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Incorporating NRP 69 recommendations into the policy framework

Final Report

National Research Program NRP 69 “Healthy Nutrition and Sustainable Food Production”

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Content

Abbreviations iii

List of Figures v

List of Tables vi

1 Introduction 1

2 Work Package I – Policy Landscape 3

2.1 Introduction 3
2.2 International Context 6

2.2.1 International Institutions 6
2.2.2 Free Trade Agreements 8
2.2.3 Industry Self-Regulation 8
2.2.4 Overall Assessment of the International Context 9

2.3 Policy Field I – Agriculture 10

2.3.1 Policy Basics 10
2.3.2 Main Policy Actors 11
2.3.3 Policy Instruments 12
2.3.4 Relevant EU Policies and Actors 17
2.3.5 Overall Assessment of Agricultural Policy 18

2.4 Policy Field II – Food Safety 19

2.4.1 Policy Basics 19
2.4.2 Main Policy Actors 20
2.4.3 Policy Instruments 21
2.4.4 Relevant EU Policies and Actors 24
2.4.5 Overall Assessment of Food Safety Policy 26

2.5 Policy Field III – Public Health 27

2.5.1 Policy Basics 27
2.5.2 Main Policy Actors 29
2.5.3 Policy Instruments 30
2.5.4 Relevant EU Policies and Actors 32
2.5.5 Overall Assessment of Public Health Policy 34

2.6 Conclusion 36

3 Work Package II – Policy Coherence 37

3.1 Introduction 37
3.2 Policy Coherence within Policy Fields 38

3.2.1 Agriculture 38
3.2.2 Food Safety 41
3.2.3 Public Health 43

3.3 Policy Coherence between Policy Fields **45**

3.3.1 Agriculture and Food Safety 46
3.3.2 Agriculture and Public Health 48
3.3.3 Food Safety and Public Health 50

3.4 Coherence with EU and International Policies **52**

3.4.1 Switzerland as an Entrepreneur in Multistakeholder Commitments 52
3.4.2 The Challenge of Ensuring the International Competitiveness of the Swiss Food Industry 52
3.4.3 Coherence with EU Policies 52
3.4.4 Overall Assessment of International Coherence 56

3.5 Conclusion **57**

4 Work Package III – Policy Recommendations **58**

4.1 Introduction **58**
4.2 Individual Projects **60**

4.2.1 Policy Field I: Agriculture 60
4.2.2 Policy Field II: Food Safety 72
4.2.3 Policy Field III: Public Health 77
4.2.4 Overarching Projects 90

4.3 Conclusion **96**

5 Summary **98**

References **100**

Impressum **103**

Abbreviations

AgricA	Federal Act on Agriculture (Landwirtschaftsgesetz LwG)
AGRIDEA	Swiss Association for Development of Agriculture and Rural Areas
AGRIFISH	Agriculture and Fisheries Council
AOP/IGP	Appellation d'Origine Protégée/Indication Géographique Protégée
B+g	bildung+gesundheit Netzwerk Schweiz
CAP	Common Agricultural Policy (EU)
CHAFEA	Consumers, Health, Agriculture and Food Executive Agency
COMAGRI	Agriculture and Rural Development standing committee
DEA	Directorate for European Affairs
DG AGRI	Directorate General for Agriculture and Rural Development (European Commission)
DC SANTE	Directorate-General for Health and Food Safety (European Commission)
EFSA	European Food Safety Authority
EFTA	European Free Trade Association
EKIL	Federal Commission for International Food Safety
EP	European Parliament
EPSD	Federal Plant Protection Service
ERFP	European Regional Focal Point for Animal Genetic Resources
EU	European Union
FAO	Food and Agriculture Organization
FC	Federal Constitution
FCA	Federal Customs Administration
FCN	Federal Commission for Nutrition
FiBL	Research Institute of Organic Agriculture
FLEP	European Forum of Food Law Enforcement Practitioners
FOAG	Federal Office for Agriculture
FOEN	Federal Office for the Environment
FOPH	Federal Office of Public Health
FSVO	Federal Food Safety and Veterinary Office
FTA	Free Trade Agreement
GDK	Schweizerische Konferenz der Gesundheitsdirektorinnen und –direktoren
GFCH	Stiftung Gesundheitsförderung Schweiz
GFSI	Global Food Safety Initiative
GlobalGAP	Global Good Agricultural Practices
GMO	Genetically modified organisms
HACCP	Hazard Analysis Critical Control Points
InfoSM	Information system for cases of notifiable diseases

IPNLF	International Pole and Line Foundation
JRC	Joint Research Center
FVC	Joint Veterinary Committee
KAP	Cantonal action programs
LEAP	Livestock Environmental Assessment and Performance
MANCP	Multi-annual national control plan
MOSEB	Monitoring-System Ernährung und Bewegung
NCD	non-communicable disease
NDA	Panel on Nutrition, Dietetics and Allergies
NGO	Non-governmental organization
NPEB	Nationales Programm Ernährung und Bewegung
NRP 69	National Research Programme NRP 69
OECD	Organization for Economic Co-operation and Development
PAFF Committee	Standing Committee on Plants, Animals, Food and Feed
PAN	Pesticide Action Network Dirty Dozen
PIC	Rotterdam Convention
POP	Stockholm Convention
RASFF	Rapid Alert System for Food and Feed
RSPO	Roundtable on Sustainable Palm Oil
RTRS	Roundtable on Responsible Soy
SAI Platform	Sustainable Agriculture Initiative Platform
SAP	Swiss Animal Protection
SCA	Special Committee on Agriculture
SECO	State Secretariat for Economic Affairs
SFS	Sustainable Food Systems
SGE	Society for Nutrition
SNP	Swiss Nutrition Policy 2017-2024
SPS Agreement	Agreement on the Application of Sanitary and Phytosanitary Measures
TRACES	Trade Control and Expert System
TVD	Tracking system for animal movements (Tierverkehrsdatenbank)
UN	United Nations
VBGF	association of cantonal appointees for health promotion
WHO	World Health Organisation
WTO	World Trade Organization
WWF	World Wildlife Fund

List of Figures

Figure 1.1 The food system, its stakeholders, and the policy landscape 1

Figure 2.1 Policy fields of the Swiss food system..... 4

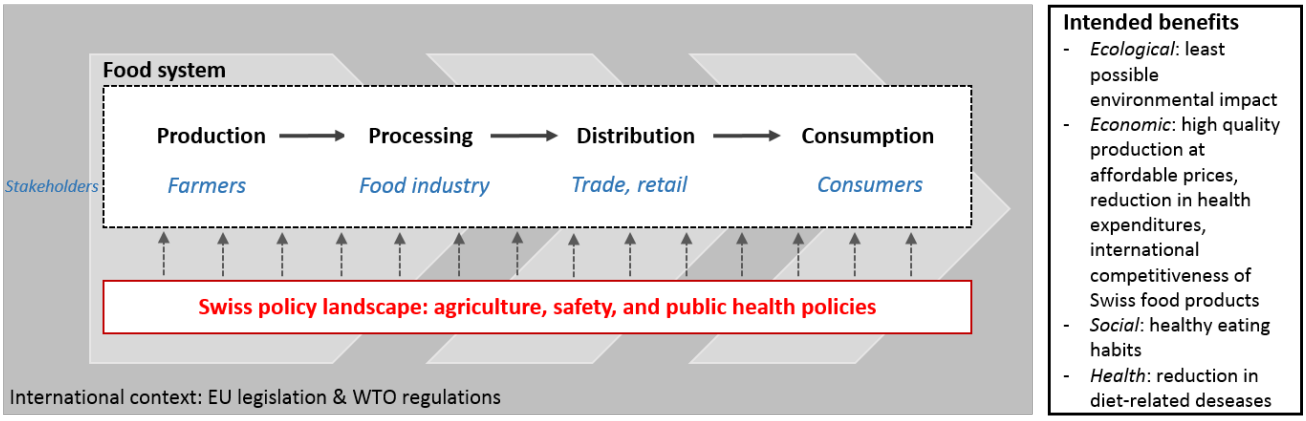
List of Tables

Table 3.1 Swiss policies targeting the food chain in the field of agriculture 38
Table 3.2 Policy instruments targeting the food chain in the field of food safety 41
Table 3.3 Policy instruments targeting the food chain in the field of public health 43
Table 3.4 Screening matrix agriculture and food safety 46
Table 3.5 Screening matrix agriculture and public health 48
Table 3.6 Screening matrix food safety and public health 50
Table 3.7 Relevant EU policies and food-related goal coherence 54
Table 4.1 Suggested policy adaptations for the “Cow emissions” project 61
Table 4.2 Suggested policy adaptations for the “Healthy pigs” project 63
Table 4.3 Suggested policy adaptations for the “Metal exposure” project 65
Table 4.4 Suggested policy adaptations for the “Organic food baskets” project 67
Table 4.5 Suggested policy adaptations for the “Safe cereals” project 69
Table 4.6 Suggested policy adaptations for the “Sustainable milk production” project 71
Table 4.7 Suggested policy adaptations for the “Nano-preservation” project 73
Table 4.8 Suggested policy adaptations for the “Preservative bacteria” project 75
Table 4.9 Suggested policy adaptations for the “Staphylococci” project 76
Table 4.10 Suggested policy adaptations for the “Dietary fiber” project 78
Table 4.11 Suggested policy adaptations for the “Functional food” project 79
Table 4.12 Suggested policy adaptations for the “Foodball” project 80
Table 4.13 Suggested policy adaptations for the “Health motivators” project 81
Table 4.14 Suggested policy adaptations for the “Iron and zinc” project 82
Table 4.15 Suggested policy adaptations for the “Mirdiet” project 83
Table 4.16 Suggested policy adaptations for the “Preventing obesity” project 85
Table 4.17 Suggested policy adaptations for the “Salt consumption” project 87
Table 4.18 Suggested policy adaptations for the “Vitamin D” project 89
Table 4.19 Suggested policy adaptations for the “Food losses” project 92
Table 4.20 Suggested policy adaptations for the “Social inequality” project 94
Table 4.21 Roles of the federal authorities 96

1 Introduction

The National Research Program (NRP) 69 "Healthy Nutrition and Sustainable Food Production" intends to improve the food system and make food production more sustainable as depicted in Figure 1.1 below. To achieve benefits as outlined in the right box of Figure 1.1, the diverse range of research projects conducted under NRP 69 created multi-faceted results and recommendations for the stakeholders involved in the food system, such as farmers, food producers, retail companies or consumers.

Figure 1.1 The food system, its stakeholders, and the policy landscape



Providing stakeholders with recommendations from NRP 69 requires coordination with the *complex policy landscape* in which the food system and its stakeholders are embedded. Policies must be considered in the formulation of viable recommendations as they are *vehicles* to change the behavior of stakeholders in ways that will lead to a more sustainable and beneficial food system. Matching results and recommendations from NRP 69 with relevant policies thus is a precondition for the successful, scientifically-informed adaptation of the food system.

This report incorporates the results and recommendations of NRP 69 into the Swiss food policy landscape. The report consists of three major parts, hereafter referred to as 'Work packages'. *Work package I* systematically maps the Swiss food policy landscape. Food policy is a very complex policy issue that contains a multitude of policies pursuing different goals and involving different actors. Based on the widely used heuristic of the 'food chain', we divide the policy landscape in agriculture, food safety, and public health policies, and additionally consider the international policy context in which the Swiss food system is embedded and needs to be coordinated with.

Work package II of the report builds on the detailed and systematic overview of existing policies along the Swiss food chain provided in Work package I. This part of the report focuses on the coherence between these policies. Agriculture, food safety, and public health policies must cohere in important ways to ensure the operation of a sustainable and beneficial food system. A lack of coherence and integration between policies affecting the food system sends confusing messages to potential stakeholders and can undermine the achievement of policy goals. Moreover, an understanding of coherence within and between policy fields along the Swiss food chain is an important requirement for deriving useful and considered policy suggestions from the research projects conducted under NRP 69. As policy suggestions either entail "new" policies that need to be added to existing ones or revisions of existing policies, each policy suggestion may have implications for coherence.

Work package III analyzes the various research projects of NRP 69 for their policy relevance and distills concrete policy recommendations from the results and suggestions provided by the various project teams. This part of the report assigns the research projects of NRP 69 to the policy fields of agriculture, food safety, and public health, outlines the projects' results and suggestions, identifies the main policy target groups, and, if possible, makes concrete policy recommendations.

The concluding section summarizes the main results and presents a typology of roles that federal authorities may adopt with regard to the various projects in order to promote the valorization of their findings.

2 Work Package I – Policy Landscape

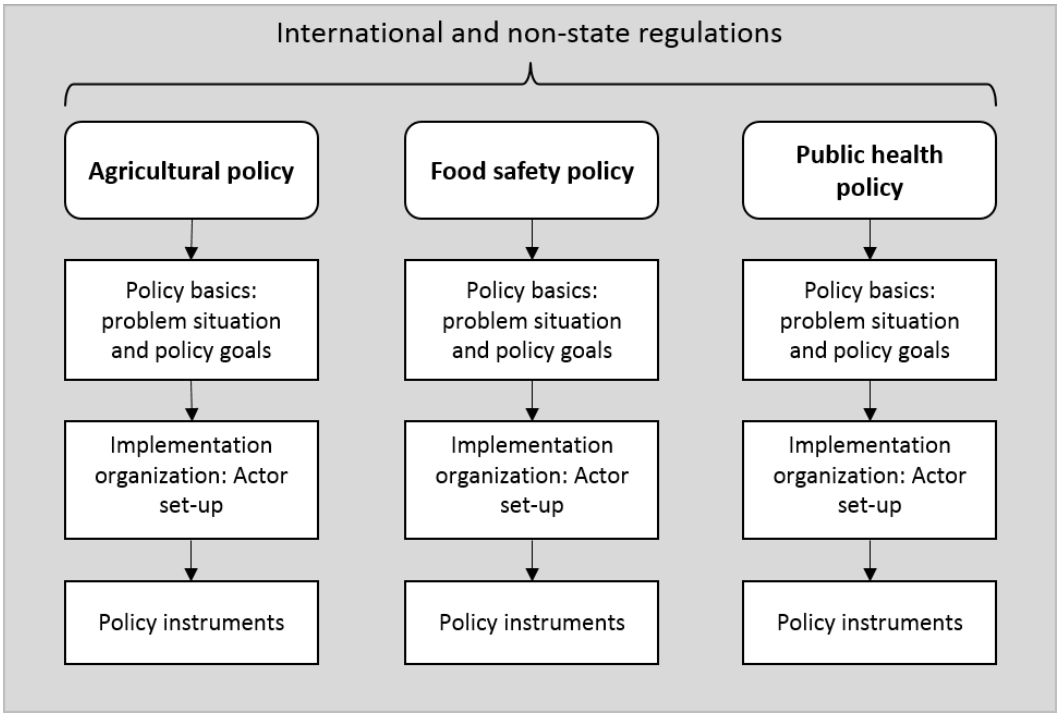
2.1 Introduction

To structure the policies that constitute the Swiss food policy landscape, we draw on the widely used heuristic of the "food chain". This allows us to group policy interventions "between stable and table" into different policy fields. We distinguish between agricultural policy, food safety policy, and public health policy. Agricultural policy captures all policies related to primary production. Food safety extends along the whole food chain, capturing all policies that intend to guarantee food safety, including processing and distribution. Finally, public health policy captures all policies that intend to influence food consumption. In each policy field, we identify existing policies and explain how those policies work. For this purpose, we examine and reconstruct the *functional chains* of relevant policies as pictured in Figure 2.1 (see also Sager & Hinterleitner 2014, Sager, Ingold, and Balthasar 2017).

Our analysis of the Swiss food policy landscape begins with the international context in terms of supranational policies within which Swiss food policy is embedded. This international policy framework is important because – especially in the policy fields of agriculture and food safety – international commitments strongly influence the possibilities and constraints of Swiss food policy while keeping up with the goal of enhancing the competitiveness of Swiss food products. In the public health area, international commitments are comparatively less important, but the international level provides an opportunity for Swiss policymakers to push forward their public health agenda.

We then treat the three Swiss policy fields in turn. For each of them we first look at the *policy basics*, i.e. the policy "on paper", consisting of the causal model at the root of the policy and the aims and goals of the policy (Sager, Mavrot, and Hadorn 2015). We ask: What is the problem the policy wants to address? How does it aim to address this problem? What are the specific goals formulated by the policy? Which are the actors (i.e. the policy targets) the policy primarily addresses?

Figure 2.1 Policy fields of the Swiss food system



In this first step, we also look at the "statutory basis" of the policy field, i.e. all the laws and ordinances in place. The statutory basis allows us to assess whether and how policy actors can intervene to reach a policy's stated goals and therefore gives us valuable information on the type of policy instruments primarily in use.

We then give an overview of the actors involved in the design and implementation of policies in each of the three policy fields (i.e. the implementation organization). We specifically ask: Which actors and institutions are involved in implementation? What are their specific tasks? What does the division and coordination of tasks between the federal and the cantonal/communal level look like? Are there linkages to international and non-state actors? We also assess whether the field is organized in a top-down way in which federal authorities take a leading role or whether the policy field is organized rather bottom-up, with the cantons taking initiative. For each field, we also give an overview of private actors and assess how they are involved in policy design and implementation.

Moreover, in order to gain an overarching understanding of the Swiss policies, we look at the relevant international context shaping the specific policy field. Due to the economic importance of the European Union (EU) as substantiated below, our discussion of the international dimensions of the policy fields of agriculture, food safety, and public health focuses on the policies and actors that prevail within Switzerland's relationship with the EU. We look at the way in which Swiss policy engages with the EU level and at the relevant EU policies and EU actors.

Finally, we systematically assess the policy instruments that are in place in each policy field to change the behavior of policy targets. In doing so, we primarily differentiate between regulations ("sticks"), incentives ("carrots"), and informational instruments ("sermons") (Vedung 2010, Sager 2009). These instrument types distinguish themselves from each other by the constraints they impose on policy targets. Strong constraints stem from regulations such as formulated rules or directives; rather indirect constraints emanate from incentives such as subsidies or taxes; the weakest constraints come from information aiming at influencing policy targets through the transfer of knowledge. This distinction allows us to systematically assess how the policies in place in each of the three policy fields primarily intend to bring policy targets to change their

behavior. Since each of the three policy fields contains a considerable number of instruments, we additionally distinguish between different domains in each of the three policy fields to get a structured idea of the *scope* of intervention.

For the review of the international context and the policy fields of agriculture, food safety and public health, we analyze official documents such as laws, ordinances, directives, policy strategy papers (at the Swiss and EU level) and official websites of the public administration, as well as scientific literature.

2.2 International Context

Switzerland's economic relations surrounding both the import and export of food products entail various international commitments, obligations and initiatives. Three important categories of the international context are a) international institutions, b) free trade agreements (FTAs), and c) industry self-regulation.

2.2.1 International Institutions

2.2.1.1 International Organizations

Switzerland's membership in the United Nations (UN) has led to its collaboration with several relevant UN organizations, most notably the Food and Agriculture Organization (FAO). Within the FAO, Switzerland participates in the International Treaty on Plant Genetic Resources for Food and Agriculture. The goals of this treaty are the conservation and sustainable use of all plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use. Through an easily accessible, freely available global pool of genetic resources, the treaty facilitates access for its members to the genetic materials of 64 crops for research, breeding and training for food and agriculture.[1] Similarly, relevant for Swiss food policy is the European Regional Focal Point for Animal Genetic Resources (ERFP), the regional platform to support the conservation and sustainable use of animal genetic resources and to facilitate the implementation of FAO's Global Plan of Action for Animal Genetic Resources in Europe. Its activities are carried out based upon a Multi-Year Program of Work.[2]

Switzerland is also a member of the Organization for Economic Co-operation and Development (OECD), which works out (non-binding) principles and recommendations such as the OECD-FAO Guidance for Responsible Agricultural Supply Chains,[3] describes and evaluates agricultural developments in its Member countries and other partner countries, and provides advisory services for agricultural reforms.[4] Every year the OECD and FAO jointly publish the 10-year Outlook for the most important regional, national and international agricultural markets.

Moreover, Switzerland is a member of the World Trade Organization (WTO), which forms the legal framework of the multilateral trading system for food and agricultural products around the globe and provides formalized mechanisms for transparency and dispute settlement. A key WTO obligation is the Agreement on Agriculture that serves to reduce trade distortion and discipline its members' measures with regard to three areas: domestic support, market access, and export competition. This agreement has rendered Switzerland's agricultural policies more market-oriented, and product-specific subsidies were transformed into direct payments during the 1990s.[5] Moreover, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) contains regulations governing measures to protect the health of people, animals and plants that can have a direct or indirect impact on international trade. The SPS Agreement does not require governments to take positive steps to ensure food safety, but mainly seeks to create exceptions and facilitate food trade (Thomann, 2018).

2.2.1.2 European Union

Whilst not formally being a member of the EU, Switzerland's trade with the EU is based on a tight network of bilateral agreements. The Free Trade Agreement (FTA) between Switzerland and the EU created a free trade

[1] Source: http://www.fao.org/plant-treaty/en/. Accessed on February 1, 2019.

[2] Source: https://www.rfp-europe.org/about-erfp/?L=5%2525252527A%252525253D0%2525252527. Accessed on February 1, 2019.

[3] Source: https://www.blw.admin.ch/blw/en/home/international/nachhaltigkeit/responsible-agricultural-investments/oecd-fao-guidelines.html. Accessed on February 1, 2019.

[4] Source: https://www.blw.admin.ch/blw/en/home/international/institutionen/oecd.html. Accessed on February 1, 2019.

[5] Source: https://www.blw.admin.ch/blw/en/home/international/institutionen/wto/agarabkommen-und-agrarkomitee.html. Accessed on February 1, 2019.

area for industrial products. Protocol No. 2 of the FTA regulates trade of processed agricultural products. Rather than creating a free trade area, the bilateral Agreement on Agriculture between Switzerland and the EU, which regulates trade of basic agricultural products, improves mutual market access by reducing tariffs and non-tariff barriers to trade for certain product segments.[6] Taken together, these agreements lead to a substantial harmonization of norms between Switzerland and the EU via "dynamic adjustments" (no automatic adoption), both concerning existing EU legislation and the development of new EU law.[7] The most relevant EU legislation is the General Food Law Regulation. This regulation lays the foundation of food and feed law through an overarching and coherent framework for the development of food and feed legislation both at Union and national levels (Sager, Thomann, Zollinger, and Mavrot 2014). It formulates general principles, requirements and procedures that underpin decision making in matters of food and feed safety, covering all stages of food and feed production and distribution. It creates procedures and tools for the management of emergencies and crises to ensure a high level of protection of human life and consumers' interests in relation to food, while ensuring the effective functioning of the internal market.[8] A further and crucial step towards the harmonization of Swiss food law with EU provisions has been the General Food Law Revision in 2017; however, some differences still remain.[9]

Thanks to the current cooperation, the EU is already Switzerland's most important trading partner for food products. In 2016, 74.5% of agrarian imports came from the EU, and 60% of Swiss agrarian exports went to the EU, with Germany, France and Italy being the main partners. Most of the goods that Switzerland exports are luxury foodstuffs, beverages, crops, and milk products. Imports focus on beverages, food products of animal origin, coffee, tea, spices, and fruit.[10] Since 2008, Switzerland negotiates an agreement in the areas of agriculture, food safety, product safety and public health in order to secure closer links with the EU along the food value chain and strengthen the cooperation on food and product safety and on public health.[11] These negotiations are coordinated by the Directorate for European Affairs (DEA) and involve the Federal Office for Agriculture (FOAG), the Federal Food Safety and Veterinary Office (FSVO), the Federal Office of Public Health (FOPH) and State Secretariat for Economic Affairs (SECO).

2.2.1.3 Multistakeholder Partnerships

Switzerland is also involved in a variety of non-binding multistakeholder partnerships surrounding food policy.[12] Examples include the Swiss national FAO committee, the Sustainable Food Systems (SFS) program, the Global Agenda for Sustainable Livestock, the Global Alliance for Climate-smart Agriculture, the Livestock Environmental Assessment and Performance (LEAP), and the Global Soil Partnership. Moreover, while not legally binding, the United Nation's 2030 Agenda for Sustainable Development provides an important framework for orientation for Switzerland. Within this framework, Switzerland has committed to implement a range of Sustainable Development Goals (SDGs), in Cooperation with the cantons, communes and non-governmental stakeholders and subject to a broad-based consultation process.[13] SDGs 2 (zero hunger; reducing food waste) and 12 (responsible production and consumption) are especially relevant for food policy. While sustainability ranks very highly in Swiss agricultural policy also in international comparison, the

[6] Source: https://www.blw.admin.ch/blw/en/home/international/institutionen/europaeische-union-eu.html. Accessed on February 1, 2019.

[7] Source: https://www.eda.admin.ch/dam/dea/en/documents/folien/Folien-Europapolitik_en.pdf. Accessed on February 1, 2019.

[8] Source: https://ec.europa.eu/food/safety/general_food_law_en. Accessed on February 1, 2019.

[9] Source: https://www.leatherheadfood.com/files/2017/01/White-paper-39-Harmonising-Swiss-and-EU-food-law.pdf. Accessed on February 1, 2019.

[10] Source: https://www.agrarbericht.ch/de/markt/marktentwicklungen/aussenhandel. Accessed on February 1, 2019.

[11] Source: https://www.eda.admin.ch/dea/en/home/verhandlungen-offene-themen/verhandlungen/fhal-gesa.html; see also https://www.blw.admin.ch/blw/en/home/international/institutionen/europaeische-union-eu/fhal-gesa.html. Accessed on February 1, 2019.

[12] Source: https://www.blw.admin.ch/blw/en/home/international/institutionen/multistakeholder-partnerschaften.html. Accessed on February 1, 2019.

[13] Source: https://www.eda.admin.ch/agenda2030/en/home/internationale-ebene/internationaler-prozess.html. Accessed on February 1, 2019.

Agrarpolitik AP22+ is designed to address remaining challenges for instance at the intersection with environmental protection and societal aspects with substantial financial support.[14]

2.2.2 Free Trade Agreements

As a member of the European Free Trade Association (EFTA), Switzerland benefits from free trade agreements with 28 countries around the globe, each of which includes only certain categories of food products.[15] Moreover, after the EU and the United States, China is the largest outlet for Swiss industrial products in Asia. In 2014, Switzerland has been the second European country to conclude a free trade agreement with China. This comprehensive agreement liberalizes trade in goods and includes regulations regarding trade in services, investment promotion, protection of intellectual property and commercial matters relevant to environmental and labor standards. According to the FOAG, Chinese imports continue to be subject to the same standards regarding hygiene of foodstuffs and veterinary requirements as local foods and must fulfil the corresponding joint Swiss and EU regulatory requirements.[16]

2.2.3 Industry Self-Regulation

Finally, beyond *public* policies, it is worth noting that in today's globalized trade for food products, transnational retailer and food safety schemes, consumer brands, and other contracting practices coming from the food industry itself exercise a huge influence on the standards employed in the production, transport, processing and marketing of food products. Prominent examples in which Swiss agri-food producers and suppliers are often involved include the principles of Hazard Analysis Critical Control Points (HACCP), Global Good Agricultural Practices (GlobalGAP), or the Global Food Safety Initiative (GFSI). Reputational concerns, consumer and watchdog organizations are amongst the mechanisms holding these private players to account.

Migros, as one of the two biggest supermarket chains in Switzerland, for instance, has joined the global UTZ certification scheme for sustainable farming for some of its products.[17] Migros also cooperates with a host of other global players and schemes on sustainability, food safety, industrial and environmental standards, including the Word Wildlife Fund (WWF), the Max Havelaar label, Amfori (formerly BSCI), GlobalGAP, GFSI, International Pole and Line Foundation (IPNLF) Roundtable on Responsible Soy (RTRS), Roundtable on Sustainable Palm Oil (RSPO), and Sustainable Agriculture Initiative Platform (SAI Platform).[18] Coop, another leading Swiss retailer, equally works on sustainability through partnerships with organizations such as Bio Suisse, the Research Institute of Organic Agriculture (FiBL), Fairtrade Max Havelaar, Swiss Animal Protection (SAP), WWF, the Stockholm Convention (POP), the Rotterdam Convention (PIC), the Pesticide Action Network Dirty Dozen (PAN) and the WHO.[19]

Some of these standards and cooperations with industrial players and non-governmental organizations (NGOs) are, by tendency, of a rather "soft" nature (when it comes to environmental standards, healthy nutrition, and sustainable farming), whereas others, such as the mentioned food safety labels, have become very important quality standards for the industry.

[14] Source: https://www.blw.admin.ch/blw/de/home/politik/agrarpolitik/ap22plus.html. Accessed on February 1, 2019.

[15] Source: https://www.blw.admin.ch/blw/de/home/international/agrarmaerkte-und-agrarhandel/freihandelsabkommen/efta-abkommen.html. Accessed on February 1, 2019.

[16] Source: https://www.blw.admin.ch/blw/en/home/international/agrarmaerkte-und-agrarhandel/freihandelsabkommen/freihandelsabkommen-schweiz-china.html. Accessed on February 1, 2019.

[17] Sources: https://utz.org/who-we-are/about-utz/ and https://www.migros.ch/de/einkaufen/eigenmarken-labels/utz.html. Accessed on February 1, 2019.

[18] Source: https://generation-m.migros.ch/de/nachhaltige-migros/partner-und-mitgliedschaften.html. Accessed on February 1, 2019.

[19] Source: http://www.coop.ch/content/act/en/principles-and-topics/partners-and-stakeholders.html. Accessed on February 1, 2019.

2.2.4 Overall Assessment of the International Context

In summary, Switzerland is embedded in a dense network of international norms and activities surrounding food policy. Some of these commitments are binding under international law (sticks), such as the agreements with the EU that partly even require Switzerland to ensure equivalence with EU law (see below), the WTO rules, and the free trade agreements. Other engagements are more of a voluntary nature (sermons), such as the multistakeholder partnerships and the advisory and evaluative activities of the OECD and FAO. Moreover, by effectively regulating market access, the instances of private or self-regulation discussed above create extremely influential incentives (carrots), such as benchmarks, accreditation and auditing mechanisms, for adopting or dismissing certain practices virtually along the entire food chain. Especially the binding international commitments importantly shape the context of Swiss food policy: consideration of these obligations is vital for ensuring the competitiveness of Swiss food producers on the global market, while maintaining adequate standards (e.g. food safety) of imported goods and protecting the health of consumers. As we discuss in detail below, the functional drivers and goals that prevail in each policy field lead to different levels of Swiss entanglement at the international level.

2.3 Policy Field I – Agriculture

2.3.1 Policy Basics

2.3.1.1 Problem Situation

Agricultural production for modern societies faces a diverse set of challenges. Firstly, to prevent the danger of shortages, agricultural production needs to provide a sufficient *quantity* of food, thereby contributing to food security in Switzerland. Secondly, to supply the population with vital nutrients, it has to guarantee a certain *quality* of food. Lastly, to ensure adequate food provision for future generations, agricultural production needs to be *sustainable*. This means that agricultural producers not only have to tend to the living organisms directly involved in the production process – plants and animals – but also to the soil and the general environment within which production occurs. Striking the right balance between such diverging requirements is highly demanding. Agricultural policy supports producers in this challenge and tries to ensure that none of the requirements are neglected.

2.3.1.2 The Swiss Agricultural Policy

Statutory Basis of Swiss Agricultural Policy

Swiss agricultural policy has its legal roots in the articles 104 and 104a of the Federal Constitution (FC).[20] Derived from the principal guidelines defined there (see below), the Federal Act on Agriculture (AgricA)[21] spells out concrete regulations. A multitude of ordinances complements the Act with definitions of specific terms, threshold values, etc.

Goals of Swiss Agricultural Policy

Historically, Swiss agricultural policy has striven towards the goal of "reliable provision of the population with foodstuffs" (FC, Art. 104). After the two World Wars in the twentieth century, the pre-eminence of food security made it possible for the Confederation to exempt agriculture from market competition and to support the sector, "if necessary in derogation from the principle of economic freedom" (FC, Art. 104). The idea of a multifunctional agriculture that also provides other public goods than foodstuff provision was codified only 50 years later. Succumbing to economic and ecological pressures, the goals to conserve natural resources, to maintain the countryside and to encourage decentralized settlement were added to the Constitution in 1996 (Baumann & Moser, 2012). Since then, the Federal Council has further extended the goals of agricultural policy by the objective of "guaranteeing animal welfare" (AgricA, Art. 2). Moreover, and especially in the course of deepening economic integration with the European single market, the international competitiveness of Swiss food products has become another goal of agricultural policy.

These developments notwithstanding, foodstuff provision has remained the central goal of Swiss agricultural policy, with the other goals often relegated to second priority in concrete legislation projects. The Swiss people seem to agree with this prioritization, as they confirmed in September 2017 that they want an agricultural sector focusing on production by putting the new article 104a ("food security") into the Federal Constitution. Article 104a does not list any new goals for agriculture: Instead, it specifies the Confederation's tasks with regard to foodstuff provision. Experts have interpreted the vote as a symbolic reaffirmation of support for the farmers. Indeed, it was the Swiss Farmers' Union that had put the vote on the agenda by collecting 100 000 signatures for the popular initiative in less than six months – a record in Swiss politics (Hofmann, 2014). The Federal Council has announced that article 104a strengthens the existing agricultural policy and that no legislation amendments will be needed to fulfil the article's purpose (Forster, 2017).

[20] *Federal Constitution of the Swiss Confederation of 18 April 1999,* SR 101.

[21] *Federal Act on Agriculture of 29 April 1998,* SR 910.1.

Article 104a is but one example of the influence of farmers on national politics. They have a vital interest in being present in the decision-making processes since virtually all of agricultural legislation focuses on them as policy targets or as beneficiaries (see below). In the pluralistic system of interest representation, the Swiss Farmers' Union as the umbrella organization of agricultural interests has developed effective strategies to be heard. Furthermore, as the vote on article 104a aptly demonstrates, farmers can usually count on strong support in the general population.

As the tasks of Swiss agriculture are clearly defined in the relevant laws, strong regulatory policy instruments (sticks) operate in this policy area. To further steer agriculture towards the fulfilment of its multifunctional goals, the Confederation applies various measures of financial support (carrots) (see below).

In the next sections, we present the actors involved in the design and in the implementation of the Swiss agricultural policy and give an overview of the instruments they apply to reach the policy's stated goals.

2.3.2 Main Policy Actors

Swiss agricultural policy is organized in a centralized way. The national level designs and implements the majority of policy instruments, with the cantons only playing minor roles in specific areas of implementation. Additionally, private organizations support the Confederation by undertaking various implementation tasks. We will first elaborate on the public actors in agricultural policy before moving on to the private actors.

2.3.2.1 Public Actors

The Federal Office for Agriculture (FOAG) is responsible for overseeing the entire implementation process of Swiss agricultural policy. Agroscope, the Swiss center of excellence for agricultural research, supports the FOAG with research, consultation and control functions. It is a publicly financed institution running seven sites in Switzerland. In several areas, the FOAG collaborates with other federal offices, e.g. the Federal Food Safety and Veterinary Office (FSVO) or the Federal Office for the Environment (FOEN).

The subnational level is also part of the organizational structure. The cantonal offices for agriculture distribute the national budget of direct payments to the farmers, manage structural improvement projects and offer education and consultation services (Widmer, 2013, p. 769). However, contrary to other policy areas, the cantons rarely conceive or re-shape agricultural policies. New impulses typically stem from the federal level, with the cantons adopting the role of implementation agents. To nevertheless have the possibility of lobbying with a united voice at the national level, the cantons are organized in the Conference of Cantonal State Councils for Agriculture.

Apart from Agroscope and the cantonal offices for agriculture, several universities of applied sciences produce knowledge on agriculture and disseminate it amongst farmers and other relevant actors.

2.3.2.2 Private Actors

The Confederation has delegated some federal tasks to private organizations (Widmer, 2013, p. 767). Sectoral organizations play a central role here, uniting producers, processors and traders of different product categories such as milk, meat or grains. They are regulating their respective sectors and may get financial support for self-help measures, as will be detailed below.

Private actors such as AGRIDEA (the Swiss Association for Development of Agriculture and Rural Areas) or the Research Institute of Organic Agriculture also deliver agricultural research and consultation. They assist farmers in a wide range of topics. Furthermore, the abovementioned Swiss Farmers' Union provides several consultation services.

2.3.3 Policy Instruments

To gain an overview of the multitude of instruments operating in the field of agricultural policy, we think of agriculture as a production system primarily supposed to reliably provide the population with foodstuffs and contribute to exports.[22] This allows us to distinguish between four instrument categories. The production system consists of different components such as plants, animals or production means, which need to be combined in specific ways. While some policy instruments set up the system and thus ensure basic production (instrument category 1), others are responsible for the system's maintenance (instrument category 2). Further, some policy instruments do not target the system itself, but the kinds and quality of the products that emanate from it. These instruments also help to promote the products on the domestic and international market (instrument category 3). Lastly, several instruments aim to facilitate and improve the general functioning of the production system (instrument category 4).

In the following, we will first present the policy instruments aimed at ensuring basic production. In a next step, we will examine the "maintenance instruments" that allow agriculture to function sustainably. After introducing the instruments that target specific products and their promotion, we will conclude with the supportive instruments and give an overall assessment of policy instruments in Swiss agriculture.

2.3.3.1 Instruments Ensuring Basic Production

The Confederation applies two major policy instruments to ensure the basic production of Swiss agriculture.

First, tariffs inhibit the import of agricultural products from abroad.[23] All other things being equal, Swiss agricultural products could not compete with foreign products on a free market. Thus, to secure sales on the domestic market and to ensure agricultural production per se, the Federal Council sets annual maximum quotas for agricultural products. Within these quotas, imports may be conducted at low tariffs. When they are exploited, higher tariffs become operative that impede further imports. The tariffs are negative incentivizing instruments aimed at importers (carrots). The FOAG is responsible for administering the quota system. The Federal Customs Administration controls the correct implementation.

Second, the Confederation distributes subsidies – in Switzerland called direct payments – to farmers.[24] As already mentioned above, farmers play a crucial role in most agricultural policies. To make them provide "public and ecological services" (AgricA, Art. 2) and to help them secure their livelihoods, the Confederation applies financial incentives (carrots). One subcategory of the direct payments is specifically designed to kick-start the agricultural production system: The "subsidies for ensuring supplies" reward farmers for using their arable land to produce human nutrition. The Confederation transfers the direct payment amounts to the cantons, which then pass them on to farmers. In order to receive payments, farmers must fulfil several criteria of eligibility. The cantons are responsible for controlling the adherence to these criteria and for overseeing the correct implementation of the policy instruments (Widmer 2013, pp. 770–772).

2.3.3.2 Instruments Ensuring Sustainable Production

The largest share of policy instruments target the maintenance of the agricultural production system. "Maintenance" does not only refer to the fact that the agricultural components require careful handling in their daily use. Maintaining elements such as soil or animals also includes a prospective dimension in that they need to be preserved and cultivated for future generations. Thus, additionally to providing the population with foodstuffs, many of the instruments presented here serve the goal of conserving natural resources. We distinguish between two major instrument types in this subcategory. First, numerous

[22] As our analytical focus lies on the food system, we will only present policy instruments influencing food production. When an instrument simultaneously targets other goals than foodstuff provision, this will be mentioned in the text.

[23] Source: https://www.blw.admin.ch/blw/de/home/markt/einfuhr-von-agrarprodukten.html. Accessed on February 1, 2019.

[24] Source: https://www.blw.admin.ch/blw/de/home/instrumente/direktzahlungen.html. Accessed on February 1, 2019.

instruments target specific components such as plants, animals and production means. Second, several instruments assume a more encompassing stance and aim at sustaining the environment within which the components operate. We will first introduce the policy instruments aimed at the specific components and then move on to the more encompassing instruments. In a last step, we will cast a glance on regulations that have been set up by private actors in this area.

Plants. Plant production is mainly steered by the National Catalogue of Varieties. The Catalogue lists officially approved plant varieties for agricultural use, i.e. grains, vegetables, fruit, vines etc. The propagation of seed material for crops and fodder plants is only allowed when the concerned variety is listed in the Catalogue. This is to ensure the safety and quality of agricultural crops (sticks). New varieties enter the National Catalogue after thorough quality testing (FOAG 2008, p. 22). The entry of vines, fruit trees and bushes into the Catalogue is not mandatory, offers however the advantage of traceability in the case of contaminations or pest infestations (FOAG 2008, p. 22). An additional Register of Protected Varieties incentivizes the breeding of new plant varieties (carrots).[25] If a company's newly developed variety enters the Register, the company is granted ownership rights for up to 30 years. The FOAG maintains both the National Catalogue of Varieties and the Register of Protected Varieties. Agroscope tests new varieties on various criteria such as efficiency and resistance. Farmers conduct the production of seed and plant material. They need to be recognized by publicly acknowledged propagation organizations (stick). Agroscope tests the quality of propagation material on a sample basis along the entire production and distribution chain.

To conserve and promote the sustainable use of plant genetic resources for food and agriculture, Agroscope maintains a national gene bank. Additionally, the Confederation pays subsidies (carrots) for projects aimed at the conservation and promotion of plant genetic resources.

Animals. While animals technically constitute a part of Switzerland's natural resources, the instruments presented here also target the goal of "guaranteeing animal welfare", as established in the Federal Act on Agriculture, Art. 2.

Firstly, several binding measures (sticks) aim at ensuring animal welfare. While fabricating animal products, farmers need to adhere to various criteria of keeping animals, such as maximum stock levels, regulations on housing or on transport. Implementation controls are conducted in the course of the control of direct payment qualification.

Secondly, farmers may apply for subsidies (carrots) when exceeding the standard requirements for animal keeping in the areas of housing and regular access to open-air. Further, the officially protected labels "outdoor keeping" and "free range keeping" for poultry products (AgricA, Art. 14) constitute an additional incentive structure for farmers to improve their animals' living conditions (carrot).

Thirdly, animal breeding organizations need to be officially registered.[26] The FOAG controls their trading of breeding animals, semen, unfertilized egg cells and embryos. Farmers benefit from these binding measures (sticks) by obtaining high-yield and resistant species, which allow for sustainable production. To promote the quality of animal breeding and to preserve endangered species, the FOAG also hands out subsidies to breeding organizations. It further organizes regular workshops on animal genetic resources in collaboration with the Swiss Society for Animal Sciences (sermons).

[25] Source: https://www.blw.admin.ch/blw/de/home/nachhaltige-produktion/pflanzliche-produktion/sortenschutz.html. Accessed on February 1, 2019.

[26] Source: https://www.blw.admin.ch/blw/de/home/nachhaltige-produktion/tierische-produktion/tierzucht-und-tiergenetische-ressourcen.html. Accessed on February 1, 2019.

Production means. Production means, such as feedstuff, fertilizer, plant protection products and veterinary drugs, also constitute an indispensable part of agricultural production. They are subject to strict control (sticks): Agroscope examines and authorizes feedstuff, fertilizer and plant protection products. To reduce the application of the latter, the Federal Council presented an action plan in 2017.[27] Due to plant protection products' diverse effects not only on plants, but also on humans, animals and the environment[28], the action plan has been jointly developed by multiple federal offices such as the FOAG, the FSVO or the FOEN, as well as by various cantonal and research actors. Most of the defined measures can be realized within the current legal framework. The implementation is ongoing. The FOAG wants to present a first evaluation of its effectiveness in 2023.

Veterinary drugs need to be authorized by the public authority for monitoring medicinal substances, Swissmedic. Further, veterinarians and farmers have strict instructions as to when and how veterinary drugs may be used (sticks). To decrease the danger of antibiotic resistances developing in humans and animals, the Confederation has started the National Strategy against Antibiotic Resistances. The strategy's measures are in the course of being implemented.[29]

Projects aiming to reduce the application of all kinds of production means in an innovative way can apply for seed money at the FOAG.[30] Thus, the Confederation also tries to achieve the goal of sustainable production by means of financial incentives (carrots).

Encompassing instruments. A further category in the "maintenance" area comprises instruments that do not target single components of agricultural production but rather the functionality of the environment within which the components interact. A number of maintenance instruments supports the sustainability of the economic, ecologic and geographic spheres in which agricultural production occurs.

Economically, the Confederation has several market relief measures at its disposal to ensure the market for agricultural products does not collapse due to overproduction. Temporary financial support (carrots) to be applied "in exceptional circumstances" aim to prevent price slumps (AgricA, Art. 13) and stabilize agricultural production (AgricA, Art. 7). Market relief measures are especially important for the Swiss egg market. The demand for eggs usually decreases drastically after Easter and during Summer, which is why during these times the FOAG pays subsidies for every egg passed on to industrial processing and for every egg that is sold to consumers at a reduced price. Producers and retailers selling eggs may apply for these subsidies directly at the FOAG. Also for meat and animals for slaughter, market relief measures exist. While the sectoral organization for meat Proviande is responsible for announcing and implementing them, the FOAG bears part of the costs. By contrast, dairy farmers and processors have found a private solution for dealing with milk oversupply. Since 2014, a company called Lactofama regularly intervenes in the market by buying milk and selling it abroad.[31] Lactofama is owned by the association of Swiss milk producers and several milk-processing companies. Finally, the Confederation supports the fresh-fruit market with two relief measures to prevent seasonal oversupply after the harvests. On the one hand, food processors are entitled for subsidies when processing berries, apples, and other fruit. They can apply for subsidies directly at the FOAG. On the other hand, the FOAG compensates processors of apple and pear juice for storing juice concentrate in their

[27] Source: https://www.blw.admin.ch/blw/de/home/nachhaltige-produktion/pflanzenschutz/aktionsplan.html. Accessed on February 1, 2019.

[28] Studies have shown negative effects of plant protection products on human health, soil fertility and on the diversity of organisms in water bodies, among others.

[29] Cf. www.star.admin.ch. Accessed on February 1, 2019.

[30] Source: https://www.blw.admin.ch/blw/de/home/instrumente/direktzahlungen/ressourceneffizienzbeitraege.html. Accessed on February 1, 2019.

[31] Source: https://www.swissmilk.ch/fileadmin/mediaplayermount/Produzenten/Medienmitteilungen/2014/medienmitteilung-smp-swissmilk-gruendung-lactofama-2014-03-20-de.pdf. Accessed on February 1, 2019.

warehouses instead of selling it directly after production. This way, the market supply is to be levelled out throughout the year.

To promote ecology, the Confederation offers subsidies for farmers that produce on an organic basis. Furthermore, organic farmers can apply the "organic" label to their products.[32] The label is administered by the Confederation and is considered a special sales argument (carrot). It also serves as legitimation for higher prices.

To support farmers in geographically remote regions and in areas that are considered difficult for agricultural production, the Confederation has created two labels for mountain and alpine products.[33] Again working as a sales argument, these labels work towards achieving the statutory goal of decentralized settlement.

Private regulations. Lastly, it is important to acknowledge the private regulation efforts of supermarket chains to ensure and maintain sustainable production. Large retailers such as Migros and Coop feature a host of product labels that build upon the abovementioned public regulations, partly expanding them with additional requirements.[34] Labels such as "Naturafarm", "Pro Montagna" or "TerraSuisse" inform the consumers about specific modes of production and incentivize farmers to adhere to these regulations if they want to sell their products in the supermarkets. While Coop and Migros have developed some of these labels themselves (e.g. "Naturafarm"), most of them have been created by private interest groups (e.g. "TerraSuisse" by IP Suisse[35] or "Bio Knospe" by *Bio Suisse*[36]). The certification and control of farms that produce for these labels is generally conducted by independent, private certification offices.

2.3.3.3 Product-Supporting Instruments

While the policy instruments presented so far aim to set up agricultural production and ensure its sustainability, the Confederation also applies instruments targeted at the fabricated products. The instruments in place try to influence the kinds and quality of products and promote them on the markets (carrots).[37] Most of these instruments promote specific, predefined products such as cheese or special crops. First, the Confederation promotes the growing of certain crops such as potatoes, sugar and rapeseed because they are considered important foodstuffs (AgricA, Art. 54). Second, meat and milk produced predominantly on grassland without additional feedstuff receive financial support. This is due to the fact that such products contain particularly high amount of nutrients. Both of these subsidies are distributed within the framework of direct payments. Third, two policy instruments aim to foster the production of cheese as a traditional Swiss product. Dairy farmers are entitled to subsidies when they sell their milk to cheesemakers instead of selling it as drinking milk (AgricA, Art. 38). They can receive additional payments for producing the milk without feeding silage (AgricA, Art. 39). This kind of milk is more expensive in the production process but essential for the making of traditional Swiss cheese such as Gruyère. On the one hand, the cheese-milk subsidies are measures of price support for dairy farmers and thus help maintaining local food production. On the other hand, the subsidies provide cheesemakers with low-cost raw material. Swiss cheesemakers have become dependent on this measure as they have been exposed to more competition with the merging of the Swiss with the European cheese market in 2007 (Flury, Sorg, & Giuliani, 2014, p. 1). The FOAG transfers the subsidies to the cheesemakers who subsequently hand it on to the dairy farmers. The FOAG's financial inspectorate monitors the correct implementation of these instruments.

[32] Source: https://www.blw.admin.ch/blw/de/home/instrumente/kennzeichnung/biolandbau.html. Accessed on February 1, 2019.

[33] Source: https://www.blw.admin.ch/blw/de/home/instrumente/kennzeichnung/berg-und-alp.html. Accessed on February 1, 2019.

[34] Source: https://www.coop.ch/de/nachhaltigkeit.html and https://generation-m.migros.ch/de/nachhaltige-migros/partner-und-mitgliedschaften.html. Accessed on February 1, 2019.

[35] Source: https://www.ipsuisse.ch/. Accessed on February 1, 2019.

[36] Source: https://www.bio-suisse.ch/. Accessed on February 1, 2019.

[37] All aspects dealing with the food safety of products will be presented in the next chapter.

The Confederation also supports sectoral organizations. The latter may request public support (carrots) for collective marketing activities or for projects enhancing the quality and sustainability of agriculture and food production (AgricA, Art. 11 and 12). Additionally, when a sectoral organization's self-help measures are threatened by the actions of non-members, the Federal Council may declare the measures to be mandatory for the entire sector (AgricA, Art. 9). In the area of milk production, the Federal Council may even go further and declare the sector organization's standard contract – a binding document for the organization's members regulating quantities and prices – as mandatory (AgricA, Art. 37).

To support the production and sales of traditional products stemming from specific regions in Switzerland, the FOAG maintains the AOP/IGP registers (AgricA, Art. 16). Producers adhering to the criteria defined in these registers may use a product's protected name – "Bündnerfleisch" or "Emmentaler" for example – and use the AOP/IGP label to stand out on the market.

Concerning meat, the Confederation has charged the sectoral organization Proviande with the neutral quality assessment of meat and animals for slaughter.[38] The controls are conducted during public markets for slaughter animals and in slaughterhouses of medium and big size. They intend to increase market transparency and promote quality.

2.3.3.4 Supportive Instruments

A last group of instruments intends to facilitate agricultural production. Through "the acquisition and provision of knowledge", the Confederation is to support "agriculture in its efforts to produce in a rational and sustainable manner" (AgricA, Art. 113).

First, the state finances its own research station Agroscope and research projects by other actors such as universities of applied sciences or the Research Institute of Organic Agriculture (FiBL) (AgricA, Art. 115 and 116). The Agricultural Research Committee, comprised of scientists, producers, consumers and other interested parties, provides strategic advice to the FOAG concerning the general directions for agricultural research (AgricA, Art. 117).

Second, the agricultural consultation system is responsible for transferring the generated knowledge to farmers and for giving them useful advice on implementing the legal requirements. Subsidiary to the abovementioned cantonal consultation services and AGRIDEA, the national level also financially supports private consultation projects (carrots).[39]

Lastly, the Agriculture Act obligates the state to monitor agriculture: "In order to create the essential basis for implementing the Act and for monitoring its effect, the Confederation shall collect and record data on certain sectors and on individual businesses" (AgricA, Art. 185). The state meets this requirement by collecting and analyzing data such as the economic state of farmers and their families, the prevalence of phosphorus and other fertilizer ingredients in the environment or the development of agricultural markets. Often, farmers are assigned with measuring indicators and transferring the values through online applications to the FOAG. In some cases, data collection and parts of the analysis are outsourced to private companies. A prominent example is the TSM trust Ltd., responsible for documenting the amounts of milk produced in Switzerland.[40]

[38] Source: https://www.blw.admin.ch/blw/de/home/nachhaltige-produktion/tierische-produktion/fleisch.html. Accessed on February 1, 2019.

[39] Source: https://www.blw.admin.ch/blw/de/home/das-blv/forschung-und-beratung/wettbewerbliche-vergabe-von-beratungsprojekten.html. Accessed on February 1, 2019.

[40] Source: http://www.tsmtreuhand.ch/index.php?id=tsm. Accessed on February 1, 2019.

2.3.4 Relevant EU Policies and Actors

The goal of competitiveness in an internationalized trade system is a major functional driver of Switzerland's international commitment in the field of agriculture, as it requires compliance with standards for accessing the domestic markets of trade partners.

2.3.4.1 Agreement on Agriculture

As mentioned earlier, since 2002 Switzerland and the European Community have a comprehensive agreement on trade in agricultural products which improves mutual market access. The agreement includes the framework agreement (regulation of rules of origin, evolutionary and protective clause, dispute settlement, Joint Committee), tariff concessions, agreements to eliminate technical barriers to trade as well as explanations on various trade issues and products. It entails the reduction of tariffs on selected products as well as trade facilitation, amongst others free trade for cheese, the mutual recognition of equivalence of certain technical regulations and quality norms, the mutual protection of designations for wine and spirits, and the mutual recognition of designations of food and agricultural products, e.g. cheese and sausage products.[41]

2.3.4.2 Free Trade Agreement

Moreover, the Protocol No. 2 of the FTA between Switzerland and the EU regulates the trade of processed agricultural products. Products are divided into those which are subject to price compensating measures (e.g. milk chocolate, biscuits, baby food) and those for which free trade applies (e.g. coffee, jam, water, beer). This system of price adjustment is also defined in the so-called "Chocolate Law" (Federal Law on the import and export of agricultural products; SR 632.111.72), which differentiates between trade with the EU and with non-EU countries.[42] As commodity prices in Switzerland are higher than in the EU, Switzerland may grant export subsidies and charge customs duties upon importation of such products, while the EU abstains both from export subsidies as well as from charging customs duties. This has allowed the food industry to boost its competitiveness, while continuing to use domestic basic agricultural products.[43]

2.3.4.3 Relevant EU Legislation

As mentioned earlier, Switzerland largely and voluntarily harmonizes its laws and ordinances with binding EU legislation (that is, a wide array of EU regulations and Directives)—though many of its standards (especially regarding environment and biodiversity) go beyond the EU's Common Agricultural Policy (CAP). The CAP is based on four main pieces of EU legislation.[44] Important EU policies on agriculture also include an array of implementing regulations, guidelines and non-binding EU policies, action plans and strategies.[45]

2.3.4.4 Relevant Actors

Within the FTA, representatives of the EU and Switzerland meet at least once a year within the Joint Committee on Agriculture, which is responsible for the administration of the agreement and for ensuring its proper implementation. Switzerland has no formal influence on EU policymaking. The European Commission's Directorate General for Agriculture and Rural Development (DG Agri) is a key player in the EU's agricultural

[41] Source: https://www.blw.admin.ch/blw/en/home/international/institutionen/europaeische-union-eu/agrarabkommen.html. Accessed on February 1, 2019.

[42] Source: https://www.blw.admin.ch/blw/en/home/international/institutionen/europaeische-union-eu/protokoll-nr-2.html. Accessed on February 1, 2019.

[43] Source: https://www.eda.admin.ch/dam/eda/en/documents/publications/EuropaeischeAngelegenheiten/Schweiz-und-EU_en.pdf. Accessed on February 1, 2019.

[44] These are: Direct support: Regulation (EU) No 1307/2013; Market measures: Regulation (EU) No 1308/2013; Rural development: Regulation (EU) No 1305/2013; Horizontal issues: Regulation (EU) No 1306/2013. Source: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance. Accessed on February 1, 2019.

[45] Source: https://ec.europa.eu/agriculture/index_en. Accessed on February 1, 2019.

policymaking and reform agenda. Although it can act as a policy advocate and enjoys a monopoly on formal policy initiation, its role is constrained by the preferences of member states if its proposals are to stand any chance of success. Moreover, the Special Committee on Agriculture (SCA) prepares the ground for meetings of the Agriculture and Fisheries Council (AGRIFISH), which brings together ministers for agriculture and/or fisheries from each EU member state. Within the European Parliament (EP), the Agriculture and Rural Development standing committee (COMAGRI) plays a key role. The membership of COMAGRI reflects the political balance of the Parliament as a whole but many of its members have very close links to agriculture (Greer & Hind, 2012).

2.3.5 Overall Assessment of Agricultural Policy

The policy field of Swiss agriculture is populated by a multitude of instruments targeting different aspects of production. The bird's eye perspective reveals a dominance of subsidies (carrots) and regulations (sticks). By contrast, campaigns, workshops and similar informational instruments (sermons) are rarely used. Another striking feature of agricultural policy instruments is the fact that they often serve several goals simultaneously. While all of the instruments presented above target the food chain, they also try to conserve natural resources, guarantee animal welfare or promote specific products on the domestic and international market. Both the dominance of subsidies and regulations and the fact that policy instruments often simultaneously pursue a multitude of goals are due to the long history of agricultural policy in Switzerland and to the Confederation's strong stance in this area.

Despite the multi-functional nature of most agricultural policy instruments, it is noteworthy that only very few instruments explicitly target the food system goal of reducing the environmental impact of agricultural production. Although the goal of "conservation of natural resources" implies the reduction of environmental impact, it is striking that the only instruments directly targeting this goal – the two action plans to reduce plant protection products and the use of antibiotics – are rather new and of a non-binding nature.

Regarding Switzerland's international obligations toward the EU, the economic ties in the field of agriculture are very close due to several international agreements, and the EU is Switzerland's most important trading partner in agriculture. Switzerland engages in continuous harmonization with relevant EU law regarding agricultural products, which are de facto binding for Switzerland. For Switzerland, these policies crucially serve the goals of economic competitiveness and food security. Regarding the goals of sustainability and quality, Swiss policies are at least equivalent to the CAP but sometimes also go beyond EU minimal standards.

2.4 Policy Field II – Food Safety

2.4.1 Policy Basics

2.4.1.1 Problem Situation

The transformation of primary products into consumable food is a very complex and multi-faceted process. At every link in the food chain, from the production of primary products, through processing and distribution to consumption, food (in its various processing stages) can become infested or contaminated by a wide variety of harmful substances such as bacteria, viruses, pesticides, metals, or drugs. Harmful substances can lead to an immediate outbreak of certain diseases or, through their slow accumulation within the human body, can have long-term detrimental health effects. While some substances are only harmful if absorbed in higher quantities (such as lead from venison meat), other substances are already harmful in very small doses (e.g. several types of viruses on food).

To keep food production as free from harmful substances as possible (and as much as is necessary), measures must be taken that cover the whole food chain. Therefore, food safety is a cross sectional policy problem that relates several policy fields within the Swiss food system to each other. There is also traditionally strong agreement that food safety is a policy problem best dealt with at the national level. As the products fabricated in the various cantons (as well as imported products) can freely circulate within the Swiss food market, consumers all over Switzerland depend on a nationwide food safety policy.

2.4.1.2 The Swiss Food Safety Policy

The cross-sectional nature of the food safety problem finds its embodiment in the Federal Food Chain Strategy[46]. The strategy was adopted in 2015 and is coordinated by the *Federal Food Safety and Veterinary Office* (FSVO). It aims to harmonize and coordinate the policy efforts of more than 70 federal and cantonal entities engaged in securing food safety along the food chain.

Statutory Basis of the Swiss Food Safety Policy

The necessity to coordinate food safety policy at the national level manifests itself in the significant legislative powers granted to the federal authorities in the area of food safety (WHO 2015). Consequently, the Swiss food safety policy has a strong statutory basis consisting of a dense net of federal laws and ordinances that detail what is allowed and what not in the production, processing and distribution of food in Switzerland. The most important laws are the federal agricultural law, the federal animal disease law, the federal food law, and the ordinance on veterinary medicinal products. A multitude of ordinances details these laws and contains meticulous instructions for policy targets. The strong and abundant statutory basis at the federal level has implications for the actor set-up and for the policy instruments the Swiss food safety policy applies.

First, the strong statutory basis explains the top-down, rather hierarchical actor set-up that can be found in the policy field of food safety. Akin to agricultural policy, federal authorities take a leading and coordinative role in the area of food safety, while cantons act as implementers of the food safety policy. Second, the strong statutory basis allows policy actors to primarily operate with policy instruments that compel policy targets to comply with certain rules (sticks). The only exception to this pattern are policy instruments that target food consumption (see below). As the statutory basis allows the food safety policy to only authoritatively intervene "outside of the home", only relatively unobtrusive policy instruments (sermons) can be used to influence food safety during consumption.

Goals of the Swiss Food Safety Policy

[46] Source: https://www.blv.admin.ch/blv/de/home/das-blv/strategien/strategie-lebensmittelkette.html. Accessed on February 1, 2019.

The Swiss food safety policy's overall goal, which provides the motivation for the many laws and ordinances in place, is that all food that can be consumed in Switzerland is safe to eat. To reach this overarching goal, the food safety policy pursues three major "procedural" goals, each of which targets a different part of the food chain. First, the policy wants to make sure that only uncontaminated and unpolluted foodstuffs (i.e. primary products of animal or plant origin) find their way into the food chain. Second, the policy aims these foodstuffs to remain uncontaminated and unpolluted during the processing and distribution process. And finally, the policy wants to bring consumers to keep and prepare food in a save way.

In the next two sections, we present the actors involved in the design and in the implementation of the Swiss food safety policy and give an overview of the instruments they apply to reach the policy's stated goals.

2.4.2 Main Policy Actors

Like agricultural policy, food safety policy is organized in a comparatively centralized way in Switzerland. While federal authorities are in charge of the design and coordination both of the policy at large and of particular instruments, cantonal authorities implement the policy. Also food processors and distributors (ranging from farmers to slaughterhouses, importers, supermarkets, restaurants, etc.) are involved in the implementation of the policy. In the following, we distinguish between public actors (both at the federal and cantonal levels) and private actors.

2.4.2.1 Public Actors

The federal unit in charge of the Swiss food safety policy is the FSVO. The FSVO is the "Swiss federal centre of excellence for the fields of food safety, nutrition, animal health, animal welfare and species conservation in international trade".[47] Within the FSVO, the Federal Food Chain Unit supervises the implementation of (legislative) instructions and the control activities at the cantonal level.[48] The FSVO receives scientifically based support in assessing food safety relevant issues from the Federal Commission for International Food Safety (EKIL), from Agroscope, and from Swissmedic. EKIL, in particular, supports the FSVO in monitoring international laws and assessing their implications for national policy. At the federal level, also the Federal Office for Agriculture (FOAG) and the Federal Customs Administration (FCA) play important roles in food safety. While the FOAG is in charge of devising and supervising the implementation of instructions that relate to food safety in primary production, the FCA is in charge of supervising and coordinating border controls of foodstuffs.

The cantonal veterinary offices and the cantonal health offices are responsible for implementing federal instructions on food safety and for ensuring compliance by maintaining an extensive control system. This control system is institutionalized in the multi-annual national control plan (MANCP). The MANCP details the control activities that the cantons have to conduct along the food chain.[49]

2.4.2.2 Private Actors

Food producers and distributors (consisting of farmers, slaughterhouses, importers, supermarkets, restaurants, etc.) play an important implementing role in the area of food safety. They have an "obligation of self control" (Art. 26 of the federal food law) and must comply with the "good manufacturing practice" and the "good hygiene practice". These practices are supposed to make sure that food producers and distributors can actually comply with and react to the instructions contained in the various laws and ordinances. Moreover, some food producers and distributors adopt private quality control tools such as the above-

[47] Source: https://www.bundespublikationen.admin.ch/cshop_mimes_bbl/2C/2C59E545D7371ED58BDBB53642747109.pdf. Accessed on February 1, 2019.

[48] Source: https://www.blv.admin.ch/blv/en/home/das-blv/organisation/blk.html. Accessed on February 1, 2019.

[49] Source: https://www.blv.admin.ch/blv/de/home/das-blv/organisation/blk/nationaler-kontrollplan.html. Accessed on February 1, 2019.

mentioned Hazard Analysis Critical Control Points (HACCP), which help them to ensure food safety in their activities.

Finally, veterinarians and various animal health services perform important control and advisory tasks in ensuring food safety in primary production. They advise producers in matters of food safety and report anomalies to public authorities.

2.4.3 Policy Instruments

The strong statutory basis of the Swiss food safety policy allows policymakers to mainly apply and work with clear-cut rules (sticks) to secure food safety along the food chain. The various laws and ordinances contain instructions for policy target groups on what is allowed and what not in food production in Switzerland. A comprehensive control system aims to ensure compliance with these instructions. The control system targets individual products (product controls), actors involved in food production (process controls) and food imports (border controls). This policy instrument structure is in place for the largest part of the food chain. As an exception to this pattern, policy actors apply informational instruments (sermons) when targeting food safety issues related to consumption.

To structure the multitude of policy instruments that are currently in place to maintain food safety along the food chain, we distinguish between three safety areas. *Safety area 1* comprises instruments that target food safety in the production of primary products. *Safety area 2* contains instruments ensuring food safety during processing and distribution. *Safety area 3* comprises instruments that target food safety during consumption. The three safety areas tightly correspond with the three procedural goals outlined previously.

2.4.3.1 Instruments Targeting Primary Production (Safety Area 1)

The policy instruments in safety area 1 primarily target farmers and other producers of primary products. The latter have to be registered at the responsible cantonal office and are subject to several legally binding instructions and compliance controls. The instruments in safety area 1 can be subdivided in plant-related and animal-related measures.

Plant-related measures. Plants are important primary products that either directly enter the food chain or are processed into feedstuff. Several policy instruments aim to keep plant products free from harmful substances such as certain pesticides, fertilizers, and plant pests. As residues of plant protection products and fertilizers can have detrimental effects on humans, these products are subject to strict regulations and controls. The federal authorities regularly examine and authorize fertilizer and plant protection products and maximum residue concentrations on a scientific basis. To reduce the application of these products during plant production, the Federal Council presented an action plan in 2017 whose implementation is ongoing.

Moreover, the Federal Plant Protection Service (EPSD), which is under the control of the FOAG and the Federal Office for the Environment (FOEN), strives to prevent the import and spreading of various plant pests.[50] Several plant pests must be reported to the cantonal plant protection services upon discovery in order that infested plants can be quickly isolated and prevented from entering the food chain.

Finally, the federal authorities imposed a moratorium on the cultivation of genetically modified organisms (GMO) in Switzerland. Farmers may not utilize GMO to enhance their productivity. The only exception to this rule, the use of genetically modified feedstuff, is strictly regulated to guarantee the harmlessness to animals

[50] Source: https://www.blw.admin.ch/blw/en/home/nachhaltige-produktion/pflanzenschutz/pflanzengesundheit-eidg-pflanzenschutzdienst.html. Accessed on February 1, 2019.

and humans. The moratorium was renewed in 2017 to last another 4 years. *Agroscope* is responsible for monitoring GMO in feedstuffs.

Animal-related measures. The second group of policy instruments in safety area 1 addresses animals and products of animal origin. The instruments currently in place relate to harmful substances that animals may take in through veterinary drugs and to animal health more broadly. Next to harmful substances contained in feedstuffs (which are covered by the plant-related instruments described above), veterinary drugs can accumulate in farm animals (and in the primary products directly originating from them such as eggs and milk) and thereby represent a threat to human consumers. Therefore, veterinary drugs need to be authorized by the public authority for monitoring medicinal substances, *Swissmedic*. Further, veterinarians and farmers are subject to strict instructions as to when and how veterinary drugs may be used. To decrease the danger of antibiotic resistances developing in humans and animals, the Confederation devised the National Strategy against Antibiotic Resistances. Moreover, to reduce the likelihood of residues of veterinary drugs in food, farmers and veterinarians must comply with drug- and animal-specific withdrawal periods before slaughtering animals or before further processing animal products.[51]

Several animal-related policy instruments directly target the health of animals. Primary products derived from healthy animals are less likely to be infested by harmful substances. Moreover, healthy animals need fewer amounts of potentially food safety relevant veterinary drugs. Owners of farm animals need to adhere to various criteria of keeping animals, such as maximum stock levels or regulations on transport and selling of animals to prevent the outbreak of diseases. In case of an outbreak, sick animals need to be treated or killed. To ensure compliance, cantonal authorities regularly control farms on aspects of disease prevention such as animal movements, disease awareness, application of veterinary drugs, animal welfare, and the implementation of hygiene measures.[52]

2.4.3.2 Instruments Targeting Food Processing and Distribution (Safety Area 2)

The policy instruments in place in safety area 2 target the various parts of the food industry, consisting of slaughterhouses, food producers, importers and distributors including supermarkets, restaurants, and canteens.[53] Akin to the instruments in safety area 1, the instruments targeting the food industry encompass clear instructions on the processing and distribution of primary products and processed food, in combination with occasional controls to ensure compliance. The primary purpose of these instruments is to make sure that safe primary products remain safe during processing and distribution. The main groups of instruments in safety area 2 are regulations on slaughtering, pathogens and other harmful substances, imports, product recalls, and on expiry dates.

Slaughtering. The first group of instruments target the slaughtering of animals designated for food production. They are supposed to make sure that only healthy animals enter the food processing process. The meat control agency of the FSVO obliges slaughtering businesses to inform it on planned slaughters and instructs veterinarians to conduct health tests prior to slaughtering.[54] Moreover, there are specific hygiene and sanitary regulations slaughtering businesses must comply with. The meat control agency of the FSVO

[51] Source: https://www.blv.admin.ch/blv/de/home/tiere/tierarzneimittel/fachgerechter-umgang-mit-tierarzneimitteln/rueckstaende.html. Accessed on February 1, 2019.

[52] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/lebensmittelsicherheit/verantwortlichkeiten/nationale-kontrollprogramme.html. Accessed on February 1, 2019.

[53] We do not treat water suppliers as being part of the food industry, though for them, a range of equivalent policy instruments exists. The 'Ordinance on Drinking Water and Water in Public Baths' contains detailed standards for the processing, distribution and quality of drinking water that (mostly cantonal) water providers must comply with. See https://www.admin.ch/opc/de/classified-compilation/20143396/index.html. Accessed on February 1, 2019.

[54] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/lebensmittelsicherheit/verantwortlichkeiten/fleischkontrolle.html. Accessed on February 1, 2019.

additionally decrees meat tests to be conducted immediately after slaughtering. Equivalent tests and controls exist for milk products.

Pathogens and other harmful substances. A second group of policy instruments aims to prevent pathogens and other harmful substances from infesting foodstuffs during processing and distribution. Pathogens like bacteria, viruses, inedible fungi and parasites can infest primary products during the processing and distribution process. Food producers and distributors must comply with strict hygiene regulations to minimize the risk of infestation and are regularly checked for compliance.[55] Similar regulations exist for potentially harmful substances that may be used during food processing like chemical substances or additives. The existing regulations detail the criteria that additional substances must fulfil in order to be deployable in food processing.[56] Moreover, the FSVO has issued regulations that detail the materials that can be used for packaging.[57] These regulations make sure that potentially harmful substances in packaging material do not diffuse into food. Finally, the FSVO regulates the application of various technologies to foodstuffs (e.g. irradiation procedures to increase food keepability).

Imported foodstuff. The third major group of policy instruments in safety area 2 targets the safety of imported foodstuff. As almost fifty percent of the food consumed in Switzerland stems from imports, policy instruments targeting import safety crucially contribute to overall food safety in Switzerland.[58] The import of animals, animal products and plants is regulated in several ordinances, which detail the import conditions for the various species and products. Regulations distinguish between imports from member countries of the European Union and imports from third countries as well as between commercial and private imports. The Trade Control and Expert System (TRACES), in which Switzerland cooperates with the EU, allows to capture and keep control of commercial cross-border movements of animal products.[59] Moreover, cantonal authorities, in collaboration with the Federal Customs Administration, regularly conduct border controls of feed- and foodstuff.[60] In case of specific dangers (e.g. animal disease outbreaks in other countries or discovery of contaminated products during border controls), the federal authorities can issue protection measures or temporary restrictions of imports.

Product recalls. In case the above measures fail to guarantee food safety in safety area 2, i.e. when contaminated or polluted products are distributed to consumers despite the existence of regulations and controls, the federal authorities can mandate product recalls. The FSVO collaborates with cantonal authorities and affected companies (like supermarkets) and communicates product recalls via media releases and on the internet.[61]

Expiry date regulations. The last type of instruments to be found in safety area 2 – and the type that is closest to consumers (safety area 3) – are expiry date regulations. They stipulate and detail the ways that food

[55] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/lebensmittelsicherheit/krankheitserreger-und-hygiene.html. Accessed on February 1, 2019.

[56] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/lebensmittelsicherheit/zusatzstoffe.html. Accessed on February 1, 2019.

[57] Source: https://www.blv.admin.ch/blv/en/home/gebrauchsgegenstaende/materialien-in-kontakt-mit-lebensmitteln/verpackungen.html. Accessed on February 1, 2019.

[58] Source: https://www.blw.admin.ch/blw/de/home/politik/ernaehrungssicherheit/aktuelle-situation/schweiz.html. Accessed on February 1, 2019.

[59] Source: https://www.blv.admin.ch/blv/de/home/import-und-export/rechts-und-vollzugsgrundlagen/hilfsmittel-und-vollzugsgundlagen/traces.html. Accessed on February 1, 2019.

[60] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/lebensmittelsicherheit/verantwortlichkeiten/nationale-kontrollprogramme.html. Accessed on February 1, 2019.

[61] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/rueckrufe-und-oeffentliche-warnungen.html. Accessed on February 1, 2019.

distributors must equip packaged food products with use-by dates and minimum durability dates.[62] The information conveyed on the packaging allows consumers to easily assess whether a product can be considered safe at the time of consumption.

2.4.3.3 Instruments Targeting Food Preparation and Consumption (Safety Area 3)

The policy instruments in safety area 3 target consumers. Their primary purpose is to provide consumers with information related to food preparation and consumption. Information and recommendations aim to make sure that food is prepared and consumed in ways that minimize the likelihood that harmful substances enter the human body. Since food preparation and consumption is a private matter, only relatively unobtrusive policy instruments (sermons) are in place to reach this goal. The instruments currently in use primarily consist of hygiene recommendations issued by the FSVO on the preparation (esp. heating) of food and on the storage of food. They are conveyed through information campaigns (e.g. "sicher geniessen") using flyers, media advertisements, billboards and the internet.[63] Moreover, there are recommendations on specific foods (esp. on insects, mushrooms, and game meat). Finally, the FSVO can issue public warnings on contaminated food.[64]

2.4.3.4 Supportive Instruments

Another group of policy instruments supports the continuing effectiveness of the Swiss food safety policy by providing policy actors with up-to-date, safety-relevant information. Because food production is a highly dynamic and complex process, new dangers for food safety constantly emerge in all of the three safety areas. Animal or plant diseases can break out inadvertently, technological changes in food processing can lead to unanticipated gateways for harmful substances, or consumers may have to learn how to handle new foodstuffs (e.g. insects). Therefore, the Swiss food safety policy relies on a comprehensive monitoring system along the food chain that allows policy actors to identify risks and react to newly emerging dangers for food safety.

Comprehensive monitoring and information collection instruments address animal and plant health and the spread of diseases. The FSVO and cantonal veterinary services have several monitoring instruments in place. The most important of these instruments are a national early detection system on animal health, a database on disease reports (InfoSM), and a tracking system for animal movements (TVD) to guarantee food safety when animal diseases are spreading.[65] The FSVO further monitors animal disease hazards from abroad in its "radar bulletin" and supports research on food safety. Finally, the FSVO and the FOPH regularly conduct risk assessments and diagnostics of highly contagious diseases animals and humans may contract.

2.4.4 Relevant EU Policies and Actors

Compliance with commonly agreed food safety standards is a functional prerequisite both for trading food products and for protecting the health of domestic and international consumers.

2.4.4.1 Entanglement in EU Single Market

Due to the trade agreements with the EU in the field of agriculture (see above), the EU's food safety requirements are of direct relevance for Switzerland and compliance with them is crucial to ensure the exportability of Swiss products. Accordingly, Switzerland cooperates with the European Food Safety Authority (EFSA) and participates in the EU's Rapid Alert System for Food and Feed (RASFF).[66] The RASFF is a key tool to

[62] Source: https://www.admin.ch/opc/de/classified-compilation/20143397/index.html. Accessed on February 1, 2019.

[63] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/lebensmittelsicherheit/krankheitserreger-und-hygiene/hygiene.html. Accessed on February 1, 2019.

[64] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/rueckrufe-und-oeffentliche-warnungen.html. Accessed on February 1, 2019.

[65] Source: https://www.blw.admin.ch/blw/de/home/nachhaltige-produktion/tierische-produktion/tvd.html. Accessed on February 1, 2019.

[66] Source: https://www.eda.admin.ch/dea/en/home/verhandlungen-offene-themen/verhandlungen/fhal-gesa.html. Accessed on February 1, 2019.

ensure the flow of information to enable swift reaction when risks to food safety are detected in the food chain.

2.4.4.2 Veterinary Agreement

Annex 11 of the bilateral Agreement on trade in agricultural products between Switzerland and the EU is known as the "Veterinary Agreement". It covers the control of animal diseases, trade in animals and animal products and the import of these animals and products from third countries. By creating the basis for the common veterinary area, the veterinary agreement implies that Switzerland has a contractual obligation to ensure legal equivalence with EU veterinary law, most importantly in the area of veterinary drugs used in livestock production.

When the common veterinary area came into existence in 2009, border veterinary controls for trade in animals and animal products between Switzerland and the EU were abolished. Within this framework, Switzerland (specifically, the FSVO) modifies Swiss legislation in response to changes in EU legislation, communicates changes in Swiss legislation, and monitors compliance at the external border.[67]

2.4.4.3 Relevant EU Legislation

In response to several food crises, the EU issued the General Food Law which currently provides the general legal framework for food safety regulation in the EU. The EU has adopted emergency measures and established a general plan for crisis management as adopted by Decision 2004/478/EC. Member States are also required to draw up their own contingency plans to apply in emergency situations. According to Article 13 of Regulation (EC) No 882/2004, these contingency plans must outline the national administrative authorities to be engaged in crisis management, and their respective powers and responsibilities, as well as the channels and procedures for communication between the relevant actors. EU secondary legislation details the obligations of Member States and their authorities to implement and control food safety. Ordinary veterinary drugs are usually regulated in Directive 2001/82/EC, and medicated feedstuffs in Council Directive 90/167/EEC. A host of other regulations, directives, decisions and non-binding EU policies regulate aspects of food safety in detail, covering the topics of labelling and nutrition, biological and chemical safety, animal by-products, food fraud, food improvement agents, novel food, animal feed, and food waste.[68]

EU Member States are responsible for the enforcement of food safety legislation along the food chain. They organize official controls systems to verify that operators' activities and goods placed on the EU market comply with relevant standards and requirements. All business operators are subject to official controls irrespective of their size, depending on the risk posed by different activities to the safety of the agri-food chain. The role of the EU is to assure that the control systems at national level are effective. If non-compliances are sufficiently serious, stronger actions may be taken including legal action, restrictions or even bans on the movement of goods or animals.[69]

2.4.4.4 Actors

Decisions taken by the EU in the area of animal health and food safety affect Swiss legislation through the Veterinary Agreement. Switzerland therefore seeks to represent its position to the EU by participating in working groups and in the standing committee. Absent voting rights for Switzerland, its scope for influence is, however, limited.[70] The correct implementation of the Veterinary Agreement is monitored by the Joint

[67] Source: https://www.blv.admin.ch/blv/en/home/das-blv/kooperationen/internationale-abkommen/veterinaerabkommen-schweiz-eu.html. Accessed on February 1, 2019.

[68] Source: https://ec.europa.eu/food/safety_en. Accessed on February 1, 2019.

[69] Source: https://ec.europa.eu/food/audits_analysis_en. Accessed on February 1, 2019.

[70] Source: https://www.blv.admin.ch/blv/en/home/das-blv/kooperationen/internationale-abkommen/veterinaerabkommen-schweiz-eu.html. Accessed on February 1, 2019.

Veterinary Committee (JVC) that updates the Veterinary Agreement, discusses bilateral problems, and looks for mutually acceptable solutions. The FSVO sends a delegation to the JVC.

At the EU level, the Health and Food Audits and Analysis Directorate, which resides under the Directorate-General for Health and Food Safety (DG SANTE) of the European Commission, drafts and proposes EU laws on product and food safety. Through its Health and Food Audits and Analysis Directorate (previously called Food and Veterinary Office – FVO), DG SANTE carries out inspections and audits in member states to ensure that effective official control systems are in place and evaluate the compliance of member states and Switzerland with EU food safety legislation. Moreover, the Standing Committee on Plants, Animals, Food and Feed (PAFF Committee) delivers opinions on draft measures that the Commission intends to adopt.

Composed by representatives of all member states and presided by a European Commission representative, the PAFF Committee's mandate is to help the EU deal effectively with health risks at every stage of the production chain.

The European Food Safety Authority (EFSA) is an independent regulatory agency that was created to provide EU institutions and member states with scientific and technical opinions on food policies and the resolution of food safety incidents. As an independent agency responsible for scientific advice and support, the EFSA plays a key role in EU food governance. Finally, the European Forum of Food Law Enforcement Practitioners (FLEP), founded in 1990, is an informal network of national food-law-enforcement practitioners for exchanging information, fostering learning and cross-border cooperation, and developing mutual trust in the resolution of practical control problems.

2.4.5 Overall Assessment of Food Safety Policy

Food safety policy in Switzerland is a mature and relatively homogenous policy area spanning the whole food chain from primary production to consumption. A strong statutory basis makes the federal authorities (in particular the FSVO) strong policy actors with significant room for maneuver to secure food safety and adapt to new risks especially in safety area 1 and safety area 2. While the policy instruments in these areas address a multitude of safety-relevant factors and situations, their overall structure is very similar. Detailed instructions (sticks), in combination with an extensive control system, want to make sure that the actors involved in food production, processing, and distribution act in ways that do not jeopardize food safety. The instruments in safety area 3 are an exception to this pattern, as they mainly supply information to consumers (sermons). As we will outline in the next section, policy instruments that target consumers directly are, by tendency, significantly less authoritative than instruments targeting food producers and distributors.

At the EU level, through its international obligations, Switzerland is de facto in full harmony with the EU's sophisticated and effective network of regulations and institutions ensuring food safety in the single market. These regulations tend to be binding and the European Commission has expanded its enforcement activities to Switzerland. Conversely, Switzerland has little influence on the formulation of these rules which it implements.

2.5 Policy Field III – Public Health

2.5.1 Policy Basics

2.5.1.1 Problem Situation

The Swiss health system is traditionally concerned with ever-rising healthcare costs (Vatter & Ruefli, 2014). Only from the 1990s onward, however, have international and national political actors begun to perceive public health as a venerable policy problem. By now, healthy nutrition, next to exercising and sport, is widely seen as a key prevention against the spread of non-communicable diseases (NCDs) and is therefore crucial for keeping down healthcare costs. The nexus between nutrition, NCDs and healthcare costs, backed by numerous scientific studies, has gradually shifted nutrition and eating habits higher up the agenda in healthcare policy-making.

While healthy food in Switzerland is relatively easy to get and affordable for the largest part of the population, the food choices made by the Swiss population are often unhealthy. The Swiss population consumes too much sweet and salty food and animal fat while not eating enough fruits, vegetables, and cereals. National and international studies overwhelmingly show that unhealthy food choices and eating habits contribute to overweight and obesity.

The reasons behind the pervasiveness of unhealthy food choices and eating habits in Switzerland are captured by the "three A's": affluence, abundance, and agony (of choice). Swiss consumers are confronted with a huge variety of affordable foods, of which large parts are unhealthy. In many cases, especially when under time pressure or stress, citizens are overwhelmed by this decision-making situation. This is where the recently overhauled Swiss Nutrition Policy comes in.

2.5.1.2 The Swiss Nutrition Policy

The *Swiss Nutrition Policy 2017-2024* (SNP) is part of the Federal Council's *Health 2020* strategy, which was adopted in 2013.[71] The Health 2020 strategy considers the prevention of NCDs as one of its five key priorities and key goal for the 2016-2019 legislative period. The NCD prevention strategy was adopted in spring 2016 by the confederation and by the cantons and, like the SNP, is scheduled to run from 2017 to 2024.[72] It replaces three national prevention programs – tobacco, alcohol and "Nationales Programm Ernährung und Bewegung" (NPEB) – which ran from 2008-2016. Hence, while the SNP is an independent policy, it is nested into the NCD and Health 2020 strategies.

2.5.1.3 Statutory basis of the Swiss Nutrition Policy

A peculiarity distinguishing the SNP from the other two policy fields surrounding the Swiss food system, namely agricultural policy and food safety policy, is the lack of a strong statutory basis. With public health being a relatively young policy problem, political plans to create an original statutory basis took concrete shape only recently. The reason why these plans failed so far can be found in the high fragmentation and decentralization of the Swiss health care system. Goal and interest conflicts between public actors and private actors (like health insurers), and between the federal and the cantonal levels (at which 26 different health systems exist), make it notoriously difficult to reform the Swiss health care system (Vatter & Ruefli, 2014).

The complex institutional landscape explains why the Swiss Federal Council was hitherto unable to create a strong statutory basis for a federal public health policy. In 2009, amid opposition from the economy and public skepticism towards increased governmental intervention, the Federal Council failed to get a federal law on prevention and health promotion through parliament (Vatter & Ruefli, 2014, p. 841). This law would have

[71] Source: https://www.bag.admin.ch/bag/de/home/strategie-und-politik/gesundheit-2020.html. Accessed on February 1, 2019.

[72] Source: https://www.bag.admin.ch/bag/de/home/strategie-und-politik/nationale-gesundheitsstrategien/strategie-nicht-uebertragbare-krankheiten.html. Accessed on February 1, 2019.

granted federal authorities an overarching coordination and steering role in public health policy and would have regulated the division of tasks between the federal and the cantonal levels.

Adaptations of adjacent laws have occurred in recent years, but these do not provide the Confederation with a capacity to act equal to that granted by an original federal law on prevention and health promotion. The most important of these adjacent laws is the federal law on health insurance. In Article 19, this law requires health insurers to promote disease prevention and coordinate their activities with cantonal authorities. Moreover, the recently revised federal food law provides a statutory basis for influencing food choices via food labelling strategies. Adjacent laws notwithstanding, Switzerland, in international perspective, has still a relatively weakly developed public health policy (OECD and WHO 2006). The federal authorities are therefore bound to rely on collaborative modes of governance between federal, cantonal, and private actors in public health policy-making and implementation. This collaborative mode of governance, dictated by a weak statutory basis, is clearly visible in the conceptualization of the SNP and in the policy instruments it can apply.

To reach its goals, the SNP strongly relies on collaborative governance structures in which the food industry and the cantons play important roles. Food manufacturers and suppliers are identified as key policy targets, as they influence important components of the context surrounding food choices. By encouraging the industry to modify recipes and to change advertising behavior, healthier food choices can be made. Moreover, since the federal authorities' policy initiatives are constrained by a weak statutory basis, they have to rely on the cantons as "public health laboratories", in which innovative instruments supporting healthy food choices are developed and implemented.

The collaborative nature of the SNP also manifests itself in the policy instruments that can be chosen to reach the SNP's stated goals (see below). A strong statutory basis is a precondition for the application of policy instruments that compel policy targets to change their behavior (sticks) and for policy instruments that work with relatively strong, often monetary, incentives to bring about behavior change among policy targets (strong carrots). In the absence of such a statutory basis, the SNP can only rely on relatively weak policy instruments to reach its goals (mainly sermons).

2.5.1.4 Goals of the Swiss Nutrition Policy

The SNP wants to make it easier to choose a healthy and varied diet to prevent the spread of NCDs, thereby contributing to the well-being and health of the Swiss population and to the reduction of health costs. The two main goals of the SNP are the strengthening of nutritional literacy among the Swiss population and the facilitation of healthy food choices. Awareness of the health implications of particular food choices is the precondition for a healthy diet. Therefore, the SNP wants to increase awareness and improve the informational basis on which Swiss citizens make their daily food choices. "Dietary information must be easily accessible, clearly understandable for everyone, and possible to implement in everyday life".[73] However, despite adequate and sufficient information, making healthy food choices is often difficult because consumers are tempted to eat unhealthy food or because healthy food is more difficult to come by in particular contexts. The SNP therefore also aims at improving the framework conditions for healthy food choices, e.g. by changing the selection of products available in particular environments or by making available products healthier. Overall, the SNP wants that everyone "living in Switzerland is able to choose a balanced and varied diet. They possess the skills to do so and have the necessary environment they need in order to autonomously maintain a healthy lifestyle irrespective of their origin, socio-economic status and age".[74]

[73] Eating Well and Staying Healthy: Swiss Nutrition Policy 2017 – 2024. See: https://www.blv.admin.ch/blv/en/home/das-blv/strategien/schweizer-ernaehrungsstrategie.html. Accessed on February 1, 2019.

[74] Eating Well and Staying Healthy: Swiss Nutrition Policy 2017 – 2024. See: https://www.blv.admin.ch/blv/en/home/das-blv/strategien/schweizer-ernaehrungsstrategie.html. Accessed on February 1, 2019.

In the next two sections, we present the actors involved in the development and in the implementation of the SNP and give an overview of the instruments they apply to reach the goals of the SNP.

2.5.2 Main Policy Actors

To systematically map the actors involved in the development and delivery of the SNP, we distinguish between federal and cantonal actors, and between public actors in charge of the policy and semi-public or private actors involved in the implementation of particular instruments.

2.5.2.1 Public Actors

The federal unit in charge of the SNP is the Federal Food Safety and Veterinary Office (FSVO). The FSVO is responsible for developing and coordinating the implementation of the SNP.

The FSVO receives scientific support from the Federal Commission for Nutrition (FCN), an extra-parliamentary commission set up in 2015. The FCN has an advisory function and prepares "scientifically based opinions and expert reports in the field of nutrition or on the effect of nutrition on health".[75] Its members include "representatives from education and research in the field of nutritional sciences and food sciences, from nutritional medicine, the food industry and food trade, and consumer organizations".[76]

While the FSVO is clearly in charge of the SNP, the Federal Office of Public Health (FOPH) also plays a role. The FOPH is in charge of the Health 2020 strategy and the NCD strategy in which the SNP is embedded and coordinates some of the policy instruments that we present below. Overall, the FOPH's role with regard to the SNP is relatively small, however, as most of the instruments it coordinates do not primarily relate to nutrition but to public health more broadly.

At the cantonal level, public health policy is coordinated by the Schweizerische Konferenz der Gesundheitsdirektorinnen und -direktoren (GDK), an intercantonal platform for the collaboration in health issues. The GDK, which exists since 1919, plays a rather small role in the delivery of public health instruments. However, as can be read from its annual reports, the GDK supports the broader NCD strategy and is thus open to policy impulses from the federal level.[77] One of the commissions of the GDK, the association of cantonal appointees for health promotion (VBGF), represents an important contact point for the federal level when it comes to coordinating and initiating policy measures in the area of public health.

2.5.2.2 Semi-public and Private Actors

The most important semi-public and private actors in the realm of the SNP are the Swiss Society for Nutrition (SGE) and the Stiftung Gesundheitsförderung Schweiz (GFCH). While the SGE represents the primary "information delivery vehicle" for the federal authorities (mainly related to the "health literacy" goal of the SNP), the GFCH can be conceived as the Confederation's main "coordination vehicle" for creating bottom-up governance solutions (mainly related to the "framework conditions" goal of the SNP).

The Swiss Society for Nutrition (SGE) is a public association founded in 1965. Its primary purpose is to provide the Swiss population with nutrition-related information and to promote research in this field. It has a service agreement with the FSVO. The SGE sees itself as a national communication agency for health issues and performs this role primarily by means of information services. It provides information on nutrition-related issues both directly to the public and to mediators such as health practitioners or non-governmental

[75] Source: https://www.eek.admin.ch/eek/en/home.html. Accessed on February 1, 2019.

[76] Ibid.

[77] Source: https://www.gdk-cds.ch/fileadmin/docs/public/gdk/gdk/jahresberichte/gdk-jb-2016_de_web.pdf. Accessed on February 1, 2019.

organizations (NGOs) in various forms (see below). Moreover, the SGE provides a platform for information exchange between actors involved in public health issues such as experts or NGOs and a network for experts.

The Stiftung Gesundheitsförderung Schweiz (GFCH) is a private foundation that collaborates with cantons and the food industry in health promotion. It is funded by the federation, the cantons and health insurers, which are obliged under Article 19 of the federal law on health insurance to promote disease prevention and coordinate their activities with the cantons by means of an overarching organization. Like the SGE, the GFCH targets both the Swiss population and mediators such as schools or companies with its activities. These activities concern public health more broadly, but some of them target the reduction of obesity, for which healthy nutrition is considered a key facilitator. The GFCH stimulates the adoption of health promotion measures by the cantons (cantonal action programs, KAPs) and by the industry (workplace health management), and coordinates and evaluates these measures (see below). As such, the GFCH is the federal authorities' primary instrument to coordinate a bottom-up approach for the development of public health policy in Switzerland.

Next to SGE and GFCH, there are other semi-public and private actors present in the public health policy field, albeit less directly involved in the implementation of the SNP. The most important are Public Health Schweiz and CardioVasc Suisse. Public Health Schweiz is an independent professional association consisting of individual and organizational health experts. One of its working groups, the Fachgruppe Ernährung, serves as an expert platform for nutrition-related issues within Public Health Schweiz. It maintains contacts with federal authorities, NGOs and research institutes and regularly publishes statements on policy-relevant nutrition questions. CardioVasc Suisse is an alliance of NGOs working in the public health sector, members or partners of which are the SGE, the GFCH and Public Health Schweiz, among others. The primary purpose of the alliance is to coordinate the public health related advocacy activities and lobbying activities of its members.

2.5.3 Policy Instruments

We have already mentioned that the weak statutory basis of the SNP manifests itself in the type of policy instruments it can apply to reach its goals. A weak statutory basis prevents policy-makers from applying policy instruments that compel policy targets to change their behavior (sticks). They can only rely on informational instruments (sermons) and weak incentives (carrots) to reach the policy's stated goals. Within the sermons category, however, one can identify a significant range of instruments in place that work towards increasing the nutritional literacy of the Swiss population. Also weak incentives that work towards improving the framework conditions for healthy food choices can be found.

The SNP in its present form is still a very young policy. A fully-fledged action plan that integrates existing policy instruments in a coherent scheme and concretizes the implementation of planned instruments has only recently been published.[78] Moreover, it should be noted that many of the policy instruments in the public health field do not target nutritional aspects but other public health related aspects such as exercising or workplace health. This is particularly true for many of the cantonal action programs (KAPs) and the workplace health management programs administered by the GFCH. In the following, we only give an overview of instruments that are already in place and that are related to nutrition.

We distinguish between *three instrument categories* applied within the realm of the SNP: 1) informational instruments that aim to improve nutritional literacy, 2) instruments targeting the framework conditions of healthy food choices, and 3) supportive instruments that ensure an adequate implementation of the SNP. These instruments are delivered directly by federal authorities, through its main delivery vehicles SGE and GFCH, and through the cantons.

[78] The action plan was published in June 2018. Cf. https://www.aktionsplanernaehrung.ch/. Accessed on February 1, 2019.

2.5.3.1 Informational Instruments

Informational instruments aim to provide nutritional information for the general population, for specific target groups, and for mediators such as doctors or nutrition experts, who pass on this information in daily contact with the population. Informational instruments constitute the most extensive instrument category within the SNP. They can take different forms and are distributed through flyers, booklets, reports and magazines, via campaigns, and on the internet, or are directly attached to products.

A basic and traditional informational instrument are regulations on food content declarations which provide a basis for healthy food choices. These regulations detail the nutritional information that food distributors must attach[79] to their products. The most important declarations concern ingredients, calories, and allergy notifications.

Another prominent informational instrument is the Swiss food pyramid, published by the FSVO and the SGE. The food pyramid graphically illustrates a balanced and healthy diet and gives concrete, diet-related recommendations.[80] A recent evaluation reveals that the food pyramid is well known by mediators and by the population, and that it provides easily understandable, though very general, information (gfs-zürich, 2016). The policy actors also distribute nutritional information through booklets (e.g. "Diet and nutrition during pregnancy and while breastfeeding"), flyers (e.g. "Versalzen Sie sich Ihre Gesundheit nicht"), and scientific reports (e.g. on iodine supply, on vitamin D deficiency, or on proteins in human nutrition). To sensitize the Swiss population to nutritional topics, the policy actors also rely on issue-specific information campaigns (e.g. "Just do it" by the GFCH). Other informational instruments are targeted at particular parts of the population. For example, the FOPH, in collaboration with the Swiss Red Cross, publishes nutrition-related information in foreign languages through the platform Migesplus.ch. Another targeted instrument is the nutrition test nutricalc, through which the SGE provides individualized dietary recommendations.

While most informational instruments target citizens directly, there are also informational tools that are primarily targeted at mediators such as practitioners or educators. The SGE offers advanced training on nutritional aspects for practitioners such as kindergarten teachers. Moreover, it offers consulting services to companies like analyses of food offers in companies or workshops on healthy nutrition. The SGE's quarterly magazine Tabula is targeted at health practitioners who want to pass on nutritional information to their customers.

2.5.3.2 Instruments Targeting the Framework Conditions of Healthy Food Choices

Policy instruments targeting the framework conditions of healthy food choices are much less widespread than informational instruments. The instruments in this category set incentives for the food industry to improve the framework conditions of healthy food choices (carrots).[81]

In this category, the major instruments are Actionsanté and Fourchette verte. Actionsanté is a cooperation of the FOPH and the FSVO that aims to incorporate the food industry into the SNP via so called "promises for action" relating to the composition and supply of foods, advertising behavior and the promotion of health literacy.[82] Canteens, food producers and distributors that publicly commit to implementing measures in one of those areas are allowed to use the logo of Actionsanté. Commitments to reduce the amount of salt or sugar in offered products or Swiss Pledge, by which food producers and distributors commit to limit advertisement of fatty, salty and sugary foods to children, are typical examples. The policy initiative Fourchette verte is based

[79] This involves oral information transmission in supermarkets, restaurants and canteens.

[80] Since June 2018, the food pyramid also exists in app form. See https://www.aktionsplanernaehrung.ch/Aktuell/neue-app-fuer-eine-ausgewogene-ernaehrung. Accessed on February 1, 2019.

[81] From the perspective of food consumers, however, they constitute 'sermons', as logos allow them to make more informed food choices.

[82] Source: https://www.bag.admin.ch/bag/de/home/strategie-und-politik/nationale-gesundheitsstrategien/strategie-nicht-uebertragbare-krankheiten/actionsante.html. Accessed on February 1, 2019.

on a similar mechanism.[83] Companies in the food service industry such as restaurants or canteens are awarded a protected label if they offer balanced meals in accordance with the food pyramid. Fourchette verte is part of the KAPs administered by the SGE.

2.5.3.3 Supportive Instruments

Another group of policy instruments supports the implementation of the SNP by 1) providing an *adequate information basis* for targeted and successful policy interventions, and by 2) *facilitating coordination* of the many actors involved in the governance structures surrounding the SNP.

Assessing the long-term health effects of nutrition-related policy interventions is very difficult and can only be done based on reliable data. Therefore, federal authorities have recently intensified their data collection efforts in the area of health and nutrition. The most important instruments in this category are the Swiss Health Surveys, menuCH, and the Monitoring-System NCD. The Swiss Health Surveys are carried out by the Federal Statistical Office on a five-year basis since 1992. They collect representative data on the health situation of the Swiss population and on health-relevant behavior. menuCH is a national nutrition survey commissioned by the FSVO and the FOPH that runs since 2014 and collects representative data on food consumption, eating and exercising habits and anthropomorphic measurements of the Swiss population.[84] The Monitoring-System NCD, run by the FOPH since 2017, provides additional data on the nutrition situation of the Swiss population and is the successor of the "Monitoring-System Ernährung und Bewegung" (MOSEB).[85]

Due to its bottom-up governance structures, public health policy in Switzerland unavoidably features many public, semi-public, and private actors. Among these actors, coordination is important to reach common goals and a certain level of efficiency in policy delivery. Therefore, there are several policy platforms by which actors can exchange information and coordinate their approaches. The most important platform is the "Dialog Nationale Gesundheitspolitik", where federal authorities and cantons coordinate their policy approaches in the area of public health.[86] A more targeted platform is "Bildung + gesundheit Netzwerk Schweiz" (b+g), where actors coordinate public health interventions in the educational sector.[87] Finally, associations like the SGE also provide intra-organizational platforms for members and supporters to exchange information.

2.5.4 Relevant EU Policies and Actors

As the policy goals in the area of public health mainly relate to the domestic arena, Swiss policies do not need to adapt to international norms. Accordingly, Switzerland engages with the international environment much less intensively than in agriculture and food safety.

2.5.4.1 Little Coordination Switzerland-EU

The global roots of the Swiss nutrition policy appear to go back to the International Conference on Nutrition of the World Health Organization (WHO) in 1992. As the WHO member states subsequently undertook to develop and implement national strategies, Switzerland published its first nutrition strategy in 2001.[88] The EU does have healthy nutrition on its agenda, yet there does not appear to be explicit coordination of Swiss and EU strategies and activities.

[83] Source: http://www.fourchetteverte.ch/de/. Accessed on February 1, 2019.

[84] Source: https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/ernaehrung/menuch.html. Accessed on February 1, 2019.

[85] Source: https://www.bag.admin.ch/bag/de/home/das-bag/ressortforschung-evaluation/forschung-im-bag/forschung-nichtuebertragbare-krankheiten/monitoring-systemncd/monitoring-system-ernaehrung-bewegung.html. Accessed on February 1, 2019.

[86] Source: https://www.bag.admin.ch/bag/de/home/strategie-und-politik/nationale-gesundheitspolitik/dialog-nationale-gesundheitspolitik-staendige-plattform-bund-kantonen.html. Accessed on February 1, 2019.

[87] Source: https://www.bildungundgesundheit.ch/. Accessed on February 1, 2019.

[88] Source: https://www.blv.admin.ch/blv/en/home/das-blv/strategien/schweizer-ernaehrungsstrategie.html. Accessed on February 1, 2019.

2.5.4.2 Relevant EU Policies

The EU can adopt health legislation under the Treaty on the Functioning of the European Union if it regards the protection of public health, the approximation of laws, or social policy. Outside the area of food safety and the making of Nutrition and Health Claims when labelling food products,[89] there currently is no relevant EU legislation in the area of healthy nutrition. Policies related to agricultural production, food safety and nutrient requirements are organized at the EU level, whereas concrete public health measures are embedded into the socio-economic and health context at the member state level. Due to the subsidiarity principle, EU public health policy mainly serves to complement national policies, and to ensure health protection in all EU policies.

In 2007, the Commission established a coherent and comprehensive, but non-binding Community strategy on nutrition, overweight and obesity-related health issues. The corresponding White Paper[90] focuses on action that can be taken at local, regional, national and European levels to reduce the risks associated with poor nutrition and limited physical exercise, and sets out the Commission's plans to strengthen monitoring and reporting of the situation through initiatives such as the Nutrition Policy Database or the International inventory of documents on physical activity promotion. The High Level Group on Nutrition and Physical Activity was set up to strengthen the role of governments in counteracting overweight and obesity.[91]

Moreover, the EU invests in health issues, e.g. by co-financing research as well as the EU health program, whose first objective is to promote health, prevent disease and foster healthy lifestyles through "health in all policies". The Program (in which Switzerland cannot participate) is implemented by means of annual work programs agreed with countries on a number of annually defined priority actions and the criteria for funding actions (grants and tenders) under the program. [92] Horizon 2020, the EU's biggest Research and Innovation programme, which is also eligible to Swiss research institutions, has its own funding program Food & Healthy Diet. Moreover, the European Commission's recently launched Food 2030 agenda is an EU research and innovation policy whose priorities are: Nutrition for sustainable and healthy diets, climate smart and environmentally sustainable food systems, circularity and resource efficiency of food systems, and innovation and empowerment of communities.[93]

Although cost-effective health promotion and disease prevention is one of the objectives of the DG Health & Food Safety's Strategic Plan for 2016-2020, concrete activities toward this goal are still mainly in the hands of member states. The High Level Group on Nutrition and Physical Activity agreed in December 2015 to an Added Sugars Annex promoting a voluntary reduction of 10% in added sugars in processed food by 2020 (validated, amongst others, by Switzerland). The Directorate General for Health and Food Safety (DG SANTE) of the European Commission is also working on an impact assessment on trans fats, based on which the Commission may propose an initiative aiming to restrict the use of industrially produced trans fatty acids in foods.[94] However, an overarching European food and nutrition policy is yet to materialize.[95]

2.5.4.3 Actors

DG SANTE looks at sustainability and public and consumer health separately from food systems or food chains. Relying on input and agreement from EU Member States, it prepares and adopts an annual work program that

[89] Source: https://ec.europa.eu/food/safety/labelling_nutrition/claims_en. Accessed on February 1, 2019.

[90] See http://ec.europa.eu/health/archive/ph_determinants/life_style/nutrition/documents/nutrition_wp_en.pdf. Accessed on February 1, 2019.

[91] Source: https://ec.europa.eu/health/nutrition_physical_activity/high_level_group_de. Accessed on February 1, 2019.

[92] Source: https://ec.europa.eu/health/policies/overview_en. Accessed on February 1, 2019.

[93] Source: https://ec.europa.eu/research/bioeconomy/index.cfm?pg=policy&lib=food2030. Accessed on February 1, 2019.

[94] Source: https://ec.europa.eu/info/sites/info/files/strategic-plan-2016-2020-dg-sante_en_0.pdf. Accessed on February 1, 2019.

[95] Source: https://www.wur.nl/upload_mm/8/2/3/cd1e12fa-ea45-4206-a1c8-94ab059b326e_2610_TowardsaEuropeanFood-LR.pdf. Accessed on February 1, 2019.

defines annual priorities, communicates with internal stakeholders, and produces reports and evaluations.[96] DG SANTE's Public Health component (which includes health determinants) is separate from safety and from consumer health. In this area, the Consumers, Health, Agriculture and Food Executive Agency (CHAFEA) implements the EU Health Program, the Consumer Program and the Better Training for Safer Food program.[97] As mentioned earlier, the High Level Group on Nutrition and Physical activity is composed of EU (and EFTA) government representatives and is led by the European Commission. The group enables governments to share analysis, policy ideas and best practices, and develop common approaches, works on priorities for healthy nutrition, facilitates relevant collaboration with and between stakeholders as well as the sharing of evidence, data and best practices, and prepares the groundwork for relevant prevention and promotion initiatives agreed by the steering group on promotion and prevention.[98]

The group holds regular meetings with the EU platform for action on diet, physical activity and health. This platform is a forum for European-level organizations, including food business operators, consumer organizations, public health NGOs, and scientific and professional associations. Its members subscribe to voluntary commitments and share their action plans with each other, setting out what they intend to achieve and by what means. The WHO, the Joint Research Center (JRC) and the European Commission jointly provide their assessment on whether commitments are sufficiently relevant to the objectives of the platform. Members produce annual monitoring reports that are examined by external auditors.[99] Moreover, the European Food Safety Authority (EFSA) is an independent regulatory agency that takes the perspective of the food chain. EFSA's Panel on Nutrition, Dietetics and Allergies (NDA) advises on recommended intake values for macro and micronutrients. The NDA is also involved in attempts to harmonize pan-European food and nutrition surveillance. However, dietary guidelines are not the competence of EFSA, but of the member states. National Focal Points promote the opportunities of the Health Program, advise and assist applicants, contribute to reporting and evaluation, and disseminate results.[100]

2.5.5 Overall Assessment of Public Health Policy

Public health policy in Switzerland is a policy area "still in the making", with many policy instruments not yet implemented. Hence, it is particularly difficult to comprehensively assess the policy instruments that are supposed to improve the nutritional literacy among the Swiss population and the framework conditions for healthy food choices. Despite this difficulty, however, it strikes the eye that most policy instruments in place target the first goal of the SNP (nutritional literacy), while instruments targeting the second goal (framework conditions) are only weakly developed. The reason for this imbalance lies, as we explained above, in the weak institutionalization of the SNP at the federal level. A weak statutory basis prevents federal authorities from assuming a more proactive role in public health policy and from applying policy instruments that work with prohibitive rules or with stronger incentives. In fact, the incentives currently applied within the SNP are only relatively weak "logo incentives". Therefore, the federal authorities strongly depend on the voluntary cooperation of the food industry and the cantons in improving the framework conditions for healthy food choices. This is also the reason why the cantons are considered to be important policy laboratories for the future development of public health policy in Switzerland (Vatter & Ruefli, 2014). The NCD strategy accordingly formulates the goal that all cantons develop comprehensive cantonal public health programs in the future; programs that not only focus on tobacco and alcohol consumption, but on public health more broadly (VBGF, 2010). While this is not an unrealistic goal, it is clear that much more work will be needed. The cantonal action programs (KAPs) that are in place so far are the most important steps in this direction.

[96] Source: https://ec.europa.eu/info/departments/health-and-food-safety_en. Accessed on February 1, 2019.

[97] Source: http://ec.europa.eu/chafea/. Accessed on February 1, 2019.

[98] Source: https://ec.europa.eu/health/nutrition_physical_activity/high_level_group_en. Accessed on February 1, 2019.

[99] Source: https://ec.europa.eu/health/nutrition_physical_activity/platform_en. Accessed on February 1, 2019.

[100] Source: https://www.wur.nl/upload_mm/8/2/3/cd1e12fa-ea45-4206-a1c8-94ab059b326e_2610_TowardsaEuropeanFood-LR.pdf. Accessed on February 1, 2019.

However, while they are generally evaluated positively (Fässler, Laubereau, & Balthasar, 2014), they are few in number and only targeted at adolescents and elderly people.

In international comparison, Switzerland tends to lag behind in implementing active policies aiming at fostering healthy nutrition. Thus, rather than constraining the Swiss scope for action, international initiatives, such as the 2015 Milan Declaration,[101] provide an opportunity to push this agenda forward. While the EU has a comprehensive yet non-binding strategy for healthy nutrition, consisting of a mix of sermons and sticks (e.g., through financing research), Switzerland only perfunctorily benefits from these instruments (e.g. through Horizon 2020).

[101] Source: http://easo.org/2015-milan-declaration-a-call-to-action-on-obesity/. Accessed on February 1, 2019.

2.6 Conclusion

The Swiss food policy landscape is very complex: a multitude of policies can be identified in the three policy fields of agriculture, food safety, and public health. These policies pursue a number of goals, address different policy targets, and involve a multitude of public and private actors in implementation. Each policy field contains a diverse range of policy instruments supposed to reach the goals pursued in that field. For each field, we could identify a distinct instrument pattern. While agricultural policy primarily works with regulations (sticks) and incentives (carrots) to reach its goals, food safety policy addresses policy targets predominantly by means of strict regulations (sticks). In stark contrast, public health policy mainly relies on informational instruments (sermons) to reach its goals. Obviously, a complex policy landscape with distinct instrument patterns in its various fields requires lots of coordination and bears the risk of incoherencies. The next part of this report addresses this issue. It examines coherences between the instruments in each of the three policy fields (intra-policy coherence), and then systematically analyzes coherences between the policy fields of agriculture, food safety, and public health.

3 Work Package II – Policy Coherence

3.1 Introduction

Whereas the report on work package I presents a detailed and systematic overview of existing policies along the Swiss food chain, this part of the report focuses on the coherence between these policies. In doing so, we continue to structure the policies along the historically grown policy fields of agriculture, food safety and public health. While targeting different parts of the food system, these policy fields must cohere in important ways to ensure the operation of a sustainable and beneficial food system. A lack of coherence and integration between policies affecting the food system sends confusing messages to potential stakeholders and can undermine the achievement of policy goals (Mavrot, Hadorn, & Sager 2018; May, Sapotichne, & Workman, 2006; Thomann, 2017; Tosun & Lang, 2017; Ugland & Veggeland, 2006). An adequate understanding of coherence is also a precondition for the formulation of viable policy suggestions, which is the subject of work package 3. Policy suggestions informed by findings from the research projects of NRP 69 may have implications for policy coherence along the food chain. This part of our report thus serves as an important basis for embedding scientifically informed policy suggestions in the existing policy structure in work package 3.

Our analysis of policy coherence within and between the fields of agriculture, food safety, and public health is based on an understanding of coherence developed by Nilsson et al. (2012). Nilsson et al. (2012, p. 397) define policy coherence as "an attribute of policy that systematically reduces conflicts and promotes synergies between and within different policy areas to achieve the outcomes associated with jointly agreed policy objectives". In other words, coherence within and between agriculture, food safety, and public health is an important precondition for a food system that sustainably produces high-quality food at competitive prices and encourages consumers to eat healthily, thereby contributing to a reduction in diet-related diseases.

To assess the coherence of policies along the Swiss food chain, we follow a three-step approach. In a first step (section 2.2), we examine the coherence *within* the policy fields of agriculture, food safety and public health based on the analyses performed for work package 1 (intra-policy coherence). We first summarize the policy objectives and instruments in each field and then discuss interactions between them. Interactions involve both risks for incoherencies and potentials for synergies between particular policy objectives and policy instruments. In a second step (section 2.3), we examine interactions (potential incoherencies and potential synergies) *between* agricultural policy, food safety policy, and public health policy (inter-policy coherence). In a last step (section 2.4), we discuss the coherence of the Swiss food system with its international context, specifically with EU policies. We conclude with an overall assessment of coherence in Swiss food policy.

3.2 Policy Coherence within Policy Fields

3.2.1 Agriculture

Work package I revealed a great variety of instruments targeting the food chain in the policy field of agriculture. Table 3.1 provides a schematic overview of instruments clustered according to their objectives.

Table 3.1 Swiss policies targeting the food chain in the field of agriculture

	Objective	Instrument
A 1	**Plant-related objectives:**	
	– Ensure the safety and quality of agricultural crops	– National Catalogue of Varieties (propagation of seed material is only allowed when a variety is listed in the Catalogue)
	– Incentivize the breeding of new plant varieties	– Register of Protected Varieties (30 years ownership rights for newly developed varieties)
	– Conserve and promote the sustainable use of plant genetic resources for food and agriculture	– National gene bank – Subsidies for projects aimed at the conservation and promotion of plant genetic resources
A 2	**Animal-related objectives:**	
	– Guarantee animal welfare	– Regulations on the keeping of animals (maximum stock levels, housing and transport regulations) – Subsidies for exceeding the standard requirements for animal keeping – Labels for poultry products (outdoor keeping and free range keeping) – Registration duty for animal breeding organizations
	– Promote the quality of animal breeding and preserve endangered species	– Subsidies for animal breeding organizations – Workshops on animal genetic resources
A 3	**Objectives in the area of production means (feedstuff, fertilizer, plant protection products and veterinary drugs):**	
	– Ensure safety of foodstuff and prevent negative effects of production means on plants, animals and the environment	– Authorization duty for feedstuff, fertilizer and plant protection products – Regulations on the use of veterinary drugs
	– Reduce the application of production means	– National Action Plan Plant Protection Products – National Strategy against Antibiotic Resistances – Seed money for projects reducing the application of production means
A 4	**Food security objectives:**	
	– Ensure arable land is used to produce human nutrition	– Subsidies for ensuring supplies
	– Promote the growing of important foodstuffs	– Subsidies for crops such as potatoes, sugar and rapeseed

	Objective	Instrument
A 5	**Objectives relating to market stability**	
	– Secure sales on the domestic market and agricultural production	– Annual maximum quotas for agricultural products
	– Ensure the market for agricultural products does not collapse due to overproduction	– Temporary financial support “in exceptional circumstances”; for eggs, meat and animals for slaughter – Subsidies for the processing of berries, apples and other fruit – Subsidies to processors of apple and pear juice for storing juice concentrate in their warehouses instead of selling it directly after production
	– Increase market transparency and promote quality of meat	– Quality assessment of meat and animals for slaughter
	– Support sectoral organizations	– Financial support for collective marketing activities by sectoral organizations – Declaring sectoral organizations’ self-help measures to be mandatory for the entire sector in case of threatening actions from non-members
A 6	**Objectives promoting specific products**	
	– Promote the production of meat and milk with high amounts of nutrients	– Subsidies for meat and milk produced predominantly on grassland without additional feedstuff
	– Support the production of cheese as a traditional Swiss product	– Subsidies for dairy farmers who sell their milk to cheesemakers – Subsidies for producing milk without feeding silage
	– Support the production and sales of traditional products stemming from specific regions in Switzerland	– AOP and IGP labels
A 7	**Ecology- and landscape-related objectives**	
	– Promote ecology	– Subsidies for organic farmers – Label for organic products
	– Support farmers in geographically remote regions and in areas that are considered difficult for agricultural production	– Labels for mountain and for alpine products
	– Enhance the quality and sustainability of agriculture and food production	– Financial support for joint measures by producers, processors or traders enhancing the quality and sustainability of agriculture and food production
A 8	**Informational objectives**	
	– Support agriculture in its efforts to produce in a rational and sustainable manner through the acquisition and provision of knowledge	– Financing of Agroscope (public research institute for agriculture) – Financing research projects concerning agriculture – Financial support for consultation projects
	– Create the essential basis for implementing the Agriculture Act and for monitoring its effect	– Collecting and analyzing data on agriculture (economic situation of farmers, prevalence of phosphorus in the environment etc.)

The dense regulation of Swiss agriculture originates from the long history of the policy field. Being in the political focus for about 150 years, actor constellations and related policy priorities have shifted substantially. While this entailed many changes of agricultural policy with new instruments being introduced and old ones abandoned, it also resulted in what policy experts call "layering". Layering occurs when, over time, new policies are added to an existing policy field. Layering may result in incoherencies if the new policy "layer" is insufficiently coordinated with old layers.

Swiss agriculture is a prime example of a layered policy field. The original priority of food security for the Swiss population was complemented throughout the 20th century with the aim of a liberalized market without state interference and with ecological concerns. The different priorities and the policies they produce tend to create dilemmas of coherence. For example, if federal authorities were to cut down on financial support for farmers in order to increase their competitiveness, farmers might reduce unprofitable activities such as cultivating the landscape or providing basic foodstuffs for the population. Likewise, if federal authorities decided to incentivize farmers to produce as much foodstuff as possible to enhance Switzerland's food security, they would have to expect detrimental effects on landscapes and ecological systems from the extended use of production means such as fertilizer or plant protection products.

A complex policy field containing policies directed at various objectives is very likely to produce incoherencies as exemplified above. An exclusive orientation towards either food security, market liberalization, or ecology is politically neither possible nor desirable. Thus, the coexistence of the three primary objectives in Swiss legislation entails tradeoffs that cannot be dissolved completely.

Another type of incoherencies stems from the many actors involved in the policy-making process in the field of agriculture. The more actors with heterogeneous interests there are, the more important it is for federal authorities to strike a balance between competing policy demands. Concessions to powerful actors are thus another source for incoherencies. Examples for these incoherencies can be found in many of the reform efforts in the field of agriculture. The Agricultural Policy Reform 2014-2017 (AP 14-17), for example, featured a strong tendency towards more ecology and less market intervention. However, during the policy-making process, the reform was amended to also consider other objectives. Against the Federal Council's will, a political minority managed to introduce processing subsidies for berries, thus retaining a partly interventionist stance (cf. A 5 in Table 3.1).[102] Therefore, some incoherencies that can be found in the field of agriculture are "incoherencies by design" – incoherencies that are willfully tolerated in the political process due to intensively contested interests.

Overall, due to various priorities and diverging interests, Swiss agriculture can be characterized as a relatively incoherent policy field.

[102] Source: *Amtliches Bulletin Nationalrat* 2012, S. 1543.

3.2.2 Food Safety

To structure the analysis of policy coherence within the policy field of food safety, we first give a schematic overview of the policy instruments as described in Part 1 of our report. Table 3.2 summarizes the various policy instruments (and their particular objectives) applied in the field of food safety.

Table 3.2 Policy instruments targeting the food chain in the field of food safety

	Objective	Instrument
FS 1	**Keep plant products free from harmful substances**	– Regulations on production means (fertilizer, plant protection products)
FS 2	**Keep farm animals healthy and prevent the spread of animal diseases**	– Hygiene regulations – Regulations on animal keeping and transport – Regulations on treating or killing sick animals
FS 3	**Keep animal products free from harmful substances and ensure that only products from healthy animals are processed**	– Regulations on the use of veterinary drugs – Withdrawal periods before slaughtering or processing – Hygiene and sanitary regulations for slaughtering houses and other processing businesses – Monitoring and control of slaughtering
FS 4	**Prevent pathogens, other harmful substances, and GMO treatments from rendering foodstuffs unsafe during processing and distribution**	– Hygiene regulations – Regulation of additives – Regulation of packaging material – Regulation of technologies used to process food – Moratorium on GMO production
FS 5	**Ensure the safety of imported foodstuff**	– Regulations on the import of animals, animal products, plants, feed- and foodstuff – Temporary import restrictions in case of disease outbreaks / discovery of contaminated products during import
FS 6	**Inform consumers about failures in the food safety system**	– Product recalls
FS 7	**Inform consumers about the durability of products and on the safe preparation and consumption of food**	– Regulations on expiry dates – Hygiene recommendations on the preparation and storage of food – Recommendations on specific foodstuff (insects, mushrooms etc.) – Public warnings on contaminated foodstuff
FS 8	**Keep relevant policy actors informed on recent food safety developments**	– Monitoring systems and databases on animal health, animal diseases, animal movements etc. – Regular risk assessments and diagnostics on highly contagious diseases – Farmer registry

Many policy fields in a political system exist next to each other without much exchange or contact. The field of food safety, on the contrary, reaches into other policy fields, spanning the whole food chain from production to processing and distribution, too consumption. Food safety can only be secured if policy interventions prevent harmful substances from entering each of the three "safety areas" described in Part 1 of our report (safety area 1: instruments targeting agricultural production, FS 1 – FS 3; safety area 2: instruments targeting processing and distribution, FS 4 – FS 5; safety area 3: instruments targeting food preparation, consumption, and other public health issues, FS 6 – FS 7). With food safety being a cross-sectional policy problem, the FSVO has been granted significant policy-making authority to coordinate and harmonize policy instruments in the Federal Food Chain Strategy[103]. As explained in the previous part of this report, a top-down organization and comprehensive policy-making authority allow federal authorities to primarily operate with strong policy instruments that compel policy targets to adhere to certain rules in activities related to food production (i.e. sticks).

Together, the top-down organization and the rather homogenous policy mix consisting of detailed instructions for policy targets (sticks) work towards reducing incoherencies in the area of food safety. For one, government agencies endowed with significant authority can actively seek coherence among policy instruments without relying on the consent of other actors. Moreover, the various "sticks" employed in the three safety areas along the food chain do not negatively influence each other but work together in closing gateways for harmful substances entering the food chain.

Against this coherent configuration of policy instruments, we identify only one major source of potential incoherencies in the area of food safety. Namely, incoherencies may emerge if the detailed instructions for policy targets (sticks) and the controls supposed to ensure compliance are not coordinated with each other. If cantonal authorities, on which the FSVO extensively relies to ensure compliance, inadequately control for practices or substances considered harmful by the FSVO, incoherencies at the implementation level can result. To lower the probability for such incoherencies, federal authorities must make sure that the control system is constantly matched to its instructions. Overall, however, food security can be considered a coherent policy field.

[103] Source: https://www.blv.admin.ch/blv/de/home/das-blv/strategien/strategie-lebensmittelkette.html Accessed on February 1, 2019.

3.2.3 Public Health

Table 3.3 gives a schematic overview of the policy instruments (and their particular objectives) applied in the field of public health.

Table 3.3 Policy instruments targeting the food chain in the field of public health

	Objective	Instrument
PH 1	**Provide citizens with nutrition-related information**	– Regulations on food content declarations – Swiss Food Pyramid – Booklets, flyers, and scientific reports about nutrition-related issues – Information campaigns – Migesplus.ch and nutrition test nutricalc (target group specific information)
PH 2	**Provide intermediaries (e.g. health practitioners, employers) with nutrition-related information**	– Advanced training on nutritional aspects for health practitioners – Publications targeted at health practitioners (e.g. Tabula) – Consulting services offered to companies
PH 3	**Ensure adequate framework conditions for healthy food choices**	– Actionsanté – Fourchette verte
PH 4	**Ensure an adequate informational basis for targeted and successful policy interventions**	– Swiss Health Surveys – menuCH – Monitoring-System NCDs
PH 5	**Facilitate coordination among public health actors**	– Dialog Nationale Gesundheitspolitik – Bildung + gesundheit Netzwerk Schweiz (b+g)

Table 3.3 reveals that the number of instruments applied in the policy field of public health is significantly smaller than in the fields of agriculture and food safety. As described above, public health is a relatively young policy field in Switzerland that can only draw on a weak statutory basis. Both these aspects indicate a significant degree of coherence among the policy instruments in the field of public health.

First, in relatively young policy fields like Swiss public health policy, incoherencies resulting from so called “layering” are mostly absent. As described above, policy fields that develop over long time spans frequently experience reorientations stemming from new actor coalitions or additional policy objectives. As a consequence, new policy objectives and instruments are “layered” over each other, oftentimes resulting in incoherencies between old(er) and new(er) objectives and instruments. In a policy field that only exists for a relatively short time span, such incoherencies are very likely to be absent.

Second, a weak statutory basis prevents policy actors from employing the full spectrum of policy instruments (i.e. carrots, sticks, and sermons) to reach their policy goals in a given field. A policy field in which only sermons and weak incentives (carrots) are employed is, quite naturally, much less affected by incoherencies between different instrument types. Taken together, its relatively young age and its weak statutory basis indicate significant policy coherence within the field of public health.

The only major source of incoherence in the policy field of public health can be located within the category of informational instruments (PH 1 – PH 2). Given that the policy actors employ a rather large set of informational instruments, ranging from online information services to print publications and consulting services, there is the risk that the various informational instruments are not well-matched and send conflicting information to both citizens and mediators (like health practitioners or employers). Particularly in the context of a policy field that constantly incorporates new scientific information on nutritional aspects, it is important that the various informational instruments are repeatedly updated and geared to each other. For the instruments supposed to ensure adequate framework conditions for healthy food choices (PH 3), these insights theoretically apply as well. However, since this instrument category is still rather thin, the current risk of incoherencies stemming from contradictory incentives can be considered negligible.

With instruments that facilitate coordination among public health actors and that ensure an adequate informational basis for targeted and successful policy interventions (PH 4 – PH 5), the policy field of public health also disposes of instruments that actively work towards coherence by keeping the various other policy instruments (PH 1 – PH 3) up to date and supplying them with the same type of information. Overall, we identify a significant degree of coherence between the various policy instruments in the field of public health.

3.3 Policy Coherence between Policy Fields

This section examines (in)coherencies between the policy fields of agriculture, food safety, and public health. For each possible link between the three policy fields, we construct screening matrices as proposed by Nilsson et al. (2012). A screening matrix cross-tabulates the various policy instruments to be examined for interactions (potential incoherencies and synergies). This allows for a systematic assessment of coherence between policy fields as it forces one to examine every potential combination of policy instruments for interactions (Nilsson et al., 2012, pp. 400–403). Each cell in the screening matrices contains either a slash (/) or an asterisk (*). A slash indicates that we could not identify interactions between a policy objective and instrument(s) from one policy field and a policy objective and instrument(s) from another policy field. Conversely, an asterisk indicates that we identified interactions (either potential incoherencies or potential synergies) between two policy objectives and their instruments. We discuss any interactions in detail.

3.3.1 Agriculture and Food Safety

Table 3.4 presents the results of our coherence analysis between the fields of agriculture and food safety.

Table 3.4 Screening matrix agriculture and food safety

	FS 1: Keep plant products free from harmful substances	FS 2: Keep farm animals healthy and prevent the spread of animal diseases	FS 3: Keep animal products free from harmful substances and ensure that only products from healthy animals are processed	FS 4: Prevent pathogens, other harmful substances, and GMO treatments from rendering foodstuffs unsafe during processing and distribution	FS 5: Ensure the safety of imported foodstuff	FS 6: Inform consumers about failures in the food safety system	FS 7: Inform consumers about the durability of products and on the safe preparation and consumption of food	FS 8: Keep relevant policy actors informed on recent food safety developments
A 1: Plant-related objectives	/	*	*	/	*	/	/	*
A 2: Animal-related objectives	/	*	*	/	*	*	/	*
A 3: Objectives in the area of production means (feedstuff, fertilizer, plant protection products and veterinary drugs)	*	*	*	/	/	*	/	*
A 4: Food security objectives	/	/	/	/	/	/	/	/
A 5: Objectives relating to market stability	/	/	*	/	/	/	/	*
A 6: Objectives promoting specific products	/	/	/	/	/	/	/	/
A 7: Ecology- and landscape-related objectives	*	*	*	/	/	/	/	/
A 8: Informational objectives	*	*	*	/	/	/	/	*

*Key: / = no interaction, * = interaction (potential incoherence or synergy). Read as: "row influences column" or "column influences row".*

As Table 3.4 demonstrates, the policy fields of agriculture and food safety feature many possible interactions between objectives and instruments. The biggest overlap is situated – not very surprisingly – in what above was labelled as "safety area 1", i.e. where food safety objectives and instruments target primary production (intersection of FS 1 – FS 3 with A 1 – A 8). The interaction analysis reveals the great potential for synergy here, as many agricultural objectives and instruments may strengthen food safety if properly implemented. For example, animal health (FS 2) and, by consequence, the safety of animal products (FS 3) rely heavily on the quality of fodder plants. Agricultural policy guarantees a minimum quality standard by only allowing thoroughly tested plant varieties to be cultivated (A 1) and by closely monitoring the application of fertilizer and plant protection products (A 3). Further, the objective to stabilize the meat market (A 5), specified by the

instrument of quality assessments of meat and animals for slaughter, goes hand in hand with the objective to only process products from healthy animals, which is also ensured by means of controlling measures in slaughtering houses (FS 3). While different actors conduct these controls to avoid conflicts of interests, informational exchange between them could lead to greater efficiency. Finally, the promotion of more ecology in agriculture with subsidies for organic farming or sustainability projects (A 7) can strengthen animal health (FS 2) by improving their living conditions and fostering their immune systems. Evidently, sustainable and organic agriculture (A 7) also serves as a means to keep plant products free from harmful substances (FS 1).

The fact that "safety area 1" heavily interacts with agriculture is further visible at the intersections of A 2 and FS 2 as well as A 3 and FS 1. Regulations on animal keeping and regulations on production means play a role in both agricultural policy (A 2, A 3) and food safety policy (FS 1, FS 2). While the regulations in agricultural policy rather focus on objectives such as animal welfare and ecology, they target the same regulatory object as the food safety regulations. As the respective regulations are well compatible, we see no danger for incoherencies here.

Ensuring the safety of imported foodstuff (FS 5) has a clear impact on plant- and animal-related production (A 1 and A 2) as well as on the concomitant objectives of a safe primary production (FS 1 – FS 3). As plants and animals used in agricultural production are often of foreign origin, it is crucial to examine them closely during importation to prevent the spread of diseases. The common market with the EU is an important guarantor for coherence here, since the majority of imported plants and animals stem from EU member states that are regulated by the same set of laws and subject to the same controls as Switzerland. Thus, border controls are restricted to plants and animals coming from third countries.

Another food safety objective that can largely profit from interactions with agricultural policy is FS 6, "inform consumers about failures in the food safety system". If controls in the areas of animal-keeping (A 2) and production means application (A 3) are implemented seamlessly, the number of failures in the food system to be communicated to consumers is likely to diminish. Conversely, failures in these areas (A 2 and A 3) would have to be remedied with product recalls to mitigate dangers to human health.

Lastly, the two policy fields' information objectives (A 8 and FS 8) each display a host of interactions with other objectives and instruments. Agricultural research and knowledge distribution (A 8) may affect food safety positively, especially in safety area 1 (FS 1 – FS 3). For example, studies on so-called push-pull farming systems render the application of plant protection products unnecessary, thus reducing the risk of harmful substances entering the food chain.

In addition, primary production itself (especially A 1 – A 3) can profit from information gained in the food safety process. For instance, information on newly spreading animal diseases are vital for farmers to take precautionary measures with their own livestock. Overall, the two information objectives can benefit from informational exchange with each other (A 8 and FS 8).

3.3.2 Agriculture and Public Health

Table 3.5 presents the results of our coherence analysis between the fields of agriculture and public health.

Table 3.5 Screening matrix agriculture and public health

	PH 1: Provide citizens with nutrition-related information	PH 2: Provide intermediaries (e.g. health practitioners, employers) with nutrition-related information	PH 3: Ensure adequate framework conditions for healthy food choices	PH 4: Ensure an adequate informational basis for targeted and successful policy interventions	PH 5: Facilitate coordination among public health actors
A 1: Plant-related objectives	*	*	/	/	/
A 2: Animal-related objectives	*	*	/	/	/
A 3: Objectives in the area of production means (feedstuff, fertilizer, plant protection products and veterinary drugs)	*	*	/	/	/
A 4: Food security objectives	*	*	/	/	/
A 5: Objectives relating to market stability	*	*	/	*	/
A 6: Objectives promoting specific products	*	*	/	/	/
A 7: Ecology- and landscape-related objectives	*	*	/	/	/
A 8: Informational objectives	*	*	/	/	/

*Key: / = no interaction, * = interaction (potential incoherence or synergy). Read as: "row influences column" or "column influences row".*

As can be read from Table 3.5, there are important interactions between all instrument categories in the field of agriculture (A 1 – A 8) and policy instruments that provide citizens and intermediaries like health practitioners or employers with nutrition-related information (PH 1 – PH 2). The main reason for this interaction is, quite simply, that agricultural production provides the ground for healthy food choices. Agricultural policy, by and large, must make sure that citizens are able to buy products that are part of a healthy and equilibrated diet. Moreover, agricultural policy must make sure that these products can be bought at affordable prices. Otherwise, consumers cannot, or are unwilling to, comply with dietary recommendations. For example, if the Swiss Food Pyramid recommends the consumption of a certain amount of fish or vegetables on a daily basis, but these products are very expensive or hardly available in Switzerland, then it is unlikely that consumers (especially the less well-off) can implement those recommendations. To avoid incoherencies between agricultural production and nutrition-related information, public health policy must therefore consider the domestic market situation for healthy products. Several labels informing

consumers about the content and origin of specific products (A 6 – A 7) can also help consumers to make healthy food choices.

Another interaction exists between agricultural instruments targeting market stability (A 5) and public health instruments that aim to create an adequate informational basis for targeted and successful policy interventions (PH 4). This interaction points to a potentially fruitful coordination between agriculture and public health policy. The policy instruments collecting nutrition-based information (PH 4), from the Swiss Health Surveys, to menuCH, to the Monitoring-System NCDs, yield important information about the eating habits of Swiss consumers. A better understanding of the eating habits of Swiss consumers may be useful for creating effective and up-to-date policy instruments to stabilize agricultural markets (A5). As described in the first part of our report, federal authorities aim to interfere in agricultural markets as little as possible, and if they do so nevertheless, they primarily target the supply side. However, subsidies for particular products, annual maximum quotas or temporary financial supports are still applied in the field of agriculture. More information about the demand side of agricultural markets (i.e. consumers) may help to fine-tune these types of market-stabilizing interventions. Overall, we identify important interactions between the fields of agriculture and public health.

3.3.3 Food Safety and Public Health

Table 3.6 presents the results of the coherence analysis of the policy fields of food safety and public health.

Table 3.6 Screening matrix food safety and public health

	PH 1: Provide citizens with nutrition-related information	PH 2: Provide intermediaries (e.g. health practitioners, companies) with nutrition-related information	PH 3: Ensure adequate framework conditions for healthy food choices	PH 4: Ensure an adequate informational basis for targeted and successful policy interventions	PH 5: Facilitate coordination among public health actors
FS 1: Keep plant products free from harmful substances	*	/	/	/	/
FS 2: Keep farm animals healthy and prevent the spread of animal diseases	*	/	/	/	/
FS 3: Keep animal products free from harmful substances and ensure that only products from healthy animals are processed	*	/	/	/	/
FS 4: Prevent pathogens, other harmful substances, and GMO treatments from rendering foodstuffs unsafe during processing and distribution	*	/	/	/	/
FS 5: Ensure the safety of imported foodstuff	*	/	/	/	/
FS 6: Inform consumers about failures in the food safety system	*	*	/	/	/
FS 7: Inform consumers about the durability of products and on the safe preparation and consumption of food	*	*	/	/	/
FS 8: Keep relevant policy actors informed on recent food safety developments	/	/	/	/	/

*Key: / = no interaction, * = interaction (potential incoherence or synergy). Read as: "row influences column" or "column influences row".*

A first interaction between the two policy fields exists at the intersection of the majority of food safety instruments (FS 1 – FS 7) and policy instruments that provide citizens with nutrition-related information (PH 1). Regulations on food content declarations (which are an important part of PH 1) inform consumers about the content of particular foods. For this information being not only comprehensive but also correct, food content declarations rely on food safety policy. For example, declarations on products containing particular

types of meat assume that food safety instruments prevent these products from containing other types of meat. Moreover, food content declarations assume that products are generally free from harmful substances. Otherwise, they would have to additionally declare the risk of products being affected by various harmful substances. Taken together, food content declarations depend on “preparatory work” in the field of food safety so that they can correctly and comprehensively inform consumers about the content of food.

A second interaction exists between policy instruments that inform consumers about food-safety relevant issues (FS 6 – FS 7) and policy instruments that provide citizens and intermediaries like health practitioners or employers with nutrition-related information (PH 1 – PH 2). Both these instrument groups rely on functioning communication channels to effectively reach relevant consumers. This provides potential for coordination, as food-safety relevant information could be integrated into dietary recommendations. For example, dietary recommendations on the consumption of fish could be accompanied by information on how to store and prepare fish in ways that reduce the risk of food poisoning. Overall, we consider the fields of food safety and public health to be relatively well coordinated.

3.4 Coherence with EU and International Policies

In this paragraph, we assess the coherence of Swiss policies with international commitments. In doing so, we concentrate on Switzerland's compliance with and contribution to the goals defined in these international commitments. This focus on goals rather than instruments is warranted because soft rules and non-binding rules prevail at the international level; instruments mostly materialize at the level of nation states in order to achieve internationally shared objectives.

3.4.1 Switzerland as an Entrepreneur in Multistakeholder Commitments

Next to its cooperation with the European Union (EU), Switzerland is closely embedded in an international network of binding and non-binding commitments in the area of agriculture, food safety, and public health. For instance, Switzerland has been described as being among the Food and Agricultural Organization's (FAO) foremost partners. Switzerland cooperates in and supports programs in areas such as food loss, waste reduction, sustainable food systems, governance of tenure, rural livelihoods, genetic resources, nutrition, animal health, and water management. It also rapidly responds to and supports the FAO's resilience program. All of this indicates the extent and depth of Switzerland's commitment to shared food security and sustainable agricultural development goals.[104] Moreover, Switzerland adheres to the principles and recommendations of the Organization for Economic Cooperation and Development (OECD). Switzerland also generally has a good reputation as a compliant member of private regulatory networks and labels setting quality standards for the industry.[105]

3.4.2 The Challenge of Ensuring the International Competitiveness of the Swiss Food Industry

The OECD's latest review of Swiss agricultural policies suggests that Switzerland has adopted an elaborate system of agricultural policy measures and gradual reforms since the mid-1990s by reducing market interventions and increasing the role of direct payments. In international comparison, these policies have generally been successful in improving the environmental performance of Swiss agriculture. Conversely, the impact on the competitiveness of the Swiss food and beverage sector is more mixed; with most of the food industry performing weakly compared to competitors in EU benchmark countries.[106] However, the Swiss government, which protects its own agricultural industry with record-high duties and subsidies, has recently faced criticism from the World Trade Organization (WTO). With the WTO Agreement on Agriculture prohibiting all future export subsidies, Switzerland might need to revise its law (the so-called Swiss Chocolate Law), which governs subsidies for food exporters for the difference between Swiss and global market prices for milk and grains. Switzerland has lately failed to comply with most WTO-approved tariff quotas, facing the challenge to avoid breaching the WTO Agreement on Agriculture while still supporting its own agricultural industry and food exporters.[107]

3.4.3 Coherence with EU Policies

Table 3.7 below maps the main objectives of the relevant EU policies in the three areas as described in the report of work package 1. The table indicates the overarching coherence of the Swiss policies with these goals in terms of potential interactions. The coherence of Swiss with EU policies is generally very high, and no significant potential incoherencies (other than the potential intra-and inter-policy incoherencies discussed

[104] Source: http://www.fao.org/countryprofiles/index/en/?iso3=CHE.Accessed on February 1, 2019.

[105] Source: https://www.blw.admin.ch/blw/de/home/international/institutionen/multistakeholder-partnerschaften.html. Accessed on February 1, 2019.

[106] Source: https://read.oecd-ilibrary.org/agriculture-and-food/oecd-review-of-agricultural-policies-switzerland-2015_9789264168039-en#. ccessed on February 1, 2019.

[107] Source: https://www.swissinfo.ch/eng/business/chocolate-law_how-wise-guy-switzerland-is-outwitting-the-wto/43243886. Accessed on February 1, 2019.

earlier at the national level, which can be assumed to also exist at the international level) were detected. This means that at the EU level, too, tensions between the goals of food security, market liberalization, and ecology exist. Swiss policies tend to fare well regarding food security and ecology, while a tendency for protectionism runs counter to full market liberalization. Despite important alignments under Switzerland's new General Food Law Revision in 2017, some minor differences with EU legislation still exist.[108]

Thanks to continuous harmonization, the Swiss agricultural policies are generally coherent with the EU rules. Regarding the goals of sustainability and quality, Swiss policies are at least equivalent to the CAP but sometimes also go beyond EU minimal standards (e.g. when it comes to ecological standards) not least thanks to greater resources for supporting producers financially in Switzerland. This can potentially create tensions with the goals of agricultural productivity and competitiveness of EU farmers on the Swiss market. For example, it is more difficult for EU producers to comply with the Swiss requirement of a mandatory 7% of land reserved for ecological focus areas. "Greening" agricultural policies while keeping farmers well off is politically much more difficult in the EU than in Switzerland. Moreover, such advanced ecological standards intrinsically discourage the kind of intensive farming that maximizes productivity.[109]

At the level of food safety, Switzerland is fully integrated in the EU veterinary space. This means that the Swiss food safety regulations are fully equivalent to the EU regulations. While the enforcement of EU food safety law is generally the competence of member states (and Switzerland), the European Commission does mandate audits which also take place in Switzerland. Results suggest that the federal structure leads to cantonal differences in enforcement.[110] As mentioned in WP1, Switzerland also cooperates with the European Food Safety Authority (EFSA) and participates in the EU's Rapid Alert System for Food and Feed (RASFF). The RASFF provides food and feed control authorities with an effective tool to exchange information about measures taken in response to serious risks detected in relation to food or feed, and coordinate the latter. It consists essentially of clearly identified contact points in the Commission, EFSA, EEA and at national level in member countries exchanging information in a clear and structured way by means of an online system called iRASFF. We could not identify any incoherencies relating to issues of food safety; indeed, Switzerland has reported a mediocre number of hazards in 2017.[111]

Finally, in the area of public health, it is less the presence of Swiss policies than their relative absence that might constitute an obstacle in achieving the goals at the EU level (which, however, are largely non-binding for Switzerland anyway). As mentioned previously, Switzerland tends to lag behind in implementing active policies aiming at fostering healthy nutrition. While the EU has a comprehensive yet non-binding strategy for healthy nutrition, Switzerland only perfunctorily benefits from these instruments (e.g. through Horizon 2020). As Table 3.7 reveals, two out of 10 goals of the respective EU policies are not explicitly mirrored in Swiss policies. Specifically, this concerns the goals of promoting "health in all" policies and developing cost-effective health promotion and disease prevention. Moreover, there is also room for coordinating the monitoring systems for healthy nutrition that exist in Switzerland and the EU. This means that there is scope for the Swiss policymakers to improve the coherence of Swiss policies with EU policies in these areas.

[108] Source: https://www.leatherheadfood.com/files/2017/01/White-paper-39-Harmonising-Swiss-and-EU-food-law.pdf. Accessed on February 1, 2019.

[109] Source: https://foodpolicyforthought.files.wordpress.com/2013/05/differences-eu-and-switzerland.pdf. Accessed on February 1, 2019.

[110] Source: http://ec.europa.eu/food/audits-analysis/audit_reports/details.cfm?rep_id=2360. Accessed on February 1, 2019.

[111] Source: https://ec.europa.eu/food/sites/food/files/safety/docs/rasff_annual_report_2017.pdf. Accessed on February 1, 2019.

Table 3.7 Relevant EU policies and food-related goal coherence

	EU policies and main objectives	Swiss policies		
		Agri-culture	*Food safety*	*Public health*
Agriculture	**Agreement between the European Community and the Swiss Confederation on trade in agricultural products**			
	Improve mutual market access	*	/	/
	Eliminate technical barriers to trade	/	/	/
	Mutual recognition of the protected designation of origin (PDO) and protected geographical indications (PGI)	/	/	/
	Dispute settlement	/	/	/
	Free trade Agreement			
	Compensation of commodity-price related differences in costs of products	/	/	/
	Common Agricultural Policy (CAP)[112]			
	Ensure stable supply of affordable food for EU consumers	/	/	/
	Improve agricultural productivity	*	/	/
	Ensure that European Union (EU) farmers can make a reasonable living	*	/	/
	Help tackling climate change and the sustainable management of natural resources	/	/	/
	Maintain rural areas and landscapes across the EU	/	/	/
	Keep the rural economy alive by promoting jobs in farming, agri-foods industries and associated sectors	/	/	/
Food safety	**Rapid Alert System for Food and Feed (RASFF)**			
	Ensure the flow of information between its members	/	/	/
	Enable swift reaction when risks to public health are detected in the food chain	/	/	/

[112] Source: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance_en. Accessed on February 1, 2019.

	Veterinary Agreement[113]			
	Strengthen the free-trade relations between the Parties	/	/	/
	Improve the access of each to the market in agricultural products of the other	/	/	/
	General Food Law[114]			
	Guarantee a high level of protection of human life and health and the protection of consumers' interests	/	/	/
	Guarantee fair practices in food trade, taking into account animal health and welfare, plant health and the environment	/	/	/
	Ensure free movement of food and feed manufactured and marketed in the Union, in accordance with the General Food Law Regulation	/	/	/
	Facilitate global trade of safe feed and safe, wholesome food by taking into account international standards and agreements when developing Union legislation, except where this might undermine the high level of consumer protection pursued by the Union.	/	/	/
	Health and Food Audits and Analysis[115]			
	Ensure that EU legislation on food and feed safety, animal health, animal welfare, plant health and in the area of medical devices is properly implemented and enforced	/	/	/
	Ensure that EU citizens enjoy a high level of safety	/	/	/
	Ensure that goods are traded under safe conditions	/	/	/
Public health	**Community strategy on nutrition, overweight and obesity-related health issues**			
	Better informed consumers	/	/	/
	Make the healthy option available	/	/	/
	Encourage physical activity	/	/	/
	Develop the evidence base to support policy making	/	/	/
	Develop monitoring systems	/	/	*
	Develop a picture of good and best practice	/	/	/

[113] Source: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2002.114.01.0132.01.ENG. Accessed on February 1, 2019.

[114] Source: https://ec.europa.eu/food/safety/general_food_law/principles_en. Accessed on February 1, 2019.

[115] Source: https://ec.europa.eu/food/audits_analysis_en. Accessed on February 1, 2019.

EU health programme			
Promote health, prevent disease and foster healthy lifestyles through "health in all policies"	/	/	*
Protect EU citizens from serious cross-border health threats	/	/	/
Contribute to innovative, efficient and sustainable health systems	/	/	/
DG Health & Food Safety 's Strategic Plan for 2016-2020			
Cost-effective health promotion and disease prevention	/	/	*

3.4.4 Overall Assessment of International Coherence

Overall, the Swiss policies can be considered slightly more protectionist than EU policies, i.e. they use taxpayer's money in order to ensure the competitiveness of Swiss producers in the EU single market. However, and thanks to the close bilateral relations with the EU, this does not go at the expense of Swiss participation in the EU single market. In the area of public health, there is scope (though no obligation) for improving the coherence of Swiss with EU policies and use the EU example as an opportunity to push this agenda further at the domestic level.

3.5 Conclusion

Our analysis of policy coherence within and between policy fields suggests that overall, the Swiss policies of food safety and public health tend to be designed coherently in light of the objectives that they should attain, as well as considering Switzerland's international obligations with the EU. The Swiss agricultural policies have lower levels of overall coherence. While we did not analyze the actual implementation of these policies, in theory, the policy designs entail potential tensions in three main areas.

(1) Facilitating versus correcting markets

Food policies, like many other regulatory policies, are characterized by the coexistence of two competing logics of regulation. Some rules aim to correct common market problems—such as the safety of food—through (re)regulation. A common example of market-correcting regulation is environmental standards for agricultural production. Conversely, other rules may serve to lower restrictions on freedoms or rights or distortions to the common market, such as barriers to trade, in order to facilitate markets. The reduction of tariffs within the Swiss-EU Agreement on Agriculture is an example of a market-facilitating rule. This may lead to a regulatory "race to the bottom" in order to create a "level playing field" for producers and foster free trade (Thomann, 2019).

From the perspective of Switzerland, this tension implies challenging trade-offs. On the one hand, Switzerland confronts the need to compete in the European single market. On the other hand, Swiss policies protect domestic producers, consumers, and the environment. Given Switzerland's generally high market-correcting standards especially compared to the EU, incoherencies with the goal of facilitating markets are unavoidable and may prompt continuous policy adjustments.

(2) Accounting for the existence of multiple objectives

Similar tensions exist at the national level. Especially in the field of agriculture, Swiss policies must strike a balance between several, oftentimes competing objectives. Policies intended to secure food safety, enhance market liberalization, or protect the environment automatically produce tensions that need to be balanced out carefully.

(3) Taking private actors and businesses on board

Finally, the three policy fields of agriculture, food safety, and public health involve—although to different degree—a considerable number of private actors that contribute to the design and implementation of policies. In fact, both national and international policy objectives cannot be achieved without significant cooperation of non-state actors. This cooperation imperative can create tensions that need to be constantly supervised by Swiss policy-makers.

An understanding of coherence within and between policy fields along the Swiss food chain is an important requirement for deriving useful and considered policy suggestions from the research projects conducted under NRP 69. As policy suggestions either entail "new" policies that need to be added to existing ones or revisions of existing policies, each policy suggestion may have implications for coherence. The insights about coherence created in this part of our report thus help us in formulating policy suggestions that do not produce incoherencies or contractions between existing policies.

4 Work Package III – Policy Recommendations

4.1 Introduction

In this part of our report, we analyze the various research projects of NRP 69 for their policy relevance and distill concrete policy recommendations that improve various aspects of the Swiss food system.

In doing so, we proceed in four steps. First, we *assign the research projects* of NRP 69 to the three policy fields that structure our report: agriculture, food safety, and public health. While some of the projects yield policy recommendations that are relevant for more than one of these fields (e.g. recommendations relating to agriculture and food safety), most of the projects regard only one of the three fields. A small group of projects was classified as "overarching", making recommendations that concern the food system as whole.

In a second step, we give a short description of the respective project. In doing so, we focus on the (explicit or implicit) *political problem(s)* the research project (more or less directly) addresses, and on the policy implications that can be derived from the respective project. The research projects of NRP 69 vary considerably in their immediate "policy relevance". While some projects allow concrete policy recommendations to be distilled, other projects contain more basic research that cannot (yet) be transformed into concrete policy recommendations. However, even these projects allow deriving strategic recommendations for the federal authorities on where more comprehensive policy action might be required in the future.

Third, we identify the main (potential) *policy target groups* for the proposed policy measures of each project, i.e. those actors that would need to change their behavior were the recommendations transformed into policy and incorporated into the Swiss policy space. In this step, we also analyze the incentive structures of the policy target groups. The incentive structures yield insights about whether and to which degree policy target groups are willing to change their behavior in line with the proposed policy measures resulting from a research project. To do so, we identify the advantages and disadvantages that arise for potential policy target groups if they adapted their behavior according to the proposed policy measures. Advantages are mainly of an economic or financial nature. Disadvantages arise primarily from the administrative effort and the "costs of compliance" associated with the consideration of the recommendations. If there are both advantages and disadvantages for policy target groups, we give greater weight to the disadvantages, because policy target groups often pay more attention to disadvantages than to advantages (so-called "negativity bias"). In addition, many benefits for policy target groups only arise in the long run, whereas most disadvantages are of immediate importance. Advantages and disadvantages, taken together, yield insights about the attitude of policy target groups towards the recommendations stemming from the research projects. The attitude of policy target groups is an important factor to be considered in the formulation of effective policy instruments.

In the fourth and final step of the analysis, we suggest *concrete policy instruments or policy instrument adaptations* in order to incorporate the recommendations stemming from NRP 69 into the Swiss food system. In doing so, we consider three aspects. First, we match our policy propositions with the expected attitudes of potential policy target groups as analyzed in step three. By tendency, if policy target groups exhibit a positive attitude towards the recommendations, relatively unobtrusive policy instruments (sermons) should suffice to bring them to change their behavior. If policy target groups exhibit a negative attitude, more constraining instruments (carrots and sticks) are required. Second, in formulating policy propositions, we consider existing policies. Some projects yield policy propositions in areas that are already densely populated with policies and, accordingly, require "policy updates". Other projects yield recommendations in areas rather scarcely

populated by policy and, therefore, require new policy measures. Third, we make only policy propositions that have a realistic chance of being implemented in the Swiss political system.

Before we proceed to the individual projects, a caveat is in order: When distilling policy adaptations from the findings of the projects, we take the latter as given. In other words, this part of our report does not evaluate the projects' findings from a scientific perspective or assesses their reliability or generalizability. Rather, it assumes that they are scientifically sound and develops the recommendations made by the research teams further so that they can find their way into the Swiss policy space.

4.2 Individual Projects

4.2.1 Policy Field I: Agriculture

4.2.1.1 Cow Emissions (Dr. Sabine Schrade, Dr. Joachim Mohn, Dr. Angela Schwarm)

Political Problem and Policy Implications

A large proportion of greenhouse and ammonia emissions in Switzerland are caused by dairy farming. A declared goal of the Swiss "Agricultural Climate Strategy"[116] is to considerably reduce these emissions by 2050 compared to 1990. Improvements in dairy farming are a precondition for reaching this goal. In their project "Cow Emissions", researchers from Agroscope, Empa, and ETH Zurich tested different ways to reduce various kinds of emissions through structural and technical adaptations in dairy farming. In particular, they found that ammonia emissions can be reduced considerably by building stables with a slightly sloped solid floor that allows cattle urine to drain faster. Ammonia emissions can further be reduced by introducing raised standing platforms (so called feeding stalls) which lower excrement accumulation and allow for more frequent dung removal. The researchers recommend taking into account those measures when building or converting new cattle housings. Moreover, they recommend introducing a needs-based and balanced diet in dairy farming to further reduce harmful emissions. A follow-up research project funded by the SNF that further investigates the effect of certain feeding practices on emissions (AERCOW)[117] is already underway.

Policy Target Groups and Their Attitude

When it comes to dairy production, the primary policy target group are the *dairy farmers*. Generally, dairy farmers want to generate profit with their dairy production. They can be expected to adopt the project's recommendations if their implementation is at least cost-neutral. As the construction or conversion of cattle houses to reduce ammonia emissions entail certain costs but do not directly yield more profit, we expect dairy farmers to be rather reluctant to follow these recommendations on their own accord. Moreover, dairy farmers might have reservations towards sloped stable floors fearing their livestock might slip and get injured. The same attitude can be expected with regard to nutrition recommendations: dairy farmers should be rather reluctant towards these innovations if they entail more costs and no additional benefits.

Suggested Policy Adaptations

As stated above, we expect the dairy farmers to have a slightly negative attitude towards the project's recommendations. Informational measures (sermons) should therefore be complemented by incentive-based instruments (carrots) to yield a change in behavior. In fact, the project's findings have already informed a number of tailored policy recommendations: They have been directly integrated into the education and training of dairy farmers and consultants. Moreover, the findings are being spread among the public, the respective scientific community, and the concerned federal authorities. In January 2018, the FOAG additionally introduced an incentive-based measure by granting financial contributions to farmers who convert their cattle houses accordingly (solid floors with slope and feeding stalls).[118] We thus conclude that the project's findings are already well embedded in the policy field and that no additional measures have to be taken at this point. If at all, financial contributions could be extended to farmers that feed their livestock with an emission-efficient diet.

[116] Source: Klimastrategie Landwirtschaft. https://www.blw.admin.ch/blw/de/home/nachhaltige-produktion/umwelt/klima.html. Accessed on February 25, 2019.

[117] Source: Ammonia and Greenhouse Gas Emission Reduction from Dairy COWs (AERCOW). http://p3.snf.ch/Project-177061 Accessed on February 25, 2019.

[118] Source: Structural Improvement Ordinance. Verordnung über die Strukturverbesserungen in der Landwirtschaft (SVV). https://www.admin.ch/opc/de/classified-compilation/19983466/index.html. Accessed on February 25, 2019.

Table 4.1 Suggested policy adaptations for the "Cow emissions" project

Target Groups	Sermons	Carrots	Sticks
Dairy Farmers	*FOAG/SERI may continue to include the research findings on emissions and emission reduction measures in the agricultural basic training and further education.*	*FOAG may continue giving financial contributions to dairy farmers who convert their cattle housings in accordance with the research findings.* FOAG may grant financial contributions to farmers for following the project's animal nutrition recommendations.	/

Note: Recommendations in italics are already in place.

4.2.1.2 Healthy Pigs (Prof. Dr. Peter Spring, Dr. Andreas Hofer, Dr. Stefan Neuenschwander, Dr. Martin Scheeder, Dr. Sandra Senti Grieder, Dr. Xaver Sidler)

Political Problem and Policy Implications

Pork production has a negative impact on the environment due to its emission of greenhouse gases and ammonia. Moreover, the frequent use of antibiotics in pig farming increases the risk of antibiotic resistances in pigs. The research project "Healthy pigs", conducted by researchers from the Bern University of Applied Sciences, SUISAG, ETH Zurich, and the University of Zurich, identified several factors that are conducive to an increased number of infections among pigs and thus contribute to a greater use of antibiotics. By improving hygiene conditions, providing enough special feed for young animals, and by not letting animals of varying ages share the same sty, the antibiotic use in pig farming can be reduced considerably. Better data analysis and at least two visits from the veterinary service per year can also help to reduce the use of antibiotics. Moreover, the researchers identified genetic markers in certain pigs that point to a resistance to certain coli bacteria that are responsible for piglet diarrhea. The researchers suggest choosing pigs whose genes are resistant to these bacteria. With regard to the emission of greenhouse gases and ammonia, the research project found that pigs that use proteins more efficiently emit fewer harmful gases. Further research is needed, however, to identify the concrete factors that contribute to higher protein efficiency in pig farming. In the following, we therefore focus on recommendations that target the reduction of antibiotics and their negative effects.

Policy Target Groups and Their Attitude

Farmers (i.e. the corresponding associations) and the SGD (Schweinegesundheitsdienst) are the primary target groups when it comes to regulating pork production. *Farmers* primarily want to produce pork at an advantageous cost-quality-ratio. Generally, they can be expected to comply with recommendations as long as their adoption does not lead to diminished profits. However, a good reputation of the product they sell is also crucial for farmers. As the use of antibiotics in pig farming tends to hamper the image of pork meat, farmers have an interest to cut back on antibiotics. Therefore, if the recommendations that are supposed to reduce their use are effective, farmers can be expected to be open to their adoption.

While the attitude of farmers can be considered favorable under certain conditions, that of the *SGD* should be even more favorable. As one of the primary tasks of the SGD is to promote health standards in pork production,

it takes a keen interest in reducing antibiotics in pig farming and in preventing the onset of antibiotic resistances in pigs. The use of antibiotics tends to damage the image and thus the sale of pork meat.

Suggested Policy Adaptations

Some insights stemming from the project "Healthy pigs" have already led to the adoption of concrete measures on the part of private actors. First, the researchers of the "Healthy pigs" project incorporated their findings into the "Fit Pig" project, which coordinates various research programs concerning sustainable pork production. Second, the researchers transformed the factors that help to reduce infections among pigs into consulting models that are currently tested in field trials. To further distribute the findings of the project among the target groups, the FSVO could systematically include them in the vocational and continuing training programs for farmers. The FSVO could also integrate the findings in the "Animal Health Strategy"[119] and the "Antibiotic Resistance Strategy"[120]. As the incentive structure of the main target groups is principally beneficial, these informational instruments might prove sufficient to considerably change the behavior of pig farmers and the SGD. Additional incentive-based instruments (carrots) can, however, be employed to reduce the use of antibiotics in pig farming. The SUISAG, the service and competence center for the Swiss pig industry, is already working on breeding sows that are resistant to certain bacteria. In 2018, it also initiated a selection program that attempts to eliminate the genetic vulnerability of pigs to piglet diarrhea. As of late, the SGD executes a new health program that helps the participating farmers to reduce the use of antibiotics in their pork production (cf. SuisSano health program[121]). Besides supplying the farmers with the necessary information (sermons), the program gives start-up funding to farmers to encourage their participation in the program and awards them with an according label (carrots). If the SuisSano-Program yields promising results, the federal authorities can enhance the program's sustainability through (further) financial support. Thereby, they could help to establish incentive structures among farmers that help to change their behavior in the long run.

If, contrary to our expectations, those informational and incentive-based policy propositions do not yield satisfying results, the federal authorities could additionally tighten the *Animal Protection Act* and the corresponding *Animal Protection Ordinance* in accordance with the research findings to reduce the use of antibiotics.

[119] Source: Tiergesundheitsstrategie. https://www.blv.admin.ch/blv/de/home/das-blv/strategien/tiergesundheitsstrategie-schweiz.html. Accessed on February 25, 2019.

[120] Source: Strategie Antibiotikaresistenzen Schweiz (StAR). https://www.star.admin.ch/star/de/home/star/strategie-star.html. Accessed on February 25, 2019.

[121] Source: SuisSano Gesundheitsprogramm. https://www.suisag.ch/sante/suissano-gesundheitsprogramm. Accessed on February 25, 2019.

Table 4.2 Suggested policy adaptations for the "Healthy pigs" project

Target Groups	Sermons	Carrots	Sticks
Farmers	FSVO may educate farmers (vocational training and/or workshops) on how to reduce the risk of antibiotic resistances and the emissions of greenhouse gases in accordance with the research findings	FSVO may support the SuisSano health program	FSVO may tighten the requirements for pig farming in the Animal Protection Act/Animal Protection Ordinance
SGD	/	FSVO may supply the SGD with the means to continue and enhance the SuiSano-Program	/

4.2.1.3 Metal Exposure (Prof. Dr. Wolfgang Wilcke, Dr. Moritz Bigalke, Prof. Dr. Emmanuel Frossard, Dr. Armin Keller)

Political Problem and Policy Implications

Mineral phosphate fertilizers (containing cadmium and uranium) as well as manure (containing zinc and copper) are the main causes of the accumulation of trace metals in soils. Trace metals do not only impair soil fertility and plant quality. Certain trace metals also pose a potential health hazard for consumers. In their project "Metal exposure", researchers from the University of Bern, ETH Zurich, and Agroscope analyzed the level of cadmium, copper, uranium, and zinc in soils. They also investigated whether and to which degree these trace metals can enter the human food chain. Their results imply that if the current agricultural practices remain unchanged, concentrations of trace metals will keep on rising. This might have a detrimental effect on the quality and quantity of future crops. The researchers make a number of suggestions to address this problem. First, they suggest introducing minimal guideline values for uranium because the latter is not yet addressed in corresponding laws. Second, the researchers advocate the use of recycled fertilizers that are low in trace metals. Third, they recommend optimizing the distribution of liquid manure to avoid local accumulation of trace metals in the soil. Fourth, they propose to identify and introduce grain varieties that absorb smaller amounts of potentially harmful trace metals (e.g. cadmium) but transport trace metals that are beneficial to human health (e.g. zinc). Finally, the researchers suggest that the amount of trace metals in the soil could be reduced if existing regulations such as guideline values for cadmium, copper and zinc would be implemented more stringently.

Policy Target Groups and Their Attitude

Farmers form the primary target group when it comes to crop production. They are generally interested in producing crop at a favorable cost-benefit-ratio. In the long run, farmers have a keen interest in sustaining their soils' fertility in order to ensure the quality and quantity of their future crop. In the short run, however, farmers are interested in getting the most out of their arable land, applying fertilizers and manure that increase and maintain productivity. In doing so, farmers do not always adhere to the guideline values and thresholds

stipulated by federal law (i.e. the Ordinance on Soil Pollution, VBBo[122] and the Chemical Risk Reduction Ordinance, ChemRRV[123]). This suggests that farmers, especially in the short run, are not very open to the recommendations of the "Metal exposure" project.

A secondary target group consists of *fertilizer producers*, whose products sometimes exceed the minimal guideline values stipulated by federal law. Since fertilizer producers would potentially suffer economic losses from the adoption of the research project's various recommendations, we expect them to exhibit a negative attitude.

Suggested Policy Adaptations

As the incentive structures of the main policy target groups are rather negative, we expect informational instruments (sermons) to have little or no impact. Instead, the FOEN and the FOAG should employ more constraining policy instruments (carrots and sticks) to effect a change in behavior on the part of farmers and fertilizer producers. The only exception to this pattern could consist in recommendations on the optimized distribution of liquid manure, which the FSVO/SERI may additionally integrate in the vocational and continuing training programs for farmers. As mentioned above, there are already guidelines and threshold values in place for cadmium, copper, and zinc. With the exception of uranium, for which new guidelines and threshold values need to be integrated into the Ordinance on Soil Pollution (VBBo) and the Chemical Risk Reduction Ordinance (ChemRRV), the FOEN and FOAG, together with the cantonal actors, should concentrate their efforts on making sure that farmers adhere to existing guidelines.[124] Finally, the FOAG may promote research concerned with identifying grain varieties that absorb fewer harmful trace metals.

[122] Source: Verordnung über die Belastung des Bodens. https://www.admin.ch/opc/de/classified-compilation/19981783/index.html. Accessed on Feburary 25, 2019.

[123] Source: Verordnung zur Reduktion von Risiken beim Umgang mit bestimmten besonders gefährlichen Stoffen, Zubereitungen und Gegenständen. https://www.admin.ch/opc/de/classified-compilation/20021520/index.html. Accessed on February 25, 2019.

[124] Cf. "Nährstoffe und Verwendung von Düngern in der Landwirtschaft – BLW", *https://www.bafu.admin.ch/dam/bafu/de/dokumente/wasser/uv-umwelt-vollzug/naehrstoffe_und_verwendungvonduengerninderlandwirtschaft.pdf.download.pdf/naehrstoffe_und_verwendungvonduengerninderlandwirtschaft.pdf*. Accessed on February 25, 2019.

Table 4.3 Suggested policy adaptations for the "Metal exposure" project

Target Groups	Sermons	Carrots	Sticks
Farmers **Fertilizer producers**	FSVO/SERI may additionally inform farmers (vocational training and/or workshops) about how to optimize distribution of liquid manure	FOAG may promote research concerned with optimizing the transportation properties of grain varieties in order to protect human health	Federal Council may introduce threshold and guideline values for uranium in fertilizers and soils FOAG, together with cantonal actors, should increase compliance with existing regulations on guidelines and threshold values stipulated in the ChemRR and VBBo

4.2.1.4 Organic Food Baskets (Prof. Dr. Marion Fresia, Dr. Jérémy Forney, Julien Vuilleumier)

Political Problem and Policy Implications

Farmers regularly struggle for more economic independence and security. At the same time, consumers often refrain from purchasing sustainably and regionally produced food. Instead, they consume imported non-seasonal vegetables and fruits that have a negative effect on the environment. In the project "Organic food baskets", researchers from the University of Neuchâtel and the Bern University of Applied Sciences investigated how *local contract farming initiatives* (LCF initiatives) can contribute to a healthier and more sustainable food system. LCF initiatives establish direct partnerships between farmers and consumers. The latter subscribe to such an initiative in order to get regional products from farmers on a regular basis. The researchers found that LCF initiatives can not only strengthen the farmers' autonomy, but also encourage consumers to adopt healthier and more sustainable eating habits. Therefore, they recommend promoting such initiatives in various ways and improving the (legal) framework conditions for the development of LCF initiatives.

Policy Target Group and Their Attitude

The main policy target group are *farmers*. LCF initiatives provide farmers with the opportunity to diversify their activities and hence give them more security and economic independence. We therefore expect farmers to generally have a positive attitude towards LCF initiatives.

The second target group consists of *consumers*, particularly those disposing of middle or high incomes. About 80% of the members of existing LCF initiatives are higher educated consumers that belong to the middle or upper class. These consumers should exhibit a positive attitude towards LCF initiatives because they allow them to reinforce their healthy and environmentally friendly lifestyle. Overall, we consider both target groups to be rather favorable of LCF initiatives.

Suggested Policy Adaptations

For some time now, LCF initiatives have been growing throughout Switzerland. As there is no clear opposition towards LCF initiatives, the FOAG and other concerned federal offices should primarily concentrate on creating adequate (legal) framework conditions and coordination structures (carrots) for the flourishing of LCF initiatives throughout Switzerland. Adequate framework conditions encourage and facilitate the workings of LCF initiatives per se. Coordination structures may additionally help to create synergies between different LCF initiatives.

With regard to (legal) framework conditions, adaptations of existing regulations (real estate law, spatial planning etc.) might be necessary in order to help LCF initiatives to develop their full potential. For that purpose, the FOAG could conduct a demand analysis among farmers participating in LCF initiatives to establish which legal framework conditions might need amending.

Regarding the better coordination of existing initiatives, the FOAG could encourage the establishment of a web-based coordination platform administered by a private agricultural actor such as the SBV (Swiss farmers' union) and/or Bio-Knospe. The website could be used to inform farmers and consumers about the advantages and workings of LCF initiatives. Farmers could use the website to exchange best practices and register for LCF initiatives. Moreover, the website could inform consumers about LCF initiatives in their vicinity and even provide them with possibilities to register online.

Next to abolishing barriers to the flourishing of LCF initiatives, federal authorities may also actively encourage their adoption. First, the SERI (*State Secretariat for Education, Research and Innovation*), together with the concerned training facilities, could systematically include information on LCF initiatives (e.g. on their workings or on their economic and environmental advantages) in the basic agricultural and specialist training. Second, the FOAG and other federal offices could further promote LCF initiatives by encouraging public institutions like schools to enter into such partnerships. In doing so, these institutions might serve as role models, encouraging other public and private actors to do likewise.

Table 4.4 Suggested policy adaptations for the "Organic food baskets" project

Target Groups	Sermons	Carrots	Sticks
Farmers	SERI may include information on the workings and advantages of LCF initiatives in the farmers' vocational and specialist trainings	FOAG may create (legal) framework conditions encouraging and facilitating LCF initiatives	/
	SBV may inform farmers about the workings and advantages of LCF initiatives	SBV may support farmers who want to participate in LCF initiatives with an easy web-based sign-up infrastructure	
		FOAG may encourage public institutions to participate in LCF initiatives	
Consumers	SBV may inform consumers about the ecological and health advantages of LCF initiatives on the website	SBV may help consumers who want to get food baskets with an easy web-based sign-up infrastructure	/

4.2.1.5 Safe Cereals (Dr. Susanne Vogelgsang, Mario Bertossa, Dr. Thomas Daniel Bucheli, Dr. Fabio Mascher-Frutschi)

Political Problem and Policy Implications

Infections of cereals with Fusarium fungi can lead to crop losses and pose a health hazard for consumers due to mycotoxins. In order to prevent Fusarium infection, farmers in Switzerland sometimes have to apply fungicides which have a negative effect on the environment. In their project "Safe cereals", researchers from Agroscope looked into different ways to reduce cereal crop infection with fusarium fungi to prevent mycotoxin contamination and reduce the use of harmful fungicides. The researchers found that crop rotation patterns, ploughing, as well as the choice of cereal varieties are important factors in the prevention of fusarium infection. The researchers further suggest to modify crop rotation patterns, to plough the field before sowing, and to only sow cereal varieties that are less susceptible to Fusarium infection. However, the researchers also point to a trade-off inherent in these measures: While ploughing effectively reduces the risk of Fusarium infections, it also reduces soil fertility.

Policy Target Groups and Their Attitude

Farmers are the main policy target group when it comes to adaptations in cereal production. Farmers are interested in reducing the risk of Fusarium infection for at least two reasons. First, they have an economic interest to maximize harvests while keeping expenses for fungicides etc. to a minimum. Second, they can be expected to have a financial and reputational interest in selling safe, non-contaminated cereals to their

customers. Additionally, they could gain a potential market advantage over their competitors by selling pesticide-free cereals. We therefore assume that farmers are largely in favor of the project's recommendations.

Suggested Policy Adaptations

As we expect farmers to exhibit a positive attitude towards measures that reduce fusarium infection, unobtrusive instruments should suffice to foster the adoption of the project's recommendations. There are already a number of policies in place that consider the project's recommendations. For one, the findings were used to refine Agroscope's Fusarium forecasting system "FusaProg".[125] Here, federal authorities may encourage further research into additional cereal varieties and their risk of Fusarium infection to improve the information system FusaProg. Next to this information service (sermons), two financial incentives (carrots) are already in place for farmers to adapt certain crop rotation patterns and to refrain from using pesticides. Namely, the "ecological performance report" (ÖLN)[126], with which farmers must comply in order to obtain certain subsidies, states that crop rotation patterns should be adapted in order to prevent diseases.[127] Moreover, farmers that cultivate cereals without using fungicides can apply for further subsidies for "extensive production".[128] In addition to these financial incentives, the Action Plan on Plant Protection Products[129] intends to evaluate whether pesticide-free plant protection strategies should be better integrated in the education of farmers. This could lead to the development of additional informational instruments in the future (sermons).

With a number of measures already in place or underway, we recommend federal authorities to primarily focus on and encourage research into the potential trade-offs that exist between the different ways to make cereal production more sustainable. This could turn out to be an important basis for policy fine-tuning at a later point in time.

[125] Source: FusaProg. http://www.fusaprog.ch/. Accessed on February 25, 2019.

[126] Source: Ökologischer Leistungsnachweis. https://www.blw.admin.ch/blw/de/home/instrumente/direktzahlungen/oekologischer-leistungsnachweis.html. Accessed on February 25, 2019.

[127] Source: Direktzahlungsverordnung (DVZ), Art. 16.

[128] So called Extenso product contributions. Source: https://www.blw.admin.ch/blw/de/home/instrumente/direktzahlungen/produktionssystembeitraege/beitraege-fuer-extensive-produktion.html. Accessed on February 25, 2019.

[129] Source: Aktionsplan Pflanzenschutzmittel. https://www.blw.admin.ch/blw/de/home/nachhaltige-produktion/pflanzenschutz/aktionsplan.html. Accessed on February 25, 2019.

Table 4.5 Suggested policy adaptations for the "Safe cereals" project

Target Groups	Sermons	Carrots	Sticks
Cereal farmers	Federal authorities may diffuse the research recommendations among education facilities for cereal farmers	/	/
Research Community	/	Federal authorities may encourage further research into additional cereal varieties and their risk of Fusarium infection to improve the information system FusaProg. Federal authorities may encourage research into the trade-offs between measures to reduce negative environmental effects and enhance food safety.	/

4.2.1.6 Sustainable Milk Production (Dr. Pierrick Jan)

Political Problem and Policy Implications

Dairy production in Switzerland has a substantial effect on the environmental sustainability of the food system. In their project, "Sustainable milk production", researchers from Agroscope analyzed the environmental performance of dairy farms in mountain regions. They distinguish between a global and a local dimension of environmental performance. The former is concerned with the number of calories produced per unit compared to its environmental impact, namely the emission of greenhouse gases, the use of non-renewable energy resources, the toxic pollution of water, etc. The latter dimension looks at the local environmental impact, namely the local toxic pollution of the soil, water, etc. per hectare farmland. The researchers find that both dimensions of environmental performance do not necessarily complement each other. Rather, a good global environmental performance is often accompanied by a low local one. So far, however, scientists and policy makers usually only consider one of these two dimensions when addressing the sustainability of dairy farms. The researchers therefore suggest taking into account both environmental performance dimensions when developing policy interventions. They also recommend promoting factors that improve the global and the local environmental performance simultaneously like organic farming, a high educational level among farm managers, low use of cattle concentrates, and the production of milk without silage feeding.

Policy Target Groups and Their Attitude

There are two sets of recommendations given by the researchers: one targeting the policy making process as such and one targeting dairy farming. The former intend to change the institutional setting to enable policy-makers to develop and implement policies that take into account both environmental performance dimensions. Recommendations to improve the overall environmental performance and sustainability of dairy farms, however, intend to alter the behavior of dairy farmers directly. *Dairy farmers* thus form the main policy target

group when it comes to concrete measures. As we consider farmers to be largely profit-oriented, we expect them to welcome measures as long as they are income-neutral. However, if the measures lead to large additional expenditures, farmers are likely to oppose them.

Suggested Policy Adaptations

As seen above, policy interventions often only focus on one environmental performance dimension. We thus recommend to systematically reviewing the current legislation to enhance the policy knowledge in this respect. For this purpose, the FOAG could mandate an evaluation in order to identify and evaluate trade-offs and incoherencies between global and local environmental performance in the current legislation. This evaluation could prepare the ground for the formulation of concrete policy recommendations that better reconcile both environmental performance dimensions. Moreover, federal authorities could make sure that both environmental performance dimensions are systematically considered in the policy-making process by explicitly including both dimensions in the assessment instruments for new legislation (e.g. regulatory impact assessments[130] or sustainability assessments[131]).

The federal authorities, as well as private actors, are already quite active with regard to concrete policy recommendations directed at dairy farmers. Migros, in cooperation with other actors, introduced a new program in 2018 that aims to make milk production more sustainable by reducing the use of cattle concentrates among other things.[132][133] Besides subsidizing organic farming in general, the federal authorities are also working towards a more sustainable milk production. In particular, the Agricultural Policy 2022[134], which is currently in the consultation process, envisages the doubling of the subsidies for milk production without silage feeding. On top of these activities, the federal authorities could consider to include several of the project's findings into vocational training programs and/or workshops for dairy farmers.

[130] Regulierungsfolgenabschätzung (RFA).

[131] Nachhaltigkeitsbeurteilung (NHB).

[132] Source: Groupe ELSA-Mifroma. Lancierung des Produktionssystems „Nachhaltige Milch". February 2018. Accessed on February 25, 2019. http://elsamifroma2040.ch/de/2018/02/lancierung-des-produktionssystemsnachhaltige-milch/.

[133] Source: Migros Medienmitteilung. Die Migros geht neue Wege bei der Milchproduktion. April 2018. https://www.migros.ch/de/unternehmen/medien/mitteilungen/show/news/medienmitteilungen/2018/nh-milch.html. Accessed on February 25, 2019.

[134] Source: AP22+ (Agrarpolitik 2022). https://www.blw.admin.ch/blw/de/home/politik/agrarpolitik/ap22plus.html. Accessed on February 25, 2019.

Table 4.6 Suggested policy adaptations for the "Sustainable milk production" project

Target Groups	Sermons	Carrots	Sticks
Dairy farmers	FOAG may educate dairy farmers via their vocational training and/or workshops on strategies to improve the overall environmental performance of dairy farms	FOAG may continue subsidizing organic farming FOAG may intensify the subsidies for milk production without silage feeding and with reduced use of cattle concentrates.	/
Research Community	/	FOAG may mandate an evaluation in order to identify trade-offs and incoherencies between global and local environmental performance in the current legislation	/

4.2.2 Policy Field II: Food Safety

4.2.2.1 Nano-Preservation (Prof. Dr. Cornelia Gabriela Palivan, Dr. Ozana Fischer)

Political Problem and Policy Implications

Conservative best-before dates are an important driver of food waste in supermarkets, eating places, and households. A lot of perfectly edible food is withdrawn from sale or thrown away because it has exceeded its best-before date. The project "Nano-preservation", conducted by a research team from the University of Basel, suggests that replacing such rigid labels through dynamic smart labels could help to reduce this kind of food waste. Smart labels consisting of so-called nano-compartments are able to indicate the actual quality status of the packaged food through a change in color. The researchers suggest that smart labels could be applied on retail products in order to reduce food waste in supermarkets, eating places, and households.

Policy Target Groups and Their Attitude

The introduction of smart labels primarily affects retailers, consumers, and packaging companies. *Retailers* could, on the one hand, profit from smart labels as these would allow them to sell (perhaps at a reduced price) perfectly edible food that has exceeded its best-before date. On the other hand, the additional packaging costs caused by smart labels compared to conventional labeling might be higher than the cost savings resulting from the reduction of in-store food waste. Moreover, retailers also profit from conservative best-before labels, as consumers tend to throw away perfectly edible food when it exceeds its best-before date, which in turn results in more food sales. For retailers, therefore, the incentives to introduce new smart label technologies can be expected to be limited.

Consumers should have a more positive attitude towards smart labels. By tendency, smart labels would allow consumers to keep food for longer. Provided that the additional costs of smart label technology that retailers pass on to their customers are not too high, smart labels could help consumers to lower their food expenses.

Also affected by the introduction of smart labels are *packaging companies* as they must provide safe and reliable smart label technology to food producers and retailers. We assume that they are willing to do so as long as their customers demand smart labeling and are willing to pay for it. For all three target groups, a main pro-argument lies in the envisaged reduction of food-waste. While the package industry and retailers profit from a reputational effect that may translate into economic profit, consumers profit from a good conscience.

Suggested Policy Adaptations

Given that we expect consumers to generally have a rather positive attitude towards smart labels, the FSVO could employ informational instruments (sermons) to successfully influence their behavior. Informational instruments can inform consumers about the workings and the economic advantages of smart labels as well as their ecological benefit. Since the consumers' demand for smart labels might not be sufficient, positive incentives (carrots) could be employed to encourage retailers to adopt smart label technology. However, as the proposed smart labels are a new technology, they inevitably bare some risks that both consumers and retailers might be reluctant to take. The introduction of a pilot scheme testing the application of smart labels on foods could be a feasible way for the FSVO to acquaint both retailers and consumers with the new technology. Providing retailers with financial incentives (carrots) to test smart labeling on selected foods might convince them to participate in the pilot scheme. Moreover, to decrease initial skepticism on the part of consumers, smart labels could be introduced in addition to conventional best-before dates (instead of replacing them). These policy interventions promise to increase the knowledge and acceptance of smart label technology among the primary target groups. Policy-makers should additionally bear in mind that the introduction of smart label technology could necessitate revisions of food safety regulations on packaging materials. If the pilot scheme indicates that smart label technology works reliably, finds the acceptance of consumers, and verifiably contributes to the reduction of food waste, policy-makers may develop plans to make smart labels compulsory for specific product categories (sticks). Finally, to make sure appropriate smart label technology is available on

the market, policy-makers could additionally consider temporally working with minimum sale volumes for particular packaging products. Minimum sale volumes could incentivize packaging companies to make the necessary investments in smart label technology. Taken together, these measures would also contribute to the achievement of the goals of the federal Sustainable Development Strategy[135] and its respective action plan.[136]

Table 4.7 Suggested policy adaptations for the "Nano-preservation" project

Target Groups	Sermons	Carrots	Sticks
Consumers	FSVO may provide consumers with information concerning the technology behind and financial and ecological advantages of smart labels	/	/
Retailers	FSVO may provide retailers with information on the financial and reputational advantages of smart labels	FSVO may provide retailers with financial incentives to sell products with smart labels	FSVO may introduce compulsory smart labels for retailers for specific product categories
Packaging companies	/	FSVO may provide packaging companies with financial incentives to invest in smart label technology, for example in the form of minimum sale volumes for certain products	FSVO may introduce compulsory smart labels for packaging companies for specific product categories

[135] Source: Strategie Nachhaltige Entwicklung. https://www.are.admin.ch/dam/are/de/dokumente/nachhaltige_entwicklung/publikationen/strategie_nachhaltigeentwicklung2016-2019.pdf.download.pdf/strategie_nachhaltigeentwicklung2016-2019.pdf. Accessed on February 27, 2019.

[136] Source: Strategie Nachhaltige Entwicklung 2016-2019 - Massnahmen des Aktionsplans. https://www.are.admin.ch/dam/are/de/dokumente/nachhaltige_entwicklung/publikationen/strategie_nachhaltigeentwicklung2016-2019-massnahmendesaktionspl.pdf.download.pdf/strategie_nachhaltigeentwicklung2016-2019-massnahmendesaktionspl.pdf. Accessed on February 27, 2019.

4.2.2.2 Preservative bacteria (Prof. Dr. Leo Meile, Dr. Marc Stevens)

Political Problem and Policy Implications

Food waste, food poisoning, and the spread of antibiotic resistances through foods pose a challenge to food production. The refinement of preservation methods could contribute to reduce those problems considerably. In their project "Preservative bacteria", researchers from the ETH Zurich developed a biopreservation approach that enhances the safety and keepability of fermented foods like cheese and salami. The researchers isolated strains of Lactobacillus bacteria with protective properties that can be added to fermented foods. The research results show that one strain of bacteria can reduce harmful Listeria bacteria in certain foods while another strain reduces Enterococci, which are potentially hazardous as they can transmit antibiotic resistant genes. Based on their findings, the researchers recommend improving the safety and shelf-life of fermented foods by applying those protective bacteria in food processing. Moreover, they advocate the introduction of compulsory Enterococci tests during food controls, as their hazardous nature has been underestimated so far. The researchers also plan more experiments in collaboration with the food processing industry to enhance the practical applicability of the protective bacteria.

Policy Target Groups and Their Attitude

Food fermentation lies in the realm of the *food processing industry*, which we consider to be the main policy target group for this project. As explained above (cf. Nano-preservation), we expect the food processing industry to have a rather ambivalent attitude towards the problem of food waste. The industry should thus be critical towards new processing methods, especially if these entail additional costs and complicate food production. Project leaders confirm this assessment, observing that the food processing industry remained skeptical towards the application of protective bacteria.

Suggested Policy Adaptations

As the attitude of the main policy target group can be expected to be rather negative, we suggest a combination of different policy instruments to bring the food processing industry to work with protective bacteria. First, informational measures (sermons) could be used to sensitize the food processing industry and consumers about the potential threat that certain bacteria pose when present in foods. Second, we suggest that federal authorities consider financial incentives (carrots), for instance in the context of a pilot scheme, to bring the food processing industry to apply protective bacteria and to change production processes in accordance with the research findings. Third, federal authorities could consider including Enterococcus bacteria as an additional microbiological criterion in the Ordinance on Hygiene (HyV).[137] This means that Enterococci would be integrated in the bacteria lists that cantonal chemists apply during food controls. Integrating Enterococci in the legislation could bring the food processing industry to consider ways to lower Enterococci bacteria in their products in order to avoid positive testing and potential negative reactions by consumers. In this way, legal adaptations could contribute to the goal of the Swiss Antibiotic Resistance Strategy (StAR)[138] to reduce antibiotic resistances along the food chain.

[137] Verordnung des EDI über die Hygiene beim Umgang mit Lebensmitteln. https://www.admin.ch/opc/de/classified-compilation/20143394/index.html. Accessed on February 25, 2019.

[138] Strategie Antibiotikaresistenzen (StAR). . Accessed on February 25, 2019.

Table 4.8 Suggested policy adaptations for the "Preservative bacteria" project

Target Groups	Sermons	Carrots	Sticks
Food processing industry	The federal authorities may raise awareness among exponents of the industry for the hazard certain bacteria pose to food and on ways to get rid of them	The federal authorities may encourage the food processing industry to introduce a pilot scheme to test the applicability of the protective bacteria on certain foods and may simultaneously encourage further cooperation between researchers and industry The federal authorities may provide initial financial incentives to the food processing industry to start using protective bacteria (to set up the facilities to do so)	The federal authorities may introduce Enterococcus as bacteria to be tested in the Ordinance on Hygiene (i.e. Article 4 HyV)
Consumers	The federal authorities may inform consumers about the health hazard of certain bacteria.	/	/

4.2.2.3 Staphylococci (Prof. Dr. Roger Stephan)

Political Problem and Policy Implications

Enterotoxins produced by staphylococcus bacteria are one of the main drivers of food poisoning. Researchers from the University of Zurich investigated four "stress factors" that influence the formation of enterotoxins in foods during food production. They found that high levels of sugar or salt hamper the formation of enterotoxins. Lactic acid and pickling salt, however, either hamper or increase the formation of enterotoxins depending on the bacterial strain and toxin under study. So far, Swiss legislation only stipulates an upper limit for the number of bacteria present in foods. The researchers, however, remark that merely measuring the number of bacteria instead of the actual amount of toxins in foods has two shortcomings. On the one hand, toxins can be present in foods even when the bacteria that produced them are gone. On the other hand, bacteria might be present in foods without releasing harmful amounts of toxins. In the former case, people might fall ill even though the food has been tested negative for bacteria. In the latter case, perfectly edible food may be thrown away for safety reasons. Based on their findings, the researchers suggest developing detection systems that can directly identify enterotoxins, thereby helping to reduce the risk of food poisoning and the amount of food losses during production, processing and retailing.

Policy Target Groups and Their Attitude

As such detection systems are not available yet, the immediate goal is to encourage the *research community* to conduct relevant research. Provided that adequate and cost-efficient detection systems can be developed, their introduction would concern a *variety of actors along the food chain*, which must ensure that the legal requirements in terms of food safety are met.[139] Mandatory self-supervision usually obliges these actors to engage private laboratories to analyze their food. Additionally, cantonal laboratories test foods on a regular basis to ensure food safety. As long as new detection systems proof more effective and efficient than traditional testing methods of bacteria, we expect those actors to generally have a positive attitude towards new detection systems.

Suggested Policy Adaptations

In order to pave the way for new detection systems, the FSVO could provide researchers developing such detection systems with funds. If new detection systems can be developed that prove both *effective* and *efficient,* the FSVO may consider further steps to speed up their introduction. Specifically, the FSVO would have to amend the Federal Act on Foodstuffs and Utility Articles (Foodstuffs Act, LMG) and related ordinances to create an adequate legal framework for the new detection practices and to set new limit values for enterotoxins (instead of limit values for staphylococci) in foods. Since the adoption of new detection systems is likely to entail significant one-time investments on the part of the various actors along the food chain, the FSVO could additionally consider providing them with financial incentives to update their detection practices.

Table 4.9 Suggested policy adaptations for the "Staphylococci" project

Target Groups	Sermons	Carrots	Sticks
Research community	/	FSVO may fund research regarding the development of new detection systems	/
Various actors along the food chain	/	FSVO may give financial incentives to reduce the costs that accrue during the introduction of the new detection systems	FSVO may amend the Federal Act on Foodstuffs and Utility Articles and relating ordinances

[139] Source: Article 26, paragraph 1, Federal Act on Foodstuffs and Utility Articles: "Any person who manufactures, handles, stores, transports, places on the market, imports, exports or carries in transit foodstuffs or utility articles must ensure that the statutory requirements are complied with. He or she is obliged to ensure self-supervision. https://www.admin.ch/opc/en/classified-compilation/20101912/index.html. Accessed on February 25, 2019.

4.2.3 Policy Field III: Public Health

4.2.3.1 Dietary Fiber (Prof. Dr. Laura Nyström)

Political Problem and Policy Implications

The increase of non-communicable diseases such as type II diabetes, overweight, or cardiovascular diseases contributes to rising healthcare costs in Switzerland. Food with health promoting properties could help to better control these chronic diseases. The dietary fiber beta-glucan, found in oats and barley, can, among other things, help to reduce blood cholesterol levels. During food processing, however, beta-glucan molecules contained in fibers are often modified in ways that impair their health promoting properties. In their project "Dietary fiber", researchers from the ETH Zurich developed food processing techniques that preserve and enhance the health promoting properties of beta-glucan. However, before these techniques can be applied on a broad scale in food processing, more research is needed on how individuals respond to the intake of modified dietary fibers. The researchers therefore recommend conducting more basic research in this area. They also recommend putting more effort in educating consumers about the composition of food, as they often lack a fundamental understanding of how individual ingredients affect their health and well-being.

Policy Target Groups and Their Attitude

There are two main policy target groups for this project. The first consists of the *food processing industry* that is responsible for adding modified fibers to their foods. As they are primarily profit-oriented, we expect them to only do so if they get a financial advantage from it. However, at this stage of scientific development, it is rather unlikely that they will follow the project's recommendation, as the modified fibers tend to make food less appealing to consumers. In addition, the recommended food processing techniques might be risky or entail great investments on the part of the food processors. Altogether, we expect the food processing industry to have certain reservations against the project's recommendations.

The other policy target group consists of the *consumers* who eat food containing those fibers. Principally, we expect consumers to develop a positive attitude towards food containing modified fibers if they know about its health promoting properties and if the fibers do not negatively affect the taste of the food. However, since both conditions are not present at this stage, consumers should be rather skeptical.

Suggested Policy Adaptations

Irrespective of the rather negative attitudes that we establish for the two main policy target groups, no concrete policy suggestions can be distilled from the project at this stage. However, further research should be encouraged, as it could inform future policy interventions concerning non-communicable diseases and healthy nutrition.[140] In particular, the research findings may eventually lead to the adoption of refined food processing techniques and to the spread of more ingredient-oriented information for consumers on food choices. Thereby, the research findings could indirectly contribute to achieving the goals of the FOPH's "National Strategy for the Prevention of Noncommunicable Diseases (NCD strategy)" and the FSVO's "Swiss Nutrition Strategy 2017-2024".[141][142]

[140] Source: FOPH „National Strategy for the Prevention of Noncommunicable Diseases (NCD strategy)" and FSVO "Swiss Nutrition Strategy 2017-2014".

[141] Source: Nationale Strategie zur Prävention nichtübertragbarer Krankheiten. https://www.bag.admin.ch/bag/de/home/strategie-und-politik/nationale-gesundheitsstrategien/strategie-nicht-uebertragbare-krankheiten.html. Accessed on February 25, 2019.

[142] Source: Schweizer Ernährungsstrategie 2017–2024. https://www.blv.admin.ch/blv/de/home/das-blv/strategien/schweizer-ernaehrungsstrategie.html. Accessed on February 25, 2019.

Table 4.10 Suggested policy adaptations for the "Dietary fiber" project

Target Groups	Sermons	Carrots	Sticks
Research community	/	The federal authorities may fund further research on dietary fibers in terms of its effect on individual's health, processing, and taste	/

4.2.3.2 Functional Food (Dr. Andreas Steingötter, Prof. Dr. Peter Fischer, Prof. Dr. Michael Fried, Prof. Dr. Sebastian Kozerke, Prof. Dr. Wolfgang Langhans, Prof. Dr. Werner Schwizer)

Political Problem and Policy Implications

Morbid obesity and its related illnesses such as diabetes and cardiovascular diseases increasingly challenge the Swiss health care system and contribute to rising healthcare costs. In their project "Functional food", researchers from the ETH Zurich, the University of Zurich, and Zurich University Hospital developed functional food emulsions that help fighting obesity by prolonging the feeling of satiation after a meal. These functional food emulsions bring consumers to reduce their energy intake by making them feel less hungry for a longer time span after eating. The researchers recommend using functional food emulsions in the managed treatment of morbidly obese patients. As the taste of the emulsions is not very appealing, their application is currently restricted to clinical settings. Improvements in taste, however, may enlarge their scope of application.

Policy Target Groups and Their Attitude

We consider morbidly obese patients and health practitioners to be the main target groups for this project's recommendations. Both target groups should have a fairly positive attitude towards the use of functional food emulsions. *Morbidly obese patients* under treatment can be expected to have a keen interest in losing weight in an effective and painless way. For *health practitioners* treating obese patients, the emulsions might pose an interesting alternative to conventional treatments.

Even though not directly concerned yet, *health insurance companies* can also be expected to have a positive attitude towards the introduction of functional food emulsions in the managed treatment of morbid obesity, as they represent a relatively inexpensive and effective way to fight obesity in comparison to other treatments such as sleeve gastrectomy. Finally, the *food processing industry* may present a fourth policy target group. If the taste of emulsions can be improved in the future, the food processing industry should have a considerable interest in including them in their diet-product lines.

Suggested Policy Adaptations

As the attitudes towards the introduction of emulsions in the treatment of morbidly obese patients can be expected to be generally favorable, information-based instruments (sermons) should suffice to foster their adoption. Information and promotion of the emulsions, especially among health practitioners, are of great importance in this regard. Similar to the "Preventing obesity" project, the FOPH could reach out to health practitioners to inform them about the workings and the advantages of food emulsions. Additionally, federal authorities could reach out to obese patients via "information delivery vehicles" such as the SAPS (Schweizer Adipositas-Stiftung), CardioVascSuisse, the SGE or GFCH. These organizations are in the position to directly inform their clientele about the advantages of functional food emulsions via their websites, journals,

newsletters, etc. Taken together, these measures could contribute to the achievement of the goals set by the federal "NCD-strategy".[143]

Table 4.11 Suggested policy adaptations for the "Functional food" project

Target Groups	Sermons	Carrots	Sticks
Health practitioners	FOPH may inform health practitioners through "information delivery vehicles" on the workings and advantages of functional food emulsions for treating obese patients	/	/
Obese patients	Health practitioners may inform obese patients of the advantages of functional food emulsions.	/	/

4.2.3.3 Foodball (Dr. Guy Vergères, Prof. Dr. François Pralong)

Political Problem and Policy Implications

Rising healthcare costs often stem from health problems associated with an unbalanced diet. Measuring the habitual dietary intake in a reliable way is a precondition to better understand the relationship between diet and disease. So far, most studies on this relationship rely on dietary assessment tools such as food diaries and questionnaires. However, these self-reported tools are relatively imprecise. Biomarkers found in blood and urine after the consumption of food could allow for establishing the different effects of certain foods on the human body in a more objective way. To this point, only a few biomarkers have been sufficiently validated and found acceptance in the research community. Researchers from Agroscope and the University of Lausanne, as part of an international and interdisciplinary research team[144], studied biomarkers in a more comprehensive way. In their project "Foodball", they systematically assessed and validated a range of biomarkers and fed the data into various platforms to foster harmonization among the research community. The project leaders stress that more basic research on biomarkers is needed to establish their potential in illuminating the relationship between diet and disease.

Policy Target Groups and Their Attitude

At present, the *research community* forms the prior target group for this project. Researchers have a keen interest to broaden their knowledge on the relationship of diet and disease. Disposing of a set of reliable biomarkers to study this relationship, and to compare their findings with others, is an important precondition for future research success.

Health practitioners may constitute a main policy target group in the future. Provided that the measurement of biomarkers is easy to administer and relatively inexpensive, health practitioners should be interested in adopting these new assessment tools. Biomarkers could allow them to give more accurate dietary recommendations to their clientele.

[143] Source: Nationale Strategie zur Prävention nichtübertragbarer Krankheiten. https://www.bag.admin.ch/bag/de/home/strategie-und-politik/nationale-gesundheitsstrategien/strategie-nicht-uebertragbare-krankheiten.html. Accessed on February 25, 2019.

[144] Source: Food Biomarkers Alliance (FOODBALL). http://foodmetabolome.org/. Accessed on February 25, 2019.

Suggested Policy Adaptations

At this stage, no concrete policy recommendations can be distilled from the project. However, federal authorities should encourage further research and international coordination in this field. Once biomarkers are well established, they might become useful for the FOPH as well as health practitioners to propagate better dietary advice and hence advance the goals of the federal "NCD-Strategy".[145]

Table 4.12 Suggested policy adaptations for the "Foodball" project

Target Groups	Sermons	Carrots	Sticks
Research community	/	Federal authorities may encourage further research and international cooperation	/

4.2.3.4 Health Motivators (Prof. Dr. Claude Messner, Dr. Thomas Brunner)

Political Problem and Policy Implications

When offered the choice between unhealthy and healthy snacks, many people tend to choose the former. Unhealthy food choices contribute to an increasing number of obese people in Switzerland. Obesity is one of the primary drivers of growing health care costs. However, specific environmental cues can activate the desire to eat more healthily and, consequently, encourage healthier food choices. The project "Health motivators", conducted by a team of researchers from the Bern University of Applied Sciences and the University of Bern, examined the impact of environmental cues on food choices made in front of snack dispensers. The project found that environmental cues like posters featuring landscapes and sports increase the likelihood of consumers choosing healthier snacks. The reason is that such environmental cues subconsciously motivate people to make healthful choices. The project suggests that healthier food choices can be encouraged by equipping canteens, coffee places, or breakrooms with specific environmental cues.

Policy Target Groups and Their Attitude

A prerequisite for healthy snack choices is that snack dispensers at least partially supply healthy snacks. We expect that *snack dispenser operators* are only willing to equip their snack dispensers with healthy snacks if doing so promises financial gains. Depending on the margins of healthy snacks compared to unhealthy ones, it might not make sense for snack dispenser operators to include healthy snacks in the product range. Moreover, as long as healthy food choices only replace unhealthy food choices, they do not yield higher financial gains. Hence, we expect operators to be rather reluctant when it comes to equipping snack dispensers with healthy snack choices.

O*ther actors* like companies and canteens might be more inclined to provide their employees and guests with healthy snack choices and encourage them to make healthy food choices by means of environmental cues. Even though they are also profit-oriented, many companies take a direct interest in their employees' well-being. Health-oriented canteens might also take an interest in offering healthy snack choices. Hence, we identify companies and canteens as important policy target groups that could be convinced to at least partially supply their snack dispensers and eating places with healthy food choices and environmental cues.

[145] Source: Nationale Strategie zur Prävention nichtübertragbarer Krankheiten. https://www.bag.admin.ch/bag/de/home/strategie-und-politik/nationale-gesundheitsstrategien/strategie-nicht-uebertragbare-krankheiten.html. Accessed on February 25, 2019.

Suggested Policy Adaptations

Given that companies and canteens could take an interest in providing their employees and guests with healthy food, the FSVO, together with the SGE and the GFCH, could employ a range of informational instruments (sermons). Information on healthy snack choices and on how and which specific environmental cues help to increase healthy food choices could be distributed to companies and canteens. Intermediaries such as nutrition experts who advice companies on how to create healthy workplace environments are appropriate distributors of such information. To incentivize the installation of environmental cues (carrots), the FSVO could additionally encourage voluntary self-commitments by companies and canteens via labels such as *fourchette verte.* Additionally, minor financial incentives could be provided to companies if they decided to include healthy snacks in their snack dispensers and canteens and to equip them with positive environmental cues. Taken together, these adaptations would fit well into the Swiss Nutrition Strategy[146] that intends to promote a balanced diet at the workplace.

Table 4.13 Suggested policy adaptations for the "Health motivators" project

Target Groups	Sermons	Carrots	Sticks
Companies and canteens	FSVO, SGE and GFCH may inform companies and canteens about the positive effect of environmental cues on their costumers'/employees' health	FSVO, SGE and GFCH may encourage voluntary self-commitments to equip snack dispensers with healthy snacks and environmental cues	/

4.2.3.5 Iron and Zinc (Prof. Dr. Raffaele Mezzenga, Prof. Dr. Michael B. Zimmermann)

Political Problem and Policy Implications

An unbalanced diet can lead to iron deficiency, which is widespread in Switzerland and assumed to be responsible for a range of symptoms such as fatigue, headaches and diminished work performance. Additionally, iron deficiency is normally accompanied by zinc deficiency. In their project "Iron and zinc", researchers from the ETH Zurich looked into ways to reduce iron and zinc deficiency through the fortification of foods. So far, the fortification of food with iron posed a twofold challenge: For one, dietary bioavailability of iron was difficult to achieve. Moreover, the addition of iron often led to a negative change in taste or color of the fortified food. The researchers found a more sustainable, cost-efficient and effective way to fortify food with iron and zinc nanoparticles that does not impair the food's taste. So far, their animal trials show promising results. An encompassing safety assessment and human trials are planned next.

Policy Target Groups and Their Attitude

The primary future potential target group for this project's suggestions is the *food producing industry* which wants to sell its products at competitive prices and meet the expectations of consumers. As for the latter, the demand for healthy foods has constantly been growing over the last years. If the fortification of the food is indeed cost-efficient, easy to administer, and does not impair the sensory experience of the food, we expect food producers to voluntarily include those kinds of foods in their product lines.

Consumers form a second policy target group. Consumers that are interested in a balanced diet or that are aware of their lack of certain trace elements should have a great interest in consuming foods that are fortified with

[146] Source: Schweizer Ernährungsstrategie 2017–2024. https://www.blv.admin.ch/blv/de/home/das-blv/strategien/schweizer-ernaehrungsstrategie.html. Accessed on February 25, 2019.

iron and zinc. As long as the price and the taste of the fortified food meet consumers' expectations, we assume them to exhibit a positive attitude.

Suggested Policy Adaptations

The adoption of concrete policy measures depends on the results of the safety assessments and human trials. Due to the strong practical relevance of the project and the potential benefits for the health care system, we recommend the federal authorities to financially support these efforts. The revision of certain ordinances, such as the Ordinance of the FDHA on the addition of vitamins, minerals and other substances to foods[147], might additionally be necessary to create adequate legal framework conditions for this kind of food fortification.

If the safety assessments and the human trials prove successful, concrete policy measures can be considered. As we expect the attitudes towards food fortification to be largely positive, unobtrusive instruments should suffice to yield a change in behavior. Namely, the FOPH should make sure that all the concerned policy target groups are provided with comprehensive and current information about the new fortification method. With regard to consumers, the FOPH could inform health practitioners or spread information via its "information delivery vehicles" about the health benefits of fortified foods.

Table 4.14 Suggested policy adaptations for the "Iron and zinc" project

Target Groups	Sermons	Carrots	Sticks
Research community	/	The federal authorities may encourage further research to enable encompassing safety assessments of the fortification method.	The federal authorities may revise and adapt certain ordinances to create adequate legal framework conditions for the fortification method
Food processing industry	The FOPH may inform the food processing industry on the new fortification method and its advantages	/	/
Consumers	The FOPH may inform consumers about the advantages of fortified foods and educate health practitioners.	/	/

4.2.3.6 Mirdiet (Prof. François Pralong, Prof. Luc Tappy, Dr Jörg Hager)

Political Problem and Policy Implications

Unbalanced dietary practices can result in health problems and contribute to rising healthcare costs. Measuring food intake in order to give tailored dietary recommendations for a balanced diet is difficult for scientists and health practitioners because the existing self-reporting methods such as questionnaires or food diaries are not very precise. The occurrence of certain molecules in blood and tissue – so called biomarkers – could function as

[147] Source: Verordnung des EDI über den Zusatz von Vitaminen, Mineralstoffen und sonstigen Stoffen in Lebensmitteln. https://www.admin.ch/opc/de/classified-compilation/20143401/index.html. Accessed on February 25, 2019.

a more precise estimate of food intake and its effects on the human body. As a part of the same Joint European Programming Initiative[148] as the "Foodball" project, researchers from the University of Lausanne and the Nestlé Institute of Health Science investigated whether microRNA released into the blood by adipose tissue could function as a potential biomarker for food intake. Due to the technical complexity of measuring the amount of microRNA in the bloodstream, the projects findings were relatively limited. Nonetheless, the project leaders encourage further research on biomarkers for food intake as they seem a promising means to refine dietary recommendations.

Policy Target Groups and Their Attitude

As more research into microRNA as a means to measure food intake is needed, the *research community* forms the main policy target group at this stage.

Suggested Policy Adaptations

At this point, no concrete policy-recommendations can be derived from this project. Nevertheless, we recommend federal authorities to consider the possibility to encourage further research on suitable biomarkers and strengthen international coordination and cooperation in this research area.

If the technical barriers to measuring biomarkers can be overcome in the future, researchers and health practitioners should be capable of giving refined dietary recommendations based on the interpretation of biomarkers found in the bloodstream.

Table 4.15 Suggested policy adaptations for the "Mirdiet" project

Target Groups	Sermons	Carrots	Sticks
Research community	/	Federal authorities may consider encouraging further research and enhancing international research cooperation and coordination.	/

4.2.3.7 Preventing Obesity (Dr. Lukas Emmenegger, Prof. Dr. Luc Tappy, Dr. Christophe Chassard, Prof. Dr. Christophe Lacroix, Virgile Lecoultre, Prof. Dr. Herbert Looser)

Political Problem and Policy Implications

The number of obese people in Switzerland is constantly growing. Obesity is one of the main risk factors for cardio-vascular diseases. As such, it is an important driver of rising healthcare costs. In their project, "Preventing obesity", researchers from Empa, the University of Lausanne, and the University of Applied Sciences and Arts Northwestern Switzerland developed a device to help obese patients to monitor their weight loss. By blowing into the device, the latter shows whether its user has used more energy as he/she has taken in. The researchers suggest that this easy-to-use analytical device can motivate obese people to continue their efforts to lose weight because it renders the individual weight-loss process more transparent and more effective. To further refine the analytical device, the new measuring method has to undergo further clinical tests in the near future.

[148] Source: Joint Programming Initiative „ A Healthy Diet for a Healthy Life". https://www.healthydietforhealthylife.eu/index.php/about. Accessed on February 25, 2019.

Policy Target Groups and Their Attitude

Provided that these clinical tests are successful, we identify three main policy target groups potentially affected by the introduction of the device: obese patients, health practitioners, and health insurance companies. We expect all three target groups to generally exhibit a positive attitude towards the analytical device. *Obese patients* undergoing a weight-loss program are interested in the success thereof. As the analytical device can show them their current therapeutic progress, obese patients can be expected to have a positive attitude towards it. *Health practitioners* treating obese patients should also be interested in using the device as it can help them to make their therapy more effective. Finally, *health insurance companies* should take an interest in the distribution of such analytical devices among their customers, as they are likely to reduce obesity and thereby contribute to a reduction of healthcare costs.

Suggested Policy Adaptations

Since the main target groups can be expected to exhibit a positive attitude towards the introduction of the analytical device, we deem informational instruments (sermons) sufficient to support its widespread adoption. Specifically, a number of measures could be taken in order to promote the use of the analytical device among the three target groups. Information plays an important role, as familiarity with the working of the device is crucial to its success. For health practitioners to function as multipliers, they need to be informed about the workings and convinced of the therapeutic advantages of the analytical device. The FOPH could spread according information via appropriate "information delivery vehicles" such as the SAPS (Schweizer Adipositas-Stiftung), CardioVascSuisse, the SGE or GFCH. Second, the FOPH could encourage health insurance companies to subsidize the device. Finally, obese patients could be informed directly about the advantages of using the device on a daily basis.

We also suggest that a smartphone application that collects the data from the analytical device could be helpful to integrate the use of the device into patients' daily lives. The application could transform data collected from the device into personalized, real-life dietary recommendations. The FOHP could hence consider supporting further research concerning the development of such an application.

Table 4.16 Suggested policy adaptations for the "Preventing obesity" project

Target Groups	Sermons	Carrots	Sticks
Health practitioners	FOPH may inform health practitioners through "information delivery vehicles" on the workings and advantages of the analytical device for treating obese patients	/	/
Obese patients	FOPH may inform obese patients of the advantages of the analytical device for their therapy	/	/
Insurance companies	FOPH may encourage insurance companies to subsidize the use of the analytical device in the treatment of obese patients	/	/
Research community		FOPH could encourage research concerning the development of a smartphone application to go with the analytical device	/

4.2.3.8 Salt Consumption (Sigrid Beer-Borst, Kathrin Sommerhalder)

Political Problem and Policy Implications

A high salt intake is one of the driving forces of high blood pressure and increases the risk of cardiovascular diseases, thus contributing to constantly rising health care costs in Switzerland. As about one million employees eat in canteens every day in Switzerland, canteens have a major impact on the health of many Swiss citizens. Researchers from the Bern University of Applied Sciences and the University of Bern investigated how to sensitize employees to reduce their daily salt intake and how to encourage canteens to reduce the salt content of their menus. They found that workshops on healthy eating for employees and simultaneous coaching of canteen staff on how to prepare meals with less salt content can reduce the daily salt-intake of employees. The researchers thus recommend targeting both canteens and employees in order to promote and encourage healthy nutrition at the workplace.

Policy Target Groups and Their Attitude

There are three main target groups when it comes to workplace health promotion. The first of them, *canteens*, can be expected to reduce their menus' salt content if their customers demand less salty food. Moreover, we expect canteens to only reluctantly reduce their menus' salt content as it requires additional effort and creativity to change their menus.

We also expect the second target group, the *employees* regularly eating in canteens, to be not very enthusiastic about reducing their daily salt intake on their own accord. Not all employees are concerned with eating healthily in the first place, but primarily want to eat a good and appealing meal at a good price. However, employees may eat less salty food if canteens provide them with it.

The third target group consists of the *employers*. As described above for the project "Health motivators", employers can be expected to take an interest in their employees' health, insofar as unhealthy employees tend to fall sick more frequently. Employers are therefore expected to have a slightly positive attitude towards less salty canteen menus. Overall, we suggest to primarily target canteens and employers to reduce salt intake at the workplace.

Suggested Policy Adaptations

The information made available by the FSVO to canteens on salt and its effect on human health is already comprehensive. Specifically, the "Salt consumption" project led to the development of several handbooks for nutrition experts that are already available on the homepage of the FSVO.[149] However, the FSVO could promote these handbooks further by proactively giving them to canteens or by distributing them among nutrition experts advising canteens. As we expect canteens to be rather reluctant to change their behavior, we suggest not only to rely on informational instruments (sermons), but also on incentive-based instruments (carrots).[150] Specifically, the FSVO could work with labels to incentivize canteens to reduce their menus' salt content and to make salt-reduced menus the default option. For instance, clear salt content guidelines could be integrated in the *fourchette verte* label. Alternatively, the FSVO, in cooperation with private actors such as the SGE, could establish a new label to be given to canteens that adhere to the recommended amounts of salt. In doing so, the FSVO would encourage voluntary self-commitments by canteens to reduce the salt content of their menus. Moreover,

[149] Source: Die Schweizer Qualitätsstandards für eine gesundheitsfördernde Gemeinschaftsgastronomie. https://www.blv.admin.ch/blv/de/home/lebensmittel-und-ernaehrung/ernaehrung/gemeinschaftsgastronomie/qualitaetsstandards.html Accessed on February 25, 2019.

[150] We do not consider regulation-based instruments ('sticks') as they are hardly possible to implement, since the legal basis in public health is very thin. Nevertheless, such regulation-based instruments, for instance mandatory threshold values for salt in meals in canteens, might yield the most promising results.

the FSVO could subsidize employers that decide to hold nutrition workshops for their employees and canteen staff and that ask their canteens to reduce the salt content of their meals.

Finally, we suggest that there may be interesting synergies between the "Health motivators" project and the "Salt consumption" project as both projects aim to encourage healthier eating habits at the workplace. Both projects pursue the goal of the Action Plan of the Swiss Nutrition Strategy[151] to promote a healthy diet at the workplace.

Table 4.17 Suggested policy adaptations for the "Salt consumption" project

Target Groups	Sermons	Carrots	Sticks
Canteens	FSVO may distribute (directly or via nutrition experts) handbooks to canteens to inform them on how to reduce the salt content of their menus	FSVO may encourage voluntary self-commitments regarding salt amounts by establishing a new label in cooperation with the SGE or other private actors *or* *Fourchette verte* may introduce salt guidelines and may start giving their label to canteens that use the recommended amount of salt in their menus	/
Employers	FSVO may encourage employers to hold workshops for their employees	FSVO may give financial incentives to employers which agree to hold workshops for their canteen staff and employees on healthy nutrition and that ask their canteens to reduce the salt content of their menus.	/

4.2.3.9 Vitamin D (Prof. Dr. Sabine Rohrmann, Dr. Katharina Christine Quack)

Political Problem and Policy Implications

Vitamin D deficiency is widespread among Swiss citizens and accounts for weak bones and impaired muscle health. It is also associated with a number of other disorders such as cardiovascular diseases and certain forms of cancer. In pregnant women specifically, vitamin D deficiency can have a negative effect on maternal health and fetal development. So far, there has been no study on the prevalence of vitamin D deficiency in pregnant women in Switzerland. In their project "Vitamin D", researchers from the University of Zurich and the University Hospital Zurich addressed this research gap. They found that more than 50% of pregnant women in Switzerland exhibit vitamin D deficiency. They also observed that women with a migration background from Asia or Africa living in Switzerland tend to have lower levels of vitamin D than their Swiss counterparts. The researchers recommend that health practitioners pay closer attention to the supplementation of vitamin D in pregnant

[151] Source: Schweizer Ernährungsstrategie 2017–2024. https://www.blv.admin.ch/blv/de/home/das-blv/strategien/schweizer-ernaehrungsstrategie.html. Accessed on February 25, 2019.

women and issue personalized supplementation recommendations. They also suggest adopting more refined ways to assess the risk of being vitamin D deficient, for example by means of a risk score. This would enable health practitioners to issue more tailored supplementation recommendations instead of prescribing general multivitamin supplementation. The researchers already organized a couple of events in order to sensitize the professional community of obstetricians and gynecologists (SGGG)[152] for the issue.

Policy Target Groups and Their Attitude

We distinguish two policy target groups: health practitioners and pregnant women. *Health practitioners* are primarily concerned with their patients' well-being. In general, they treat their patients in accordance with their professional consensus on how to treat vitamin D deficiency in pregnant women. Changes in the professional consensus should entail changes in treating methods of health practitioners. However, the researchers remark that health practitioners often confine themselves to subscribe general multivitamin supplementation instead of making personalized recommendations because they do not seem to have the means and time to conduct a precise risk assessment. We thus expect health practitioners to principally approve of a more refined risk assessment method if it is easy-applicable and time-efficient.

Pregnant women have an interest in keeping themselves and their babies healthy and should therefore be in favor of personalized supplement recommendations. However, they may not be fully aware of the health consequences of vitamin D deficiency for themselves and their babies.

Suggested Policy Adaptations

The rather positive attitudes that we expect from both health practitioners and pregnant women suggest to primarily work with unobtrusive measures to implement the project's recommendations. To make sure the research findings alter the established professional consensus on vitamin D supplementation, the federal authorities could consider enhancing the existing knowledge transfer by integrating the research findings in the education of health practitioners. A complication to consider is that, from a dermatological standpoint, longer exposure times to the sun, which increase vitamin D levels, should be avoided. Accordingly, federal authorities should encourage a dialogue between different health professions to avoid sending conflicting information to pregnant women. In a similar vein, the federal authorities should update the recommendations issued by the FCN[153] in accordance with the research findings, especially concerning information about risk factors and methods to assess the risk of vitamin D deficiency. Moreover, by encouraging the development of an easily applicable risk assessment tool and by spreading it among health practitioners, the federal authorities could further facilitate personalized vitamin D supplementation.

Concerning pregnant women directly, we expect target group oriented sensitization to be most promising. The federal authorities should hence specifically reach out to pregnant women with migration background either directly via the platform Migesplus.ch or indirectly via immigrant associations to inform them about vitamin D deficiency and its health implications.

[152] Source: Schweizerische Gesellschaft für Gynäkologie und Geburtshilfe (SGGG). https://www.sggg.ch/. Accessed on February 25, 2019.

[153] Source: Federal Commission for Nutrition. Vitamin D deficiency: Evidence, safety, and recommendations for the Swiss Population. Expert report of the FCN. Zurich: Federal Office for Public Health, 2012. https://www.eek.admin.ch/dam/eek/de/dokumente/publikation-und-dokumentation/ausfuehrlicher-expertenbericht-vitamin-d-mangel.pdf.download.pdf/Vitamin_D_Bericht.pdf. Accessed on February 25, 2019.

Table 4.18 Suggested policy adaptations for the "Vitamin D" project

Target Groups	Sermons	Carrots	Sticks
Health practitioners	Federal authorities may work towards integrating the findings in the education of health and nutrition practitioners. FSVO may amend the vitamin D recommendations issued by the FCN in 2012 and include more specific information about risk factors of pregnant women in Switzerland.	/	/
Pregnant women	The federal authorities may issue targeted information for pregnant women via appropriate information delivery vehicles.	/	/
Research community	The FSVO and the researchers may – in collaboration with the respective professional organization (SGGG) – develop and promote a "risk score" that is easily applicable for health practitioners.	/	/

4.2.4 Overarching Projects

4.2.4.1 Citizen Consumer (Prof. Dr. Jean-Philippe Leresche, Dr. Stéphane Boisseaux, Dr. Sophie Reviron, Dr. Joëlle Salomon Cavin)

Political Problem and Policy Implications

When it comes to the transition to a more sustainable food system, citizens as consumers play a crucial role. Their preference for more local and environmentally-friendly produced food and their willingness to pay more for it is constantly growing. These trends are a good prerequisite to initiate political change towards a more sustainable food system. With their demand for more sustainably produced food, consumers could bring producers to alter their supply accordingly. In their project "Citizen Consumer", researchers from Agridea and the University of Lausanne investigated the consumers' actual involvement in the political decision-making process. They found that even though consumers are indeed involved in the decision-making process, their influence on the substance of the respective decisions remains very limited. Thus, the consumers' preferences do often not transfer into political changes. The researchers therefore recommend modifying the institutional political setting in various ways to empower the consumers and increase their political impact. First of all, they suggest improving the legal standing of consumers. In particular, they suggest to extend the right of appeal to consumer protection organizations following the example of environmental protection associations[154] and to give consumers the right to file class actions. Second, they propose that consumer protection organizations should be (more) involved in fulfilling political tasks, for instance by involving them in food inspection. Third, the researchers suggest that by improving and standardizing environmental information on foods, direct political action "on the ground" such as "boycotting" (not buying something due to its bad environmental performance) and "boycotting" (buying something due to its good environmental performance) could be made easier for consumers. Last, they recommend establishing cooperation bodies to better involve consumers in the decision-making process.

Policy Target Groups and Their Attitude

This project is different from other projects insofar that it does not recommend measures that directly alter the behavior of specific policy target groups. Rather, its measures target the political system as such in order to increase the political weight of consumers. In the next section, we therefore outline the concrete political implications resulting from the project's recommendations.

Suggested Policy Adoptions

To empower consumers, the federal authorities could consider a number of measures. First, they could provide consumer organizations that advocate sustainable food production with financial means to empower them and to allow them to intensify their political engagement. Second, we recommend to improve the framework conditions for political participation as suggested by the researchers. For one, the federal authorities, especially the FOJ, could take up the researchers' propositions concerning the right of appeal and the right to file class actions to consumer protection organizations in the revision process of the *Civil Procedure Code* (ZPO) that is currently under way. Third, various policy adaptations could be considered to involve consumer organizations in food policy tasks such as food inspection, with the effect that they could more directly influence policy implementation. As for facilitating direct political action, the federal authorities could push towards the improvement and standardization of food labels that display environmental impact information. If barriers to trade can be avoided, such labels could become mandatory – either through voluntary self-commitments or by law – prompting all food producers and retailer to apply them. Such labels would serve as information for consumers to base their food choices on more and better information.

[154] Source: https://www.bafu.admin.ch/bafu/de/home/themen/recht/fachinformationen/verbandsbeschwerderecht.html. Accessed on November 12, 2018.

4.2.4.2 Food Losses (Dr. Gabriele Mack, Dr. Andreas Keiser, Prof. Dr. Michael Siegrist)

Political Problem and Policy Implications

Potato crops suffer from one of the highest loss rates along the food chain. About 50% of the Swiss potatoes are not eaten by consumers. Instead, they get lost during harvesting, processing, trading and in households. The food losses that emerge in households are the least sustainable as consumers usually dispose of spoilt potatoes instead of using them in other ways. On the one hand, potato food losses result in financial losses along the whole processing chain. On the other hand, they have a negative environmental impact, straining the environment more than necessary. Researchers from Agroscope, the Bern University of Applied Sciences and the ETH Zurich analyzed what measures could be taken in order to reduce potato food losses and make the whole potato processing chain more sustainable. To reduce food losses on potato farms, they recommend to loosen quality standards that solely concern aesthetic criteria. Open sales of fresh potatoes and improved packaging modalities could also help consumers to reduce their potato food losses.

Policy Target Groups and Their Attitude

As potato food losses emerge along the whole processing chain, a number of policy target groups with different interests are affected. The first potential policy target groups are *farmers*. Generally, they want to sell as many of their potatoes as possible to a good price. Potatoes sold as food generally obtain higher returns than potatoes used as animal feed. Farmers are thus principally in favor of measures that ensure that they can sell a larger proportion of their potato crops as food. However, they also profit from potato food losses in the latter stages of the food chain, as they tend to create a greater demand.

Retailers form a second policy target group. They want to sell their potatoes at a competitive price. They are rather reluctant to sell unwashed or unaesthetic potatoes because they expect their costumers to refrain from buying those potatoes.

Lastly, *consumers* are a third policy target group. Generally, consumers want to buy high-quality potatoes at an attractive price. According to the researchers, aesthetic criteria play a negligible role for consumers when purchasing potatoes. Principally, consumers suffer economic losses if they buy too many potatoes and have to dispose of the spoilt ones. Taken together, we expect consumers' preferences and eating habits to have a strong impact on overall potato food losses because changes in demand are very likely to result in behavioral changes along the food chain.

Suggested Policy Adoptions

Policies should target various points along the food chain to limit food losses. To minimize potato food losses in households, we recommend employing a mix of measures: First of all, it is crucial that consumers know how to store potatoes correctly. Information on how to do that is already provided on different information platforms (e.g. by Swisspatat[155], foodwaste.ch[156]). However, the FSVO/FOAG could distribute this information even more via an information campaign (sermon). The FSVO/FOAG may also use those informational means to persuade critical consumers that non-aesthetical potatoes are perfectly edible. At the same time, the FSVO could prompt retailers through voluntary self-commitments to improve the purchase modalities of potatoes in order to enable consumers to store their potatoes more sustainably. Sustainable purchase modalities include the sale of unwashed potatoes instead of washed ones, more open sales of potatoes, different kinds of package sizes, and

[155] Souce: Swisspatat. Die Heimlagerung. https://www.kartoffel.ch/schulen/zyklus-1/kartoffelkunde/die-heimlagerung/?L=2. Accessed on February 25, 2019.

[156] Source: Foodwaste.ch. Kartoffeln. http://foodwaste.ch/tipps/gemuse/kartoffeln/. Accessed on February 25, 2019.

replacing plastic bag packaging through lightproof cardboard box packaging. The FSVO/FOAG may also encourage voluntary-self commitments among retailers to start selling non-aesthetical potatoes as well, as Coop already does under the label "Ünique"[157]. If all these rather unobtrusive measures do not yield satisfying results, the FOAG may start giving label or financial incentives to retailers for changing their purchase modalities and for selling non-aesthetical potatoes (carrots). Last but not least, the FSVO/FOAG may prompt Swisspatat and retailers to revise and relax their potato quality standards that exclusively focus on aesthetic criteria. The revision of these quality standards would enable farmers to sell a larger share of their potatoes and hence result in a reduction of food losses at the farm level.

Table 4.19 Suggested policy adaptations for the "Food losses" project

Target Groups	Sermons	Carrots	Sticks
Retailers	FSVO may encourage voluntary self-commitments by retailers to sell misshapen potatoes and to introduce new purchase modalities	FSVO/FOAG may give retailers incentives to sell non-aesthetical potatoes as well FSVO/FOAG may give retailers incentives to improve their potato purchasing modalities (open sales, unwashed potatoes) and packaging (lightproof cardboard box instead of plastic bags)	FSVO/FOAG may prompt Swisspatat/retailers to revise/relax potato quality standards that exclusively concern aesthetic criteria.
Consumers	FSVO may raise awareness among consumers via information delivery vehicles regarding proper storage of potatoes FSVO may raise awareness among consumers that potatoes take on many shapes and sizes	/	/

4.2.4.3 Social Inequality (Dr. Pedro Marques-Vidal, Prof. Dr. Murielle Bochud, Dr. Idris Guessous)

Political Problem and Policy Implications

Many Swiss citizens do not always follow the official nutritional recommendations contained in the Swiss food pyramid (issued by the SGE and FSVO). This results in an unbalanced diet. Unbalanced dietary practices can lead to obesity and associated chronical diseases. Researchers from the University of Lausanne and the University Hospital of Geneva investigated eating habits in Western Switzerland among different social strata. They identified five key reasons why people do not eat healthily: price, daily habits and constraints, fondness of good

[157] Source: Coop Ünique. https://www.coop.ch/de/labels/uenique.html. Accessed on February 25, 2019.

food, time constraints and lack of willpower. For people with low income, the higher prices of healthy food compared to unhealthy food are an important reason for why many of them eat unhealthily. For consumers with higher income, daily habits as well as a lack of time and willpower are more important. The researchers suggest extensive measures to encourage people from all social strata to pursue a healthier diet. They recommend reducing the price of healthy foods such as fruits and vegetables to overcome price-related barriers to healthier eating and to instead increase taxes on unhealthy foods. To fight daily habits and time constraints that can lead to an unbalanced diet, the researchers suggest promoting healthy ready-to-eat meals. According to the researchers, the lack of willpower could also be addressed by creating environments that are conducive to eating healthily. Banning advertisements for unhealthy foods could target the fondness of food barriers.

Policy target groups and their attitude

As the recommendations concern different areas of society, a multitude of actors are potential targets for policy interventions. When it comes to healthy and unhealthy food products, we consider *producers* and *retailers* the main policy target group. We expect producers and retailers to be mainly profit-oriented. Therefore, they should have only a weak interest in reducing the costs of healthy products in order to make them more attractive for consumers.

Another policy target group consists of *canteens* and *employers*, which considerably shape their costumers' and employees' eating environment. We expect canteens to not be principally against promoting healthier meals and creating environments that encourage consumers to eat more healthily. We expect employers to have an even stronger interest in promoting healthier eating habits among their employees.

Consumers are also considered an important policy target group as they often refrain from eating more healthily due to the various reasons described above. Once these different barriers are addressed effectively, we expect consumers to take up a more balanced diet.

Suggested policy adaptations

The action plan of the Swiss nutrition strategy already contains some informational and incentive-based measures (sermons and carrots) to support a healthy diet in different ways. [158] The main focus of these measures is on voluntary self-commitments of producers and retailers. A number of food producers and retailers have already voluntarily reduced the sugar-content of some of their products (see Work package I, "Declaration of Milan"[159]) or dispensed with commercials for unhealthy food for children (see Work package I, "Swiss Pledge"[160]). However, as we expect the attitudes of the producers, retailers as well as canteens to still be rather unfavorable, we recommend that federal authorities additionally employs more constraining and far-reaching instruments (carrots and sticks). Namely, the FDHA could start subsidizing specific healthy food products, especially fruits and vegetables. On the one hand, this would provide an incentive to producers and retailers to increase their fruit and vegetable supply. On the other hand, the lower price of healthy food products could remove the price-related barrier keeping consumers with low income from buying fruits and vegetables. At the same time, the FDHA may consider to stop subsidizing unhealthy food products such as sugar. As a result, the prices of some unhealthy foods in stores would rise, discouraging consumers to buy them. If those measures prove insufficient, even more constraining policy instruments could be adopted. Federal authorities could (re-)consider the

[158] Source: Geniessen und gesund bleiben. Aktionsplan der Schweizer Ernährungsstrategie 2017-2024. https://www.blv.admin.ch/dam/blv/de/dokumente/lebensmittel-und-ernaehrung/ernaehrung/aktionsplan-ernaehrungstrategie.pdf.download.pdf/Aktionsplan_DE.pdf Accessed on February 25, 2019.

[159] Source: Memorandum of Understanding. https://www.blv.admin.ch/dam/blv/de/dokumente/lebensmittel-und-ernaehrung/ernaehrung/erklaerung-mailand.pdf.download.pdf/memorandum-of-understanding.pdf Accessed on February 25, 2019.

[160] Source: Swiss Pledge Selbstverpflichtung: Für ein verantwortungsvolles an Kinder gerichtetes Werbeverhalten. http://swiss-pledge.ch/ Accessed on February 25, 2019.

introduction of a tax on food products that contain a certain amount of sugar and/or fat (carrot).[161] The money generated by this tax could be used to subsidize healthy food products, rendering the expenses stemming from the subsidies on these products more cost-neutral. Some European countries like the UK and France have already introduced a tax on sugary drinks. This tax decreased the consumption of sugary drinks. At the same time, it prompted the soft drink industry to reduce the sugar content of their drinks. Other constraining measures the federal authorities could consider are the ban of commercials for unhealthy food targeting children and the introduction of compulsory maximum levels of sugar and/or fat in food products (sticks).

As for measures tackling the lack of willpower and time constraints by consumers, we suggest that there are potential synergies with the projects "Health motivators" and "Salt consumption". From these projects, several policy suggestions could be derived that aim to create environments that are conducive to eating more healthily. These measures could help to tackle the lack of willpower by consumers. Taken together, these policy recommendations would fit well into the overall goal of the Swiss Nutrition Strategy[162].

Table 4.20 Suggested policy adaptations for the "Social inequality" project

Target Groups	Sermons	Carrots	Sticks
Producers	/	FDHA/FOAG may stop subsidizing unhealthy food products such as sugar	FDHA/FSVO may ban commercials for unhealthy food targeted at children
Retailers			
		FDHA/FOAG may subsidize specific healthy food products (fruits and vegetables)	FDHA may define maximum levels of sugar and/or fat in food products
		Federal Parliament may consider introducing a sugar and/or fat tax on processed foods	
Consumers	/	Federal Parliament may consider introducing a sugar and/or fat tax on processed foods	

4.2.4.4 Sustainable Agri-food Systems (Dr. Birgit Kopainsky, Dr. Rolf Frischknecht, Dr. Heinz Rütter)

Political Problem and Policy Implications

About one third of all environmental impacts in Switzerland are caused by its food system. Climate change and demographic developments pose a challenge to the Swiss food system. In their project "Sustainable agri-food systems", researchers from Flury & Giuliani GmbH, treeze Ltd., and Rütter+Partner used different environmental-economic models to describe and analyze the Swiss food system. The researchers simulated

[161] Source: Standesinitiative Kanton Neuenburg „Für ein Bundesgesetz über zuckerhaltige Produkte und für einen beschränkten Zugang zu Nahrungsmitteln mit hohem Energiegehalt". https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20170308 Accessed on February 25, 2019.

[162] Source: Schweizer Ernährungsstrategie 2017–2024. https://www.blv.admin.ch/blv/de/home/das-blv/strategien/schweizer-ernaehrungsstrategie.html. Accessed on February 25, 2019.

different possible trends for the next 30 years and investigated how susceptible the food system is to drastic falls in domestic harvests, high oil and energy prices and so forth. They also modelled the consequences of possible modifications of the current food system. Based on their results, the researchers recommend employing an integrated perspective when adopting strategies to improve the food system's sustainability. These strategies should take into account both the ecological as well as the economic dimension. The researchers suggest considering all areas of the food system (production, processing, distribution, consumption) and coordinating measures between them when adopting new policy interventions. In their subsequent NRP 69 research project "Recommendations for sustainable and healthy diets", the researchers intend to develop concrete recommendations for actors in the Swiss food system on how to make nutrition healthier and more sustainable in Switzerland.

Policy Target Groups and Their Attitude

The recommendations stemming from this project give overall strategic guidance to policy-makers on how to "design" a sustainable food system instead of addressing policy targets directly. This is of particular relevance to the FOAG and FSVO, the main actors concerned with the sustainability of the food system. With its overarching Sustainable Development Strategy[163], the FOSD is the center of competence and coordinating unit when it comes to sustainable development in general. The FOSD, as well as other federal offices, take into account the sustainability aspect of their policy interventions to a certain degree by using different regulatory assessment instruments (especially regulatory impact assessments[164] and sustainability assessments[165]).

Suggested Policy Adoptions

As the subsequent NRP 69 project intends to develop more concrete recommendations on how to make nutrition healthier and more sustainable, we confine ourselves to making general suggestions concerning the above-described regulatory assessment instruments. Specifically, the federal offices could consider to integrate the environmental-economic models developed in the "Sustainable agri-food systems" project into their regulatory practices to better assess the consequences of policy interventions. If the federal offices want to take it a step further, they could develop inter-office assessment instruments that incorporate the models of the research project to design more coherent policies and increase coordination between offices along the food chain.

When it comes to concrete measures promoting a sustainable food system, we suggest that measures concerning one aspect of the food chain should be assessed from the viewpoint of the whole food chain as well. Closer cooperation and coordination between the different federal offices might hence be needed. Only coordinated policy mixes that include both environmental as well as economic aspects can be expected to improve the sustainability of the food system in the long run.

[163] Souce: Strategie Nachhaltige Entwicklung 2016-2019. https://www.are.admin.ch/are/de/home/nachhaltige-entwicklung/politik-und-strategie/strategie-nachhaltige-entwicklung-2016-2019.html. Accessed on February 25, 2019.

[164] Source: Regulierungsfolgenabschätzung (RFA).

[165] Source: Nachhaltigkeitsbeurteilung (NHB).

4.3 Conclusion

The 22 projects analyzed in this part of the report yield a great variety of potential policy adaptations to various parts of the food system. While some projects allow for the development of very concrete policy recommendations, other projects need to be followed by further research before concrete recommendations for policy target groups can be derived.

The analysis and comparison of the results and recommendations of the 22 projects reveals three different roles for federal authorities when it comes to the scientifically informed adaptation of the food system. A first group of projects yields concrete recommendations from which policy adaptations are relatively straightforward to derive, and to which policy targets are favorable or at least not categorically opposed. Several projects in this group have already found their way into public or private regulations because policy target groups have an interest in them. With regard to these projects, we see federal authorities primarily as *enablers* or *encouragers*. They do not need to implement policy against opposition from target groups, but can concentrate on getting obstacles out of the way of private actors by creating adequate (legal) framework conditions, facilitating dialogue among involved actors, and making sure that all stakeholders are adequately informed about scientific recommendations and policy adaptations.

The second group of projects yields concrete results that should be transformed into policy adaptations but confront policy target groups that exhibit a negative attitude towards the latter. These projects require federal authorities to function as *active drivers of implementation*. To make sure that scientific findings result in the adaptation of food policy, federal authorities need to take the lead and work with more intrusive instruments that can bring policy target groups to adopt a project's recommendations even though they are generally opposed to them or currently do not yet see their benefits.

Table 4.21 Roles of the federal authorities

Federal authorities as…		
… enablers/encouragers	**… active drivers of implementation**	**… forward lookers**
Cow emissions	Trace metals	Safe cereals
Healthy pigs	Nano-preservation	Sustainable milk production
Organic food baskets	Preservative bacteria	Staphylococci
Functional food	Health motivators	Dietary fiber
Preventing obesity	Salt consumption	Foodball
Vitamin D	Food losses	Iron and zinc
Citizen consumer	Social inequality	Mirdiet
Sustainable agri-food systems		

The third group of projects requires federal authorities to adopt a long-sighted role. Several of the projects of NRP 69 do not exhibit an applied character, meaning that their findings do not (yet) result in concrete policy suggestions, but need to be followed by further research before becoming relevant for policy-makers. However, these projects contain findings that might have important policy consequences at a later point in time. In these cases, federal authorities should primarily act as *forward lookers*, pointing the way to both researchers and

policy target groups and encouraging research and investments where policy target groups are primarily concerned with their immediate situation or concrete recommendations are not yet available. Table 4.21 divides the research projects of NRP 69 according to the primary role federal authorities play in their valorization.

Of course, these roles are neither mutually exclusive nor jointly comprehensive. Instead, they should be read as accentuations of federal authorities' primary task(s) with regard to a particular research frontier or policy problem in the coming years. Research and policy developments are very likely to lead the federal authorities to adopt changing roles over time. Nevertheless, Table 4.21 provides a synoptic overview of the different roles that federal authorities need to adopt and balance in order to facilitate the transformation towards a more sustainable food system.

5 Summary

This report examines the characteristics of the various policy fields that make up the Swiss food policy landscape and proposes specific solutions for incorporating NRP 69 recommendations into this landscape. Policies must be considered in the formulation of viable recommendations as they are vehicles to change the behavior of stakeholders in ways that will lead to a more sustainable and beneficial food system. Matching results and recommendations from NRP 69 with relevant policies thus is a precondition for the successful, scientifically-informed adaptation of the food system.

Work package I reveals the considerable complexity of the Swiss food policy landscape. A multitude of policies can be identified along the food chain in the three policy fields of agriculture, food safety, and public health. The identified policies pursue a number of goals, address different policy targets, and involve a multitude of public and private actors in implementation. The three policy fields contain a diverse range of policy instruments supposed to reach the goals pursued in the respective fields. For each field, we could identify a distinct instrument pattern. While agricultural policy primarily works with regulations ('sticks') and incentives ('carrots') to reach its goals, food safety policy addresses policy targets predominantly by means of strict regulations ('sticks'). In stark contrast, public health policy mainly relies on informational instruments ('sermons') to reach its goals.

Work package II provides an analysis of policy coherence within and between agricultural policy, food safety policy, and public health policy. The analysis reveals that the Swiss policies of food safety and public health tend to be designed coherently in light of the objectives that they should attain. The Swiss agricultural policies have lower levels of overall coherence. We identified potential tensions in three main areas that policy-makers should bear in mind when adapting the Swiss policy landscape. First, Switzerland needs to manage a challenging trade-off in its relationship to the EU. On the one hand, Switzerland confronts the need to compete in the European single market. On the other hand, Swiss policies protect domestic producers, consumers, and the environment. Given Switzerland's generally high market-correcting standards especially compared to the EU, incoherencies with the single market are unavoidable and may prompt continuous policy adjustments. Second, similar tensions exist at the national level. Especially in the field of agriculture, Swiss policies must strike a balance between several, oftentimes competing objectives. Policies intended to secure food safety, enhance market liberalization, or protect the environment automatically produce tensions that need to be balanced out carefully. Finally, the three policy fields of agriculture, food safety, and public health involve—although to different degree—a considerable number of private actors that contribute to the design and implementation of policies. In fact, policy objectives cannot be achieved without significant cooperation of non-state actors. This cooperation imperative can create tensions that need to be constantly supervised by Swiss policy-makers. The insights about coherence created in this part of the report help in formulating policy suggestions that do not produce incoherencies or contractions between existing policies.

Work package III yields a great variety of potential policy adaptations to various parts of the food system. While some projects allow for the development of very concrete policy recommendations, other projects need to be followed by further research before concrete recommendations for policy target groups can be derived. This produces different situations for policy-makers. Accordingly, we suggest policy-makers, especially federal authorities, to flexibly adopt one of three roles with regard to the 22 research projects contained in NRP 69.

> Policy-makers should primarily act as *enablers* or *encouragers* with regard to scientific projects that yield concrete recommendations from which policy adaptations are relatively straightforward to derive, and towards which policy targets are favorable or at least not categorically opposed. In these situations, policy-makers do not need to implement policy against opposition from target groups, but can concentrate on getting obstacles out of the way of private actors by creating adequate (legal) framework conditions,

facilitating dialogue among involved actors, and making sure that all stakeholders are adequately informed about scientific recommendations and policy adaptations.

Policy-makers should primarily act as *active drivers of implementation* with regard to scientific projects that suggest concrete policy adaptations but confront policy target groups that exhibit a negative attitude towards these adaptations. To make sure that scientific findings result in the adaptation of food policy, policy-makers need to take the lead and work with more intrusive instruments that can bring policy target groups to adopt a project's recommendations even though they are (currently) opposed to them.

Policy-makers should primarily act as *forward lookers* with regard to scientific projects whose findings do not yet result in concrete policy suggestions but may result in important policy consequences at a later point in time. In these cases, policy-makers should point the way to both researchers and policy target groups and encourage research and investments where policy target groups are primarily concerned with their immediate situation or concrete recommendations are not yet available.

Overall, this report demonstrates the demanding task of improving the food system and making food production more sustainable. Policy-makers should consider two preconditions for succeeding in this task: the flexible adoption of specific roles in response to different research situations, and the coordination of scientifically-informed policy adaptations with a complex policy landscape.

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