10 June 1985 (as of 1 January 2009) describes the purposes and contents of NRPs as follows:

¹ *National Research Programmes are a means to direct and support coordinated research projects that have a common goal. Where needed, National Research Programmes should strengthen scientific research capacities.*

² *Topics of research are generally appropriate for National Research Programmes if:*

- a. scientific research on the problem is of national importance;*
- b. Swiss research can make a significant contribution to the resolution of the problem;*
- c. solutions require research contributions from multiple disciplines;*
- d. the research goals cannot be met exclusively through basic research, through research within a specific section of the administration, or through industrial applications research;*
- e. research on the problem can be expected to produce research results that have practical applications within a five-year time period.*

³ *The following criteria should be taken into consideration in setting forth the topics of National Research Programmes:*

- a. the programmes can provide the scientific basis for decision-making by government and the administration;*
- b. the programmes can be conducted with international collaboration and are also of great interest to Switzerland."*

Executive Summary

Providing a stable supply of healthy (and high quality) food at affordable prices is necessary both for the health and the social and economic stability of a society. However, in order to ensure sufficient production potential in the long term, the principles of sustainability must be applied consistently throughout the production, processing and distribution of food. The rise in diet-related illnesses, which account for almost one third of the disease burden in Switzerland, presents another significant challenge for our society. This underlines the importance of the links between sustainable food production, nutrition and sustainable eating habits. Sustainable consumer behaviour and eating habits mean choosing and consuming food that is produced through environmentally friendly, resource-efficient and socially acceptable methods and that contributes to individual health and well-being.

This raises the question of what an optimal food and nutrition system in Switzerland should look like in the future and how we should change our eating habits in order to optimise the ecological, economic and social effects in the long term and improve the health outcomes.

The main goals of the National Research Programme "Healthy Nutrition and Sustainable Food Production" (NRP 69) are to provide a practical base of knowledge about how healthy eating can be encouraged in Switzerland and how enough high quality, safe food products can be made available at affordable prices and with the most efficient resource management and least environmental impact possible. The conclusions of this NRP will thus contribute to current and upcoming reform processes in the Swiss agricultural and nutrition sectors.

The inter- and transdisciplinarity within the funded projects/topics is of key importance for the success of Knowledge and Technology Exchange, especially when healthy nutrition and the change of eating habits are addressed.

The NRP 69 will operate with an overall funding of CHF 13 million for a duration of 5 years. Additionally, a maximum of CHF 4 million to be shared between NRP 69 and NRP 68 "Sustainable Use of Soil Resources" will be available for projects participating in the European Joint Programming Initiatives (JPI) such as "A Healthy Diet for a Healthy Life".

The NRP 69 will operate as a cooperation between the Swiss National Science Foundation (SNSF) and the Commission for Technology and Innovation (KTI-CTI).

1. Introduction

1.1 Background

One of the greatest global challenges of the 21st century will be satisfying the demand for food – increasing because of population growth, rising incomes and changing eating habits – as available resources such as land, energy and water become scarce, while minimising the negative effects (greenhouse gas emissions, water and soil pollution, soil degradation, loss of biodiversity, etc.) of food production (including processing, storage, transport, distribution, preparation and consumption) on the environment (FAO, 2009).¹ Providing an adequate supply of safe, high quality food at affordable prices is an absolute necessity for the health and the social and economic stability of a society. This principle also rings true for Switzerland.

Long characterised by overproduction and falling or stagnating prices in primary production, the food industry has in recent years experienced a marked increase in the demand for food, accompanied by rising global market prices for products like milk powder, corn, rice, wheat and soy. This, in turn, has sparked interest in primary production and the food industry worldwide.

The rise in diet-related illnesses presents another significant challenge. Non-infectious illnesses in which diet combined with inadequate physical activity play an important role are responsible for almost 60% of yearly deaths and 47% of the global disease burden. According to estimates by the Federal Office of Public Health (FOPH), just under one third of healthcare costs in Switzerland, that means up to CHF 20 mia., are caused by diet-related illnesses. Although a large majority of the Swiss population understands the connection between diet and health and is knowledgeable about nutrition, almost one third of the population, by their own admission, claim not to pay any special attention to their diet. Compared with data from 10 years ago, the eating habits of the Swiss population have deteriorated. Among schoolchildren, a clear trend has even emerged away from shared meals at the dining room table and toward an increased intake of high-energy snacks. Further, the nutritional environment has changed. Processed food with high contents in energy, fat, sugar and salt has gained importance and is easily available at any time of the day. This results in a large number of overweight people in Switzerland and an increase in diet related illnesses like diabetes and coronary heart disease.

This raises the following questions:

- _ How can healthy eating be encouraged in Switzerland and enough healthy and safe food products be made available at affordable prices and with the most efficient resource management and least environmental impact possible?
- _ How can the principles of sustainability be applied more consistently throughout the production, processing and distribution of food products, a basic prerequisite for guaranteeing sufficient production potential and increased health in the long term?

This makes the links between sustainable food production, nutrition and sustainable eating habits even more important. Sustainable consumer behaviour and eating habits mean choosing and consuming food that is produced through environmentally friendly, resource-efficient and socially acceptable production methods and contributes to indi-

¹ FAO, 2009 "How to Feed the World in 2050" <http://www.fao.org/wsfs/forum2050/wsfs-background-documents/hlef-issues-briefs/en/>

vidual health and well-being. But it also means introducing structural measures to help favour healthy eating habits (see glossary in the appendix).

Along with these long-term aspects, the current and short-term political challenges facing the primary production, manufacturing and retail sectors must be kept in mind. Such factors include a potential free trade agreement with the EU in the agricultural and food sectors, developments in the Doha Round and increasing interdependence with global markets. In order to be able to guarantee a supply of healthy food products in the long term, the domestic agriculture and nutrition sectors must also remain or become more competitive in the short and medium term. In this respect, the application of sustainability principles as well as the quality and safety of the food produced play a prominent role. Food produced in Switzerland only remains competitive and attractive when its production and product quality, most important its nutritional quality, is superior to that of foreign-produced goods. Because of this, stakeholders all along the production and value chains are convinced that the agricultural and nutrition sectors must focus on a quality strategy in the future. The large number of parliamentary initiatives on the topics of nutrition and sustainable food production shows that these topics are a high priority on the political level, as well. In its report "Food crisis, raw material and resource scarcity" (report in response to the Stadler Postulate), the Federal Council stated that a long-term strategy for economic supply was based on optimising production and efficient use of available raw materials and resources, both in a national and international respect. In this context it is important to consider the strategy for biodiversity in Switzerland (SBS) which is currently being elaborated.² It will describe the aims and areas where sustainable use of biodiversity can be pursued.

Within this context, the goal of the research programme "Healthy Nutrition and Sustainable Food Production" is to develop possible approaches, strategies, methods and measures for promoting sustainable food and nutrition systems and healthy nutrition.

1.2 Definitions

In the context of this Implementation Plan the following definitions are valid:

Healthy Nutrition

Healthy nutrition means the intake of foods and drinks, and their nutrients and other constituents in relation to the body's needs and positive human health outcomes, taking into account interactions within and between all relevant biological, social and environmental systems. Healthy nutrition integrates 'sustainable eating habits', that is the choice of food products that provide, as an adequate, well balanced diet, positive health outcomes and originate from sustainable food and nutrition systems.

Sustainable Food and Nutrition System

A Food and Nutrition System is a set of operations and processes involved in transforming raw materials into foods and transforming nutrients into health outcomes (Figure 1), all of which functions as a system within biophysical and socio-cultural contexts (Figure 2).³ A Sustainable Food and Nutrition System produces positive health outcomes in an economically attractive, environmentally friendly and socially acceptable manner.

² <http://www.bafu.admin.ch/biodiversitaet/10372/10395/index.html>

³ Jefferey Sobal, Laura Kettel Khan and Carole Bisogni 1998. A Conceptual Model of the Food and Nutrition System. Soc. Sci. Med. Vol. 47, No. 7, pp. 853-863

Sustainable Development

The understanding of sustainability of NRP 69 is informed by the Federal Council's "Strategy for sustainable development" which, in tune with the accepted UN definition, states that sustainability is achieved if the needs of the present generation are met without negatively influencing the possibilities of future generations wishing to meet their needs. Sustainability is understood to be an overarching idea and not a sectorial concern. Looking to the future, it is to inform all fields of politics including food and nutrition.

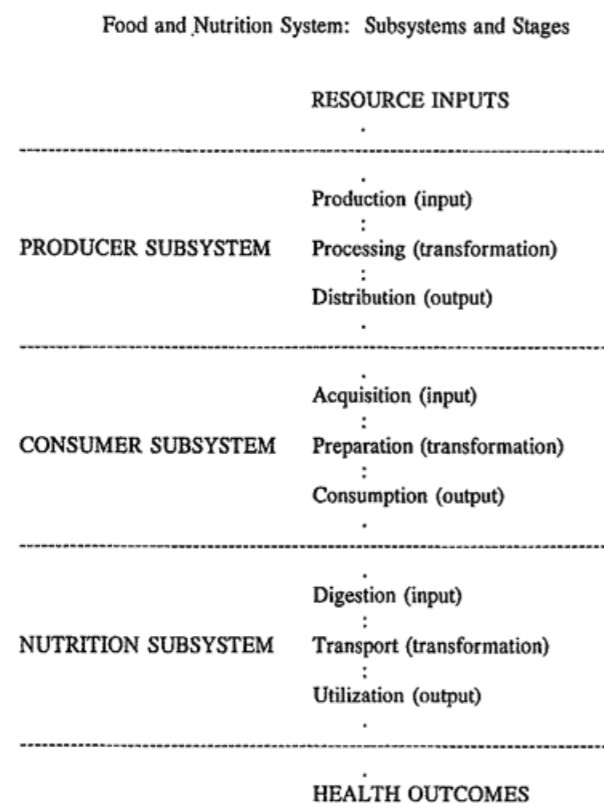


Fig. 1: The integrated model of the food and nutrition system uses a systems perspective to present relationships between agriculture, food, eating and health. The core of the model emphasises a linear flow, into the subsequent one. The linear flow components of the system include three subsystems: producers, consumers and nutrition.

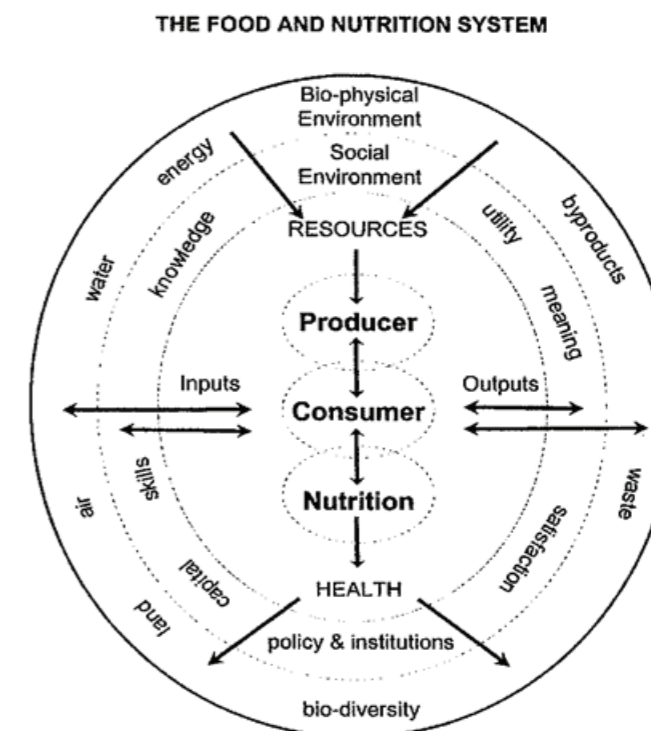


Fig. 2: The food and nutrition system operates within a context consisting of other systems that can be differentiated into biophysical and social environments. Feedback loops and webs of relationships operate within the system and between the food and nutrition system and the systems that make up its environment.

Further helpful definitions can be found in the appendix.

1.3 Mandate

On 30 March 2011, the Swiss Federal Council mandated the Swiss National Science Foundation (SNSF) to launch NRP 69. The National Research Council of the SNSF elected an ad hoc expert. This expert, in collaboration with the Research Council and the secretariat of the SNSF, organized a hearing comprising specialists from Switzerland and abroad representing disciplines judged to be of relevance to the thematic scope of the programme. This international panel critically challenged the programme outline for NRP 69. Based on the outcome of the hearing the form and the content of the programme were refined and refocused as described in the implementation plan of the NRP. A steering committee to take over the strategic management of the NRP will be established after the completion and approval of the implementation plan.

The NRP 69 will operate with an overall funding of CHF 13 million for a duration of 5 years. Additionally, a maximum of CHF 4 million to be shared between NRP 69 and NRP 68 "Sustainable Use of Soil Resources" will be available for projects participating in the European Joint Programming Initiatives (JPI) such as "A Healthy Diet for a Healthy Life" (JPI-HDHL).

The Implementation Plan was approved by the Head of the Federal Department of Home Affairs on 9 March 2012.

1.4 The research field on the national and international levels

National: With the launch of the technology platform "Food for Life Switzerland", a "Strategic Research Agenda" (defining the main issues and questions) was developed for the food industry for 2009-2020. With the help of five lines of action, the agenda shows how the sector can grow sustainably thanks to competitiveness and consumer trust. Swiss Food Research (a CTI-supported R&D consortium), which launched the platform, is an active intermediary between researchers, sponsors and businesses. It also aims to support applied research funded by CTI and co-financed by companies, which requires the appropriate scientific groundwork. The Agroscope research programmes NutriScope and ProfiCrops help link national research institutions. These programmes aim to optimise the parameters crucial for the quality, safety and healthfulness of food products. They search for solutions as to how the Swiss agricultural and nutrition sectors can stand their ground in a liberalised market and how trust in domestic products can be increased. Within the framework of its research focus "World Food Systems", the Swiss Federal Institute of Technology (ETH) examines the global dimension of the themes presented in this proposal. In addition, the ETH and the University of Zurich are currently working to set up the Zurich Obesity Research Centre (ZORC).

The National Programme on Diet and Physical Activity 2008-2012 (NPDPA) was adopted by the Federal Council in 2008. It is designed to provide a health promoting environment/structure and to encourage people to adopt healthy behaviour in the areas of diet and physical activity to prevent non-communicable diseases more efficiently. It will thereby lead to a more effective counteraction of, among others, overweight, obesity and eating disorders among the population in general, and especially among children and young people. Among the 5 goals of the programme the promotion of balanced diets and the setup of integrated approaches to promote healthy body weight are the key goals in relation to the NRP69. In order to be able to further develop existing methods, support innovative approaches and develop new methods, the programme relies on national and international research findings.

An expert group under the guidance of The Federal Office for Agriculture and the Agricultural Research Council is currently finalizing an integrated national concept for R&D in the agro-alimentary sector (Forschungskonzept Agrar- und Ernährungswirtschaft 2013-2016). In this very useful document, research and development activities/strategies, complementarities and potential new synergies, institutional tasks etc. will be carefully analysed.

In addition, the research plan Health (Forschungskonzept Gesundheit 2013-2016) of the Federal Office of Public Health and the research concept "Environment" (Forschungskonzept Umwelt 2013-2016) of the Federal Office of the Environment will describe the key research topics in this area for the coming years. Both documents will soon be published and serve as an important base in the field of NRP69.

International: After studying 'low input' farming systems (QLIF) several projects dealing with sustainability, nutrition and eating habits are currently in progress within the framework of the EU's Seventh Framework Programme. The first group ranges from projects on measures for encouraging sustainable consumption (POPP) or ensuring biodiversity (SCALES), the connections between globalisation (GLOBIS) or economics (IN-STREAM) and sustainability, engaging the civilian population in the discussion on sustainability (CSS and CSOCONTRIBUTION2SCP) to projects on nutritional models (DREAM). The EATWELL project investigates promoting healthy eating habits. Declaration and its effect on consumer behaviour are being explored in the FLABEL project. Several projects are dedicated to encouraging health-conscious behaviour (TEMPEST, ENERGY and PAPA). FAHRE maps the European food and health research landscape

and aims to investigate on how to improve its coordination in Europe⁴. Also worthy of notice is the programme Foresight UK⁵ as well as on the UNEP report Green economy⁶.

A large number of medical projects are researching the development of obesity. In the field of nutrition, current COST Actions include Feed for Health (FA 0802), Molecular Farming: Plants as a Production Platform for High Value Proteins (FA 0804) and Bio-active Food Components, Mitochondrial Function and Health (FA 0602). In the project "Towards a Greener Retail Sector", methods for recording data on sustainable developments in the retail sector are being developed.

On a global level, a ten-year framework programme (The Marrakech Process) was set up on the occasion of the World Summit on Sustainable Development in Johannesburg in 2002. Its goal is to support environmentally friendly and socially responsible models of production and consumption.

The European Topic Centre on Sustainable Production and Consumption is developing reliable and comparable data and information on resource and waste management.

The large number of projects emphasises the importance of the topics of sustainability and nutrition on both the national and international level. The European Joint Programming Initiative "A Healthy Diet for a Healthy Life" (JPI HDHL) aims to provide a holistic approach to develop and implement a research programme to understand the interplay of factors known to directly affect diet related diseases, discover new relevant factors, mechanisms and strategies, as well as to contribute to the development of actions, concepts, policies, innovative products and diets, with the aim of drastically reducing the burden of diet-related diseases. However, none of the projects focuses on a comprehensive view of food and nutrition systems, which is the goal of this NRP.

NRP 69 is the first Swiss NRP on Human Nutrition. Benchmarks for research in this field are set by the international food research network e.g. in Holland, Finland, US and New Zealand. This NRP is a chance to keep up with these networks and advance national research questions, while topics requiring multicenter-studies (e.g. in field of diet-related diseases) and which Switzerland cannot answer in a solo effort, can be tackled in collaboration with them.

2. Goals of the research programme

This NRP aims to generate useful and urgently needed contributions (strategies, tools, methods, processes, products) in order to support the development of sustainable eating habits and food and nutrition systems in Switzerland. The evidence based findings of this NRP will contribute to current and upcoming reform processes in the Swiss agricultural and nutrition sectors, particularly in the context of a multifunctional and competitive agricultural industry, and in leading to a more effective counteraction of diet related illnesses like diabetes and coronary heart disease. This necessitates a systematic analysis of challenges and courses of action along with a stronger inter- and transdisciplinary approach and more research collaboration within this sector than has been the case until now. By connecting different disciplines ranging from the natural and life sciences to nutrition, epidemiology, medicine, engineering sciences, social

⁴ <http://www2.spi.pt/fahre/library.asp>

⁵ <http://www.bis.gov.uk/foresight/our-work/projects/published-projects/global-food-and-farming-futures>

⁶ http://www.unep.org/GreenEconomy/Portals/93/documents/Full_GER_screen.pdf

sciences and humanities, and by including stakeholders from economics, government, politics and society, the systems can be grasped and researched as a whole. In order to reach the objectives of this NRP, holistic, inter- and transdisciplinary approaches will be required.

With consideration of domestic and international research results as well as specific local requirements, previous research endeavours will be further developed in the following directions:

Healthy nutrition and sustainable eating habits: Based on a systematic analysis of the current state of knowledge including different disciplines (nutrition, economy, behavioural sciences), the NRP will contribute to the assessment and development of scenarios, concepts and courses of action aimed at supporting sustainable consumption and eating habits in Switzerland. The NRP will provide new insight into eating habits and the key factors that influence them. Furthermore, it will provide information about how consumers' eating habits in terms of choosing healthy food should look and how their current behaviour and the environment can be influenced in a positive way. Factors such as sustainably produced food products, health promoting structures, pricing and marketing strategies as well as the communication and implementation of nutritional awareness, in addition to the effects of social change and resource scarcity, will be examined. A special emphasis shall be put on nutrition policy instruments, such as information to the general public and measures that result in a market intervention.

Sustainability: In Switzerland there are several approaches to judging sustainability. The Federal Council's Strategy for Sustainable Development presents a system of indicators to be used by federal, cantonal and communal authorities as well as specific assessment schemes for projects (sustainability assessment). Methods to assess sustainability in agriculture are generally limited to individual farms (e.g. RISE: Response inducing sustainability evaluation) or focus on the ecobalance of individual products (e.g. SALCA: Swiss agricultural life cycle assessment).

The practical application of these methods has shown which scientific and methodological challenges must be overcome if sustainability as a whole is to be grasped and assessed multi-dimensionally. Furthermore, sustainability management along entire value-added chains is an important topic that is relevant for the future but for which few methods are available today. By overcoming these challenges, Swiss research can occupy a global leading position in sustainability analysis in the agricultural and nutrition sectors. This NRP will contribute to enhancing existing assessment tools and lead to an overall evaluation of sustainability. In addition, the data foundation will be expanded and the requirements for future food and nutrition systems as well as necessary indicators and standards will be defined. The objectivity, value and transparency of the methods will thereby be enhanced.

Optimised systems: Based on an assessment of the efficiency of resource management in the production, processing and allocation of important food products, this NRP will contribute to identifying critical processes and process steps regarding sustainability and health outcome. It will provide alternatives for more efficient resource management, for example, reduce damaging effects on the environment along the entire value-added chain. Thus, in the process, not only the ecological dimension, but also the economic, social and health dimensions of sustainability will be taken into account.

Synthesis: This NRP will present practical information concerning how and to what extent the general economic or legal framework would have to be adjusted in order to promote sustainable and health promoting food and nutrition systems in Switzerland more quickly, effectively and efficiently. The NRP will further provide insight on efficient information and communication with regard to healthy nutrition, strengthen Swiss

research, and contribute to maintaining and increasing competitiveness in the agricultural and nutrition sectors.

Besides dedicated research following the defined focus points, an important task in the projects and in the synthesis module of this NRP is the critical scientific evaluation of national and international knowledge (state-of-the-art) with respect to nutritional behaviour, nutritional environment (circumstances) and sustainability principle in the agricultural and nutrition sectors.

Representative national data sets on nutritional status and behaviour and according to internationally accepted standards are to a large extent still lacking (see 5th Swiss Nutrition Report, SEB). However, since time and money available for this NRP are limited and since it is the task of specific Federal Offices, the exclusive collection of national statistical data will not be supported by the NRP. Restricted enlargement of the data sets can only be funded in the context of research projects addressing well defined specific questions.

3. Main research topics

The Programme will be structured in four modules, including a synthesis module. The research modules 1,2 and 3 in the programme should be operated in a synergistic way and profit from inter- and transdisciplinary interactions. The cooperation with, and the active participation in the Synthesis Activities should retain its importance (Module 4).

Module 1: Examining and influencing consumer behaviors and nutrition patterns in Switzerland

Starting with a critical analysis of previous research findings on the links between nutrition and health, the module will evaluate the suitability of potential courses of action for encouraging and supporting sustainable eating habits and health promoting structural measures.

The impact of social settings and incentives on eating habits

- _ Modelling of decision-making behaviour in food choices.
- _ Identification of how the social setting influences eating habits and food consumption and which factors lead to a change; further identification of the individual and social conditions that lead to unhealthy eating habits (also in combination with other important life-style factors such as exercise, smoking, alcohol consumption).
- _ Identification of the influence of consumer information, e.g. transparent nutritional labelling, advertising/marketing, and health claims, on consumer behaviour and eating habits.
- _ Investigation and /or modeling of the effect of structural measures, e.g. free salad bar with meals in restaurants, reduced price for healthy dishes, reduced salt content in foods, etc., on eating habits, food consumption, nutrient intake and health.

The impact of environment/structure on eating habits and nutrition

- _ Identification of the influence of other structural measures, e.g. changes in the food composition, availability of healthy/unhealthy food, taxing systems, etc., on consumer behaviour and eating habits.

- _ Development of tailored structural measures and incentives that successfully influence eating habits and food consumption. Key among issues that need to be taken into consideration are overnutrition, undernutrition and malnutrition are key problems to consider.

The effect of consumer knowledge and understanding regarding balanced diet, nutritional quality, production methods, processing methods and origin on food products

- _ Determining the level of understanding in consumers with regard to healthy eating and developing new approaches and tools to improve this understanding and support consumers in eating a healthy and balanced diet.
- _ Identifying of the connections between eating habits on the one hand and claims of product quality (including the sensory quality) and sustainable product production on the other hand.
- _ Identifying consumers who know the consequences of their bad eating habits but nonetheless persist in their behaviour. Are there rules, mechanisms or factors that would explain this persistence over time?

Fundamentals, methodologies and tools for measuring and improving food choices and diet patterns

- _ Development of new, innovative and cost-effective methods to assess eating habits and food consumption in the general population and in specific sub-groups (infants, children, very old age, etc.)
- _ Development of new methods and tools helping consumers – general population and specific groups - to monitor food intake and to maintain or reduce body weight.
- _ Development of methods for practical and tailored transfer of nutritional knowledge to the general population and specific groups.
- _ Investigation of the Swiss population's acceptance of using political measures to support sustainable eating habits.

Healthy nutrition and future developments

- _ Estimation of the effects of social change and resource scarcity on food choices and consumers' eating habits. For the future, the healthy choice shall be the easy choice.

Module 2: Evaluating the sustainability of food and nutrition systems

In this module, existing methods for assessing sustainability will be further developed and the requirements for future nutritional systems as well as the necessary indicators and standards will be defined.

Definition of objectives

- _ Definition of the desirable characteristics of sustainable food and nutrition systems as well as the required effect on the environment and society and the efficiency of resource management.
- _ Development of indicators and standards for an objective and integrated assessment of the resource efficiency and social responsibility of manufacturing processes and feeding habits along the entire production and consumption chain.

Development of methods to determine sustainability

- _ Further development of existing methods for assessing the significance of public goods and sustainability of manufacturing processes in the agricultural and nutrition sectors: integration of typically agricultural aspects like land use, biodiversity, biosafety, animal welfare, expansion of system boundaries.
- _ Development of the methodology for a holistic assessment of sustainability, building on existing methods for ecological (LCA), economic, social and health aspects as well as their weighting. Not the methodology (as an academic tool) itself is the deliverable but its practical application to realistic food and nutrition systems! The methodology must be as complex as necessary and as simple as possible.

Completion of the data foundation for sustainability assessment

- _ Definition and acquisition of the (missing) central data / parameters for a reliable evaluation of the sustainability of food and food systems.
- _ Close the knowledge gaps on imported products and on variability and regional differences.

Assessment of the sustainability of current food and nutrition systems and their communication

- _ Evaluation of the sustainability of current food and nutrition systems and food products and identification of strategies for an optimised structuring of value-added chains in Switzerland, taking future requirements into account.
- _ Strategies for communicating the findings of sustainability analyses to the target groups of consumers, farmers, industry and administration and for transforming information into concrete, practical recommendations for the retail market and for the optimisation of product information.

Module 3: Optimisation of food and nutrition systems

This module will identify alternatives for more efficient resource management and a reduction of negative effects on the environment, society and health. The vision is to make Switzerland a leading country for the development and production of high value-added and healthy food products as well as for food related services and technologies → Tasty, Healthy and Sustainable. Encourage innovative solutions for future application and secure the related intellectual property rights.

Increasing resource efficiency and avoiding negative effects on the environment along the value-added chain, including the recycling of by-products and waste

- _ Optimisation of manufacturing processes and cost-saving potential by way of innovative technologies in raw materials, energy, water, emissions.
- _ Optimization of harvesting and post-harvesting technologies, food processing technologies and packaging as important aspects for sustainability and consumer perception.
- _ Valorisation of the by-products and wastes of the agriculture and food industries.
- _ Prevention of food losses along the entire value-added chain from the producers up to the consumers.

Innovative products on the cutting edge of knowledge on healthy nutrition and sustainable production that increase the competitiveness of the agricultural and nutrition sectors and improve the health outcomes of the food and nutrition system

- _ Description of new integrated approaches for the sustainable production of raw materials for food processing, distribution and sales.
- _ Development of food products and structures for healthy and sustainable nutrition – e.g. at home, at the work place, on the road and in the communal catering and gastronomy business - especially in the context of obesity and metabolic disorders.
- _ Run carefully selected epidemiological studies, as well as physiological, metabolic, and clinical measurements including omics technologies to test the long term effects on health of new products and diets.

Optimize food based recommendations (in coordination with Module 4)

- _ Adapt and optimize nutrient-based diet recommendations and in turn develop environmentally acceptable, consumer-friendly food-based diet recommendations for the general population and specific sub-groups, e.g. children, immigrants, etc. Current knowledge of the targeted group (health and environment literacy) must be taken into account.

Investigation of goal conflicts

- _ The effects of resource-optimised processes on the sensory, hygienic and nutritional quality as well as on the price and competitiveness of food products.

Module 4: Synthesis

This module emphasises a holistic, interdisciplinary and transdisciplinary approach.

Due to the complexity of the thematic a draft synthesis shall be elaborated by the steering committee after the launch of the NRP. This draft should draw on current knowledge in order to demonstrate relevant research gaps. Also, it shall help identify research topics to be tackled more efficiently in collaboration with the JPI HDHL (see 1.4).

The chosen approaches for the final synthesis must take the entire value-added chain and its social significance into account and contain the elements of research, development and implementation in practice.

There will be no call for Module 4 at the launch of the NRP. The participants in the Synthesis Module will be selected by the Steering Committee of the NRP 69, based on the expertise of the project teams in Modules 1, 2 and 3.

Among others, the final synthesis shall include:

- (1) Nutrition, health and public policy: analysis of the current situation (including obesity, why obesity), goals (political and cultural goals), measures (like nutrition policy instruments);
- (2) Sustainable food and nutrition system.

Some aspects of the synthesis are described below:

Models and scenarios for evaluating sustainable and healthy nutrition

- _ Establish a multi-dimensional SWOT analysis (public health, society and consumer, national economy, environment (biodiversity, biosafety), agriculture, industry) as a decision making tool for the modules 2 and 3.
- _ Development of models to simulate and evaluate how the behaviour of the different stakeholders influence the processes along the whole value-added chain. These models and their evaluation should encourage the development of alternative behaviours.
- _ Modelling the product flow, value-added and externalities in the agricultural and nutrition sectors as a basis for simulating alternative scenarios consistently.

Assessment of goal conflicts and recommendations for solutions

- _ Identification, quantification and consideration of goal conflicts between sustainable food production, nutrition, economic efficiency and competitiveness of the Swiss agriculture and nutrition sectors and presentation of alternatives for avoiding or resolving goal conflicts.

Suggestion of courses of action to support sustainable, healthy nutrition

- _ Development of recommendations on how the sustainability of the entire food and nutrition system can be optimised with a view to increasing marketing opportunities for Swiss products, improving health outcomes And the burden on the environment.
- _ Development of new political and economic strategies, concepts and measures to support sustainable eating habits more efficiently and effectively. The (evidence-based) interrelation between nutrition, health and the environment must by a key decision factor.

4. Practical significance and target audience

This NRP is consistent with the guidelines of the Federal Council (Report in response to the Stadler Postulate) and contributes to optimising and increasing the efficiency of resource and raw material management. Moreover, it addresses reducing the use of certain limited resources and developing alternative technologies. The proposed research topics are highly socially and economically relevant and highly practical because the NRP aims to supply a base of knowledge that can be easily implemented to support the development of healthier nutrition, including healthier eating habits, and lead to improved health outcomes of the food and nutrition systems in Switzerland.

The NRP provides methods that can be used to clearly evaluate the sustainability of food and nutrition systems. With the help of these results, the need for action can be determined and it can be shown how food and nutrition systems can be optimised during the value-added process in order to increase human health and to preserve the environment and conserve resources, cultivate biodiversity and minimise negative effects on society. Building on this knowledge, the NRP creates incentives and the necessary conditions for the development of innovative processes for producing raw materials for food and processing them into high quality, safe food products that fulfil clearly-defined sustainability standards and diet recommendations. In addition, these processes aim to increase the competitiveness of the Swiss agricultural and nutrition sectors in an increasingly competitive field and to encourage consumer trust.

This NRP provides guidance for making decisions about which incentives can help turn the behaviour of the public in the direction of more sustainable, healthier nutrition.

The NRP provides scenarios with clear alternatives for decision-making and action for quantitatively estimating the probable consequences of all criteria declared or agreed upon as relevant. The NRP provides clear and consistent documentation of this aspect.

The NRP provides information on trade-offs (mediations, conflict of goals, considerations of cost and usefulness) between target achievement and competing goals. It also establishes the basis for balancing interests in case of a conflict of objectives.

Besides the general public, who are generally interested in high quality and safe food and sensitised to questions of sustainability in food production, other target audiences have an interest in this NRP's topic:

- _ Decision makers at the highest levels (federal and cantonal parliaments, governments and administrations) are, for various reasons, concerned with issues around nutrition and sustainable food production.
- _ Besides public authorities, the farming and farming consulting fields, the retail market, the nutritional consulting and preventative medicine fields, consumer organisations and other actors have an interest in well-founded foundations for decision making.
- _ In addition, industries have an interest in proving and improving sustainability precisely in agriculture-based value-added chains due to the lack of knowledge and practical methods in these areas.

The healthy nutrition related parts of the NRP "Healthy Nutrition and Sustainable Food Production" (NRP 69) are in part based on the situation analysis given in the "5th Swiss Nutrition Report 2005" (Fünfter Schweizerischer Ernährungsbericht 2005, edited by the Swiss Federal Office for Public Health, ISBN 3-905235-48-X) which was compiled by representatives of the relevant stakeholder groups (nutrition-related industries, consumers, federal offices, research institutes and hospitals). The report describes the nutritional situation in Switzerland and the related health aspects with a special focus on children and adolescents. The "6th Swiss Nutrition Report" will be published in Fall 2012. This update will focus on the four topics: nutritional recommendations; nutritional situation in Switzerland; interconnections between nutrition and health; measures and translational efforts. It will also serve as a decision making tool in NRP69. Further, the research plan Health (Forschungskonzept Gesundheit 2013–2016) of the Federal Office of Public Health describes research priorities in this area for the coming years.

Knowledge and technology transfer (KTT) is a particular concern of the NRP 69. It will be achieved by an early involvement of stakeholder associations (agriculture, food industry, trade, consumers) and targeted collaboration with the Innovation Promotion Agency CTI. This ensures that viewpoints of the industry are considered in the relevant aspects of a research project and that R&D results can be implemented in the practical sphere in an appropriately staggered way (push-pull approach).

5. Programme schedule

NRP 69 will be carried out as a cooperation programme between the Swiss National Science Foundation and the Innovation Promotion Agency CTI. During the two stages of NRP 69, the research projects will be funded by the SNSF. The first stage, lasting three years, will offer the possibility of "high-risk-high-reward projects". At the second stage, to last no longer than two years, SNSF will fund with priority projects with a high potential for practical application (new products and processes, services, tools, etc.) developed within the modules and projects having a good chance to continue as a CTI project.

After the conclusion of NRP 69, the application-oriented projects with a high implementation potential may apply for CTI funding. The transfer of a NRP 69 project to a CTI project can take place at any stage of NRP 69, provided that the time is right for the project in question. See also "project promotion" under www.kti.admin.ch.

Switzerland is a member of the Management Board of the Joint Programming Initiative "A Healthy Diet for a Healthy Life" (JPI HDHL). The main objectives and core research topics are to a significant extent complementary to those of this NRP (see 1.4).

According to expert opinions, solving of some of Switzerland's problem can only be accomplished in cooperation with endeavours to solve similar problems in other countries, both in Western and Central Europe, and in more remote countries..

NRP 69 researchers may answer calls from the JPI HDHL (or other JPIs), provided that the thematic of the JPI call fits with the overall goals of NRP 69. Specific funding – a maximum of CHF 4 million to be shared between NRP 69 and NRP 68 "Sustainable Use of Soil Resources" - is available to support projects with Swiss partners within the European initiatives. Successful participants will adhere to the general rules and guidelines of NRPs and of NRP 69 in particular. Participation to the JPI HDHL and other JPI calls and initiatives will be decided by the Research Council of Division IV of the SNSF, on the recommendation of the steering group of the programme.

NRP 69 will be implemented in two phases. After the initial 36 months, project funding may be continued for a maximum of 24 months. This second phase will include continuation of research activities focusing on specific topics of the NRP. In addition, during this second phase NRP 69 research groups may participate to research initiatives and calls within the JPI HDHL (or other JPIs). Since the timing between the JPIs and NRP 69 is not synchronized, participation to JPI calls may also take place during the first phase of NRP 69.

Information on JPI HDHL and on future calls for proposals is available on the website of NRP 69: www.nrp69.ch

6. Submission procedure and project selection

The Implementation Plan as well as forms, rules of procedure and instructions for the submission on the *mySNF* portal can be found on the following website: www.snf.ch.

In order to organise the programme effectively and to define appropriate priorities, a two-stage submission procedure has been set up: pre-proposals are to be submitted first, followed by full proposals. Both the pre- and the full proposals must be written in English for screening and evaluation by a group of recognised international experts.

Pre- and full proposals have to be submitted online on the *mySNF* portal. For the use of *mySNF* prior user-registration on the homepage of www.mysnf.ch is required. Previously opened user-accounts are still valid and provide unlimited access to all the funding instruments of the SNSF. To submit proposals in time, a new user account has to be opened two weeks before the submission date at the latest. The submission of the documents by postal delivery is only accepted in exceptional cases after consultation with the programme coordinator.

The proposed research projects are required to follow SNSF guidelines and must be limited to a period of no more than 36 months.

Collaboration with research groups in other countries is encouraged, provided that the planned cooperation a) brings significant added value which could not be achieved without cross-border cooperation or b) substantially enriches Swiss research in respect to content or methodology. Decisions on possible (co-)financing of research projects abroad will be made on a case-by-case basis. In the framework of NRP 69, the Austrian Science Fund (FWF) agreed to participate in the "lead agency process". The German Research Foundation (DFG) has decided not to participate in NRP 69. Joint projects may be submitted as an application package comprising a number of sub-projects. However, it is imperative that each subproject be evaluable as an individual entity.

6.1 Pre-proposals

Interested researchers will first submit a pre-proposal. Deadline for the submission is 28 June 2012. The pre-proposal should give information on the following issues:

Data to be entered directly on the *mySNF* portal:

- _ Basic data and abstract,
- _ National and international co-operation,
- _ Estimation of financial support required for salaries and running costs (budget).

Documents to be uploaded in a PDF format:

- _ Research Plan
 - Research topic and target of the project,
 - State of research,
 - Approaches and methods,
 - Timeframe and milestones,
 - Expected use and possible application of results; specific risks to be considered,
 - List of five publications considered relevant as stepping stones for the research envisaged,
 - List of your and your team's five most important publications and/or patents
- _ Short Curriculum Vitae of a maximum of two A4 pages per applicant

The Research Plan must be submitted using the template document provided in the *mySNF* portal. The project description must be in English and the final PDF file should not exceed six A4 pages.

The pre-proposals will be subjected to international scientific peer review. An international review panel will select which pre-proposals should be recommended for approval or rejection by the National Research Council (Division IV; Presiding Board).

6.2 Full proposals

In the second stage of the submission procedure the authors of the selected pre-proposals will be invited to submit detailed full proposals online on the portal *mySNF* (see above) corresponding to standard SNSF rules and guidelines.

All full proposals will be subjected to international peer review and the principal investigators will be invited to present their projects to the Steering Committee. This procedure allows the Steering Committee to query specific points and ask detailed questions. Following the presentations, the Steering Committee will reconvene to select the projects to be recommended for approval or rejection by the National Research Council (Division IV; Presiding Board).

6.3 Selection criteria

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

- _ **Scientific quality and originality:** pre- and full proposals should fulfil international state-of-the-art criteria with respect to scientific quality and originality as well as methodological standards. Furthermore they have to contain innovative components and to be clearly different from running projects.
- _ **Feasibility and compliance with the goals of the NRP 69:** proposals should reflect the programme's scientific objectives and comply with its overall framework.
- _ **Inter- and transdisciplinarity:** Inter- and transdisciplinary projects are strongly encouraged by NRP 69 and will be evaluated accordingly. Disciplinary projects are not excluded if they comply with the programme's goals.
- _ **Application and implementation:** potential for practical application and implementation of results are key elements of National Research Programmes. Projects of high practical relevance are therefore given high priority.
- _ **Personnel and infrastructure:** Projects have to be carried out in a setting that provides adequate infrastructure and personnel.

6.4 Schedule and budget

The following schedule has been set for NRP 69:

Call for pre-proposals	17 April 2012
Submission for pre-proposals	28 June 2012
Invitation to submit full proposals	1 November 2012
Submission of full proposals	4 February 2013
Final decision on full proposals	18 June 2013
Start of research	1 July 2013

NRP 69 will operate with an overall funding of CHF 13 million. The provisional allocation of this funding to different types of activities is as follows.

Module 1: Examining eating habits	ca. 4.0 Mio CHF
Module 2: Evaluating the sustainability of nutritional systems	ca. 2.0 Mio CHF
Module 3: Optimisation of nutritional systems	ca. 4.0 Mio CHF
Module 4: Synthesis	ca. 1.5 Mio CHF
Implementation and administration	ca. 1.5 Mio CHF

6.5 Contact information

Administrative information on form and content of grant proposals

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Financial aspects

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Technical help with *mySNF* and electronic submissions

Hotline:

Tel. + 41 31 308 22 99 (Français)

Tel. + 41 31 308 22 00 (Deutsch)

Tel. + 41 31 308 22 88 (English)

E-mail: mysnf.support@snf.ch

mySNF Homepage: www.mysnf.ch

7. Organisation

Panel/ Steering Committee of the Programme

President

Prof. Fred Paccaud, Director, Institut universitaire de médecine sociale et préventive, University Hospital of Lausanne/CHUV

Members

N.N.

Delegate of the National Research Council of Division IV

Prof. Stephanie Hellweg, Institute of Environmental Engineering, ETHZ

Programme Coordinator

Marjory Hunt, PhD, SNSF, Berne

Head of Knowledge and Technology Transfer

N.N.

Representatives of the Swiss Federal Administration

Dr. Urs Gantner, Leiter Fachbereich Forschung und Beratung, Bundesamt für Landwirtschaft (BLW), Berne

Dr. Michael Beer, Leiter Abteilung Lebensmittelsicherheit, Bundesamt für Gesundheit (BAG), Berne

For the State Secretariat for Education and Research (SER)

Dr. Claudine Dolt, SER, Berne

Appendix

Further Definitions

Nutrition

According to WHO Nutrition is the intake of food, considered in relation to the body's dietary needs. Good nutrition – an adequate, well balanced diet combined with regular physical activity – is a cornerstone of good health. Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity.⁷

Nutrition Science

The Giessen Declaration defines Nutrition Science as the study of food systems, foods and drinks, and their nutrients and other constituents; and of their interactions within and between all relevant biological, social and environmental systems.⁸

What Is an Evidence-Based Approach?

Simply put, an EBA is the process of systematically reviewing, summarizing, and assessing the quality of the published research in a specific topic area. The entire process is documented, transparent, and reproducible (U.S. Department of Health and Human Services, 2002). Another professional addressing the same research question using the same method should be able to replicate the analysis and arrive at the same answer.⁹

⁷ <http://www.who.int/topics/nutrition/en/>

⁸ <http://www.iuns.org/features/05-09%20NNS%20Declaration.pdf>

⁹ <http://www.cnpp.usda.gov/Publications/NutritionInsights/Insight38.pdf>